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The Erosion of Apprenticeship Training in South Africa's Metal and Engineering Industry

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Obviously protocol dictates that the usual disclaimer applies that all the above are absolved from any responsibility or adverse repercussions this work might generate and that I alone should stand up and take account for what I have done.

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ABSTRACT

This thesis explores the decline and transmutation of the apprenticeship system in South Africa, specifically as it occurred in the metal and engineering industry. It proceeds to analyse the most basic and influential imperatives which have driven this process. On the side of capital, these imperatives were the inexorable motive for a profit driven industrial organisation and on the side of organised labour, the imperatives to protect skills, jobs and wages. The existence of the one set of imperatives presupposed the need to redefine the existence of the other set. These contradictory imperatives have shaped the trajectory of the apprenticeship system in South Africa. They were contradictory because the one was an impediment on the untrammelled extension of the other. However, as the imperative of profit maximisation gradually became the predominant consideration in the relationship, it began to exert greater pressure on the character of the apprenticeship system. Within the apprenticeship training system, the imperative of profit maximization prioritised price calculation as the dominant consideration by which decisions and trajectories were chartered.

Since the state mediated the relationship between the various economic interests in society, its interventions merely curtailed a more rapid consolidation of the effects of a profit driven industrial organisational imperative, within the apprenticeship training system. The triumph of the profit maximization imperative, systematically eroded the system of apprenticeship training in the metal and engineering industry of South Africa. An institutional inertia within the South African state resulted in the manifestation of erosive effects within institutions of the state empowered with governing and managing human resources development. This institutional inertia within the state was an accompaniment to the broader erosion of the apprenticeship training system at the workplace.

INTRODUCTION

I.i The Thesis

This thesis explores the evidence and processes which have led to the decline and transmutation of the apprenticeship system in South Africa. Why has the apprenticeship system in South Africa, as an institution, declined so dramatically over a period of about fifty years? Why have the skills of artisans which were once venerated by every enterprising industrialist no longer regarded with the same significance? This thesis tries to shed some light on these questions by analysing the forces at the workplace and at a broader institutional level which have contributed in major ways to the erosion of apprenticeship training, specifically as experienced in the metal and engineering trades.

The central argument of this thesis is the following:

> A contest over the price of skilled labour between employers (buyers) and artisans (sellers) encouraged employers to undermine the monopoly which skilled artisans were perceived to hold over the supply of skilled labour. Employers therefore began to break this monopoly. Employers did so by reorganising the nature of work and undermining skilled occupations through job fragmentation and skills dilution. A system of industrial training was systematically eroded in order to reduce the price of skilled labour. This contest was fought over an extended period of time. It occurred in Britain under distinct circumstances. It has occurred in South Africa as well. In South Africa, racial divisions within the labour force have tended to cloud the issues which are almost exactly the same as in Britain. Not all countries have witnessed the same trajectory. These tensions have not destroyed the apprenticeship system in Nigeria or Germany. In Nigeria the masters dictate and determine the price of artisan labour. The antagonism between masters and artisans over the price of skilled labour has not reached the point where there is overt conflict between masters and artisans. In Germany, state intervention and regulation of apprenticeship training has prevented potential antagonisms between employers and skilled workers from undermining the apprenticeship system.

Two perspectives have influenced the way the study has been undertaken. The first relates to the international literature on industrial training and apprenticeship systems generally, which have served as a lense from which the broader debates on industrial training in South Africa have been interpreted. The international literature has also served as a beacon from which to signal issues which would probably arise later and become contentious in South Africa. One instance of this has been the gradual and systematic substitution of firm-based training, particularly in Britain, by institutional training (training performed at technical institutions and government training centres). The volume of attention given in the international literature to these issues has also enabled one to situate debates which appear peripheral in South Africa, within a broader context.

The second perspective situates the study within a conceptual framework which addresses the evolution of skills within particular historical conjuntures. The entire analysis of the evolution of skills cannot be conceptualised without considering the central question of changes in the price and costs of categories of skill within the general category of labour. It was mainly for this reason that Marxist analyses of the labour process were consulted, but alas, with the exception of Clawson (1980) and Haydu (1988), these [More (1982); Penn (1985) and Rule (1987)] proved to be of little use. Braverman (1974), in particular, proved to be deficient in conceptualising the evolution of skills in relation to changes in the price and costs of categories of skilled labour. By contrast, this issue is strongly alluded to in much of the literature on the economic history of capitalist industrial organisation. To overcome this problem, I was compelled to resort to some conceptual readaptation ['mirror-reading'] of Marx (1976), extending his conception of socially necessary labour to a concept I have found useful for this thesis, namely, that of 'technically essential skills'. Technically essential skills can be defined as the skills technically necessary to engage in particular forms of production under competitive price conditions. The concept is somewhat fluid, but is given precision and meaning in the contestation between the buyers and the sellers of labour skills.

This thesis examines the erosion of the apprenticeship system in the metal and engineering industry of South Africa. An attempt is made to understand the reasons for this process. The thesis explores this question from the consolidation of apprenticeship training in the 1920s to

its gradual and systematic erosion, particularly in the way it manifested itself from the 1960s to the 1980s.

Chapter one gives an overview of the political economy of apprenticeship training. It does this by drawing on the distinct legacies of apprenticeship training in three countries and shows how these provide models from which to understand the evolution of apprenticeship training in South Africa. Chapter two extends the discussion of apprenticeship training developed in chapter one by analysing broad themes in the history of apprenticeship training in South Africa. In particular chapter two demarcates the forces that led to the erosion of apprenticeship training in South Africa. Chapter three provides substantial empirical evidence on the changes in the structure of artisan and apprentice employment in the metal and engineering industry of South Africa between 1969 and 1992. It shows empirically the extent of the erosion of apprenticeship training. Chapter four explores the extent to which trade test results are an indicator of the erosion of apprenticeship training. Finally chapter five shows how many individuals with the potential for pursuing craft occupations, are excluded from apprenticeship training programmes because they do not meet the basic educational entry requirements. The chapter also advances tentative suggestions on how the apprenticeship system can be strengthened.

This thesis does not discuss the effects of the introduction of modular training for apprentices. The reason for not doing so, is that modularised training of apprentices is only a recent phenomenon. Therefore the evidence to assess the success of modalarised training of apprentices is still in the making.

Lii Aim of the Study

The motivation to undertake this study was shaped by a quest to explain why the ratio of artisans to semi-skilled employees in the manufacturing sector was increasing during the period of the 'eighties, i.e. why semi-skilled employment was growing at a faster rate than artisan employment.. These changes were much more evident and pronounced in the metal, engineering and allied trades. I could not understand why in the context of the much publicised 'skills shortage' debate (see Chapter 2), artisans, as guardians and purveyors of

specific workplace skills, did not play a more dominant numerical role in manufacturing employment.

From census statistics on labour, I could not understand why the numbers of artisans in a host of manufacturing industries had hardly increased between the late 1960s and the early 1980s. Moreover, I became aware of a trend which showed a gradual decline in the statutory wage gap that separated artisans from labourers. An ongoing curiosity was to know why these trends became so marked and visible at the beginning of the 1990s. Since the majority of artisans were drawn from a juridically privileged, protected and cacooned background, it seemed contradictory that the phenomenal trend in South Africa of a gradual decline in the statutory wage gap between labourers (black workers) and artisans (mainly white workers) could be possible at all. An explanation for these trends however could not be advanced only through an empirical analysis of phenomenal trends: there had to be deeper underlying forces in operation to explain this process and these could only be understood by studying the apprenticeship system in South Africa much more closely.

Therefore, the thesis sets out to analyse the structural forces which have led to a shrinkage in traditional artisan employment and training. The structural forces identified are manifest at both a micro level (factory organisation) and a macro level (industries and training institutions).

I.iii Theoretical Framework

Three closely linked theoretical currents have influenced the conception of the issues elaborated in this study. The first of these draws on the literature of the sociology of work, particularly that done under the influence of Braverman (1974) which shows how the growth of large scale industrial enterprises under contemporary capitalism led to a shift in the nature and content of manual and clerical work.

The second current draws on research undertaken by economists concerned with the economic evolution of institutions, particularly institutions responsible for fostering human resource development. Gertrude Williams (1963) and Kate Liepmann (1960) have been prominent within this area, but so too are: Casey (1986), Harbison (1973), Prais (1981 and 1995),

Metcalf (1985) and the HSRC/NTB (1985). A central concern with this group of writers is to determine which set of human resources policies is most beneficial nationally and internationally for a particular economy or society.

The third current in particular is strongly influenced by studies undertaken on the economic history of industrial training and is concerned to show why particular training policies have generally been more influential at different historical junctures and why one set of training policies has been superceded by another. Studies which can be classified within this current include: Day (1980), Hall and Miller (1975) and Sheldrake and Vickerstaff (1987).

I.iv Methodology

The methodology used to assemble the bulk of evidence on which this thesis is based has been through an historical materialist analysis of literature sources. My understanding of historical materialism is informed by Marx's analysis of exploitation as elaborated in his book *Capital*. Marx analyses the components and changes in the techniques of exploitation from one regime of industrial organisation (manufacture) to another (machinofacture). This technique informs the way I explore the decline and transmutation of apprenticeship training in South Africa. Emphasis has been placed on obtaining quantifiable evidence to sustain this perspective. It has included:

- Secondary sources of academic and non-academic literature;
- Official government publications, which have included commissions, reports and gazettes;
- Newspaper sources.

The disparate nature of the evidence necessitated wide reading and careful synthesis. Because of the general dearth of academic studies of apprenticeship training in South Africa, it was necessary for me to become familiar with ancillary sources, such as those on human resource development and industrial training, in order to gain a broader conception of the role of artisan and industrial training generally. In addition to secondary sources, I have also drawn on conversations and discussions with friends in the trade union movement and with artisans to whom I was introduced or met during the course of this study.

CHAPTER ONE: MODELS OF APPRENTICESHIP TRAINING

1.1 Introduction

This chapter analyses changes in the system of apprenticeship training in Britain, Germany and Nigeria with the objective of helping us understand the changes in the system of apprenticeship training in South Africa.

The form and organisation of apprenticeship training which emerged in South Africa bore a very close resemblance to the system of apprenticeship training which had developed up to the nineteenth century in Britain. Although the state in 16th century England had played a significant role in passing laws regulating apprentice indentureships and granting craft monopolies to particular craft guilds, it also divested itself from the task of regulating apprenticeship training. This was a prerogative which the masters exercised, particularly those who had established their reputations as craftsmen. The state's role in the evolution of the apprenticeship system was not entirely absent however. Power and decision-making was merely decentralised and under the control of craft institutions.

As in South Africa, the apprenticeship system was introduced to Nigeria via the process of British colonial rule. In Nigeria however, the state's role in regulating apprenticeship training before and after independence was almost completely absent. Although the path of the evolution of apprenticeship training in Britain and Nigeria signifies that there are no general trajectories which the evolution of apprenticeship systems necessarily mirror, the fact that this evolution occurred under the hegemony of craft institutions, however disparate, indicates the operation of an apprenticeship system under a weak form of state organisation in Nigeria. Similar features were present in the United Kingdom and in South Africa, particularly while there was minimal state intervention in the regulation of apprenticeship training. But even in Nigeria, as Mabawonku (1979) and Oyeneye (1980) show, the provision of institutional training (training in training colleges and government training centres) as an alternative to firm based (workplace based) apprenticeship indenture has also begun to take place. This signifies that the state in Nigeria is beginning to play a more active role in the promotion and regulation of apprenticeship training. Apprentices in the informal small scale enterprise sector of Nigeria

are largely drawn from the poorer sector of society. It would be interesting for later studies to observe what effect the growth of institutional based training (which is characterised by greater state intervention in this sphere) will have on the process of selection.

In Germany on the other hand, the strong institutionalisation of the apprenticeship system after the Second World War and the instrumental role of the state in maintaining it as well as broadening it to serve as a pivotal instrument in vocational education and training has imbued the apprenticeship system with more fundamental strengths than in either Nigeria or the United Kingdom. In Germany, apprenticeship training is not merely a passive agent of the market but central to state vocational education policy and is designed to accommodate a large segment of new job entrants in the labour market. In Germany, the apprenticeship system operates in unison with technical institutions of learning and not in opposition as appears to be the case in the United Kingdom.

1.2 Contextual and Conceptual Background

1.2.1 Industrial Training: International Evidence

Industrial efficiency and productivity within manufacturing economies is largely dependent on the level of the technical and vocational training which is available to the workforce (Prais, 1981). This applies particularly to precision industries such as the metal and engineering industry. The availability of technical and vocational instruction to the labour force partly explains why manufacturing economies such as that of Germany have been comparatively more successful. But the German system of technical and vocational education and skill training would not have been as successful had it not targeted a wide segment of the labour force or potential labour force. This was clearly recognised as early as 1899 by the *Bulletin de l'enseignement*. When comparing the French system of technical education with that of the German, the publication acknowledged aptly that 'German superiority does not lie at the level of higher technical education but at the level of working class instruction' (*Bulletin de l'enseignement technique* 2 (3 June 1899), cited in Day, 1980: 151). More recently,

comparisons with Britain continue to suggest that economies with a better trained work-force are relatively more successful (Labour Research Department, 1988: 4).[1]

A significant part of the technological advantage gained by the German industrial economy over competing economies is due to the high priority given to technical education and industrial training there. The existence of a comprehensive system of apprenticeship in Germany enables individuals to serve apprenticeships in numerous fields in the artisan trades as well as in industry and commerce (Williams, 1963: 22). 'Vocational training in Germany is treated as the natural sequel to schooling ...[and]...is legally obligatory for three years for all 15-18 year olds not otherwise in full-time education' (Prais, 1981: 30). Consequently, under one-tenth of new job entrants who directly take up full employment in the labour market after compulsory schooling, do so as unskilled labour (Prais, 1981: 31).

This is in sharp contrast to the situation in Britain, or in countries such as South Africa which have been influenced through their strong colonial ties with Britain. Here, much more emphasis is placed on successfully completing a primary and secondary education. School leaving certificates which have a strong academic orientation are generally regarded as a precondition for eventual employment. A large number of individuals entering the labour market after successfully proceeding through this process inevitably do so without having acquired the employable skills demanded by employers. Hence they would still be in need of further training after completing twelve years of schooling. Indeed, those who leave school before matriculating and are unable to secure an apprenticeship would almost inevitably remain unskilled or at best semi-skilled workers. Profiles of job seekers in the labour market show that this is indeed the case in South Africa (See Chapter 5). The inability of many school leavers to secure an apprenticeship position may be difficult to resolve without coming into conflict with deeply embedded conventions and entrenched modes of organisation. Mortimer has described a similar situation in the United Kingdom in the following terms:

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[1] Furthermore, the Labour Research Department notes that recent studies show that the proportion of workers in engineering and metal working with vocational qualifications was 50% higher in France than in the UK' (Labour Research Department, 1988: 4).

'...it is necessary to emphasize that public discussion on education and training for young persons tends to be focused disproportionately on the education and training of the minority who study for O and A levels of the General Certificate of Education and who apply for entrance to universities, teacher training colleges, and other higher educational institutions. This is probably inevitable when those who figure most prominently in public discussion are themselves usually the products of the higher educational system and are the parents or grandparents of youngsters who are candidates for or participants in the new system. They are, nevertheless a minority' (Mortimer, 1971: 58).

An apprenticeship system, more so one that includes but also extends beyond the traditional artisan trades, would nonetheless enable individuals who do not complete formal academic schooling to pursue their education along technical and vocational lines. This would enable them to acquire a trade or learn a profession in areas of the economy where a demand for particular skills exists. As they can do so while earning an income, the problem of financing non-income generating activities is minimised.

1.2.2 The Skills Question

The apprenticeship system, generally, but in manual occupations, in particular, has historically been characterised by the standardisation of reciprocal obligations which developed between masters and apprentices. The masters had an obligation to train their apprentices. The apprentices had an obligation to learn from and obey their masters. Masters possessed a monopoly and control over the right to exercise particular skills and knowledge at the place of work. In order to acquire the right to exercise these requisite craft skills and technical knowledge, apprentices were required to submit obediently to the obligations of their masters over a specified period of indenture. Doing so successfully armed the apprentice with the licence to be associated and become part of a fraternity of tradesmen who developed common objectives to regulate and control access to particular skilled occupations. Indeed, in the absence of other legal and juridical regulatory mechanisms, the apprenticeship system ably served this function. (Similar points were raised by Rule (1987: 102) as well as Liepmann (1960: 14)).

The history of changes in apprenticeship training cannot be divorced from the general history of the changing labour process, from craft orientated towards fordist modes of factory organisation, particularly during the early part of the twentieth century. Usually, it was in defence of institutions such as the apprenticeship system that large segments of skilled workers resisted the onset of automated mass production assembly lines under fordist modes of factory organisation. These struggles at the workplace, as Braverman (1974), Clawson (1980) and Liepmann (1960) earlier showed for the United States and Britain, were contested around the definition of skill and its remuneration. Job tasks were changed through the fragmentation and dilution of skills. The fragmentation of job tasks was in the form of a division, distribution or compartmentalisation of job tasks and was normally introduced to enhance efficiency in production. Job fragmentation is an extension of Adam Smith's famous discussion of the benefits of the division of labour. Job dilution on the other hand refers to the simplification and standardisation of job tasks. Job dilution eliminates traditional and outmoded ways of undertaking a task. Job fragmentation is an abrupt and direct change or division of job tasks. Job dilution rids job tasks of inefficient and unnecessary operations. Job dilution is a more gradual process than job fragmentation. Job demarcation refers to the legal classification of job tasks which is necessary to determine the price of labour. Employees whose jobs are being diluted will endure a period in which their skills become diluted as well. There is a conceptual difference between job dilution and skills dilution. Job dilution refers to the changing nature of conceptual and operational activities at the workplace. Skills which are not utilised consistently will experience a gradual process of decline and dissolution. Skills dilution implies that the original incumbents of such skills lose the capacity to undertake job tasks as effectively as they did in the past. Job dilution may result in job losses or the reallocation of jobs to other sectors of the enterprise. The main purpose of introducing job fragmentation and job dilution is to increase the efficiency and productivity of the labour process, but ultimately it is about the cheapening of the price of labour.

Furthermore, Liepmann argued that the locus of skills in many industrialised branches 'has shifted from the shopfloor to the preparatory stages: to work done by technicians (draughtsmen, production, planning and development engineers), by designers and metallurgists, by works managers, estimating clerks, quantity surveyors and so forth. These are the real skilled occupations in modern industry'(Liepmann, 1960: 20). Whether one

agrees or disagrees with these arguments, is really a side issue. What it illustrates though are the shifts in the way skills can be defined and classified, particularly by parties whose interests are directly influenced by the outcomes of such definitions or characterisations.

The changing nature of industrial organisation and the organisation of work often led to very rapid shifts in the technically essential skills component within the labour force. Since the definition of technically essential skills were constantly challenged and redefined by both workers and their employers, the classification of skills as either obsolete or technically essential, influenced the price of labour. Unnecessary and outdated skills had no value - no bargaining power at all. These became redundant, not however, without generating resistance.

It was the technically essential skills which commanded a high price. Their regulation and the limitation of their supply was important to maintain their value. However, both the buyers of technically essential skills (employers), as well as those employees classified as unskilled and semi-skilled labour (most of whom were denied entry to jobs which might have enabled them to acquire and perform skilled job tasks) had a material interest in emasculating the classificatory aura and mystical orientation of technically essential skills.

Throughout this thesis, it will be shown that employers attempted at every opportunity to deskill and reclassify skilled job categories as semi-skilled or unskilled. This was done either through job fragmentation or job dilution, both of which enabled semi-skilled or unskilled labour to perform skilled jobs at lower wage rates. Essentially, this was done because employers had a material interest in re-negotiating the price of skilled labour. Semi-skilled and unskilled labour had a material interest in performing work of this nature and replacing the gate-keepers who had previously occupied entry points to a whole range of skilled jobs through regulatory institutions such as the apprenticeship system. This point was cogently captured by Haydu when he wrote:

> 'And whereas deskilling undermined craft monopolies, it promised less skilled workers better pay and status'.(Haydu, 1988: 12)

In opposition to these eroding forces, organised skilled workers attempted to regulate the entry to skilled occupations. They did so in a number of different ways, some of which involved age restrictions, limitations on the ratio of apprentices to artisans or closing the trade to non-craft workers by systematic exclusion (See Liepmann, 1960: 156). To a very significant extent, the history of work under the system of factory organisation was about the issue of the perennial definition and re-definition of skill.

Where they failed to stem the tide of new configurations in skill classifications, the possessors and regulators of skilled occupations, as a rearguard and defensive measure, attempted through artisan trade unions to forge new tactical alliances with agents in a similar predicament. Similarly, the cementing of tactical relations occurred between the 'old guard' and a 'new guard' of agents on the brink of controlling emerging technically essential skills. The thesis will show that the pervasiveness of racial ideologies in South Africa prevented an early formation of such alliances, particularly between white artisan trade unions and the emerging black trade unions.

1.3 Apprenticeship Training in Britain

1.3.1 Antinomies of Artisan Training and Educational Reform in Britain

The apprenticeship system in Britain has often been castigated for consolidating and preserving a monopoly over craft skills - a monopoly controlled by a specific institutionalised segment of the working population (Hall & Miller, 1975; Lee, 1979; Williams, 1963). In my opinion, this craft exclusivity has bred an intensely defensive craft chauvinism which has prevented the apprenticeship system from operating effectively or efficiently as a system of industrial training. Similarly, it can be argued that these practices have been inserted and reproduced, to some extent, on a similar scale, in countries which were historically colonised and dominated by Britain, including South Africa.

Legally apprenticeship in Britain emerged with the organisation of guilds in the sixteenth century. The Statute of Artificers was the first legislative instrument covering the acquisition of skills in Britain. However, it did so within an extremely repressive legal framework. Passed in 1563 it extended guild regulations throughout Britain, but at the same time placed preconditions and prohibitions on the training of apprentices. Within the weaving industry for

instance, it prohibited entry to 'any who had not undergone a seven-year apprenticeship, and limited apprenticeship to the sons of gentlemen and freeholders owning more land than three pounds per annum. It thus closed the industry on paper at least, to three quarters of the rural population' (C.Hill, cited in K.Hall and I.Miller, 1975: 31). Hall and Miller contend that the Statute of Artificers gave monopolistic skill rights to the de facto possessors of such rights.

It is evident that there were similarities between the craft guilds which developed in the medieval period and in the period of the transition to capitalism on the one hand and trade unions under the consolidation of capitalism on the other. Both were concerned with wage regulation and price control, particularly in the way that these issues affected its members. Concerning the differences between craft guilds and trade unions, Lipson notes that the craft guilds regulated different grades of producers: the manual worker, the middleman and the master, whereas the 'modern trade union is a combination of manual workers' (Lipson, 1937: 390)

Perhaps the yeoman guilds most closely resembled craft unionism, because both sets of institutions discouraged competition between its members and also attempted to regulate prices and wages to the benefit of its members. However, guilds were unable to develop the organisational longevity of trade unions because as potential entrepreneurs, the journeymen were unable to establish a stable and permanent organisation which merged the interests of the successful journeymen with the less successful. Lipson advanced the following explanation for this organisational failure:

> 'To some extent their failure is accounted for by the repressive policy adopted towards them both by the local and central government. A more important reason is that, while it was becoming increasingly difficult for the hired workers as a body to achieve independence and mastership, yet the way was always open to the more enterprising among them to do so. So long as it was possible for a certain number of journeymen to become masters, a permanent and efficient association was out of the question. The leaders of the journeymen with greater intelligence and capacity than their fellows would constantly be absorbed into the higher grades of the fellowship' (Lipson, 1937: 410)

But before craft unions could emerge with any semblance of an association to the medieval guilds, it was necessary for the guilds to experience the turmoil of the domestic system. Within the domestic system, the corporatist umbilical cord between masters and journeymen was unambiguously severed, transforming the masters into capitalists and the journeymen into subcontractors and skilled labourers. Only then, and only after the journeymen combined into workers associations and trade unions, could these organisational entities claim a vague lineage with the antecedent guild organisations.

The decline of craft guilds and their eventual replacement by craft unions meant that such onerous guild laws could hardly disappear at once, particularly in a country which did not experience the abrupt turmoil's of bourgeois-democratic revolution; in a country which adopted and discarded legislation with great difficulty if not with intense anxiety, and consistently prided itself with the gradual evolution of its legal and political institutions.[2] For the apprentice, the apprenticeship tradition was a test of endurance and commitment and ultimately represented a conversion for the apprentice to similar convictions as the master. This tradition appeared to be 'designed to bind the apprentice to his master and to restrict the master in admission of others to his field of mastery' (Maclure, 1979: 44). Its existence allowed the craft unions to masquerade as patrons but to continue as prisoners of tradition, intent on maintaining its male preserve, enforcing age restrictions on training and defending its sacrosanct conventions on the length of training. In appearance this seemed to be no different to the regulation of a closed-shop with more restrictive entry qualifications. The maintenance of apprenticeships along these lines has been used to preserve a privileged market position for specific groups of workers (Penn, 1985: 130). Even where apprentices acquired extensive technical skills as a result of a relatively long apprenticeship, the absence of compulsory qualifying tests meant that there might have been many instances where very little technical skills were acquired by apprentices. Advances in technological development led to the obsolescence of time honoured skills in traditional occupations; it compelled the craft unions to defend these portals of privilege as employers attempted to exploit the reality of the situation by trying to enforce job dilution and job fragmentation.

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2 These sentiments were constantly expressed in contemporary and later writings on British institutions.

Despite these features, apprenticeship still remains the most important instrument of industrial training, especially in the more recent period. In Britain during 1974, 24 per cent of new entrants into employment were admitted via apprenticeship. This accounted for 43 per cent of all young male entrants but only 6 per cent of all young female entrants, most of whom entered the hairdressing trade (Maclure, 1979: 44). The United States remains an exception since apprenticeship training covers a very small proportion of total training in the economy, constituting only 1/300 of the total labour force. Nonetheless, this figure represented 2.26 per cent of craft and related workers and amounted to just over a quarter million in 1976 (Stromsdorfer, 1981: 46).

During the 'sixties, Gertrude Williams provided a catalogue of evidence on the inadequacies of the British apprenticeship system. At the time, the duration of apprenticeship training was five years. Indenture started at the age of sixteen and ended at twenty-one, after which 'the apprentice is considered a skilled worker and becomes entitled to a full adult rate' (Williams, 1963: 4). It could be reduced to four years for those who continued their education at a technical college after the legal school leaving age. Nonetheless a skills shortage still prevailed in the British economy.

Contributing to part of this skills shortage was the reluctance of small and medium sized firms to take on apprentices (Williams, 1963: 5). An explanation for this was provided by Williams. Apprentices were perceived to work for only four days in the week for five days pay; the fifth being reserved for day-release instruction at a technical institution. But it was acknowledged that since many of the small firms concentrated on and specialised in producing a narrow range of products or ancillary services - many of them for large firms - they appeared less and less capable of providing apprentices with a fully fledged and comprehensive training package. The dislocation to the work schedule of the small firm which occurred when apprentices were away was a further reason advanced, one which also appeared to be an ideological construct that small and medium sized firms used since day release was not compulsory and no more than thirty per cent got it. This reluctance to train apprentices coexisted with a strong preference to poach them with higher wages when they qualified as artisans. These forces only exacerbated the serious skill crisis experienced in the British economy at the time. It was also used to show that the provision of skilled labour to the economy could no longer depend

on the apprenticeship system. Apprenticeship training was seen as an unreliable agent of skills provision.

Exacerbating the skills crisis further was the prevalence of a five year training period and the application of restrictive age limits on new apprentices. The five year training period remained problematic and was difficult to reconcile with the requirements of mastering every skill. Technological advances had already been slowly diluting the job content of many traditional skills. This process was cogently described in the 'seventies by Hall and Miller who noted:

> 'That skills are changing is in any event an observable fact; for example, modern machine tools for screw-thread rolling or gear-cutting do not require the intricate operating skills which the rudimentary machines of twenty or more years needed. Or again, today's garage mechanic replaces faulty parts with factory-made or factory reconditioned spares - which is a far cry from the skills possessed by the pre-war mechanic who had to be able to repair faulty parts, to 'blue and scrape' main and big-end bearings and so on, and the mechanic of yesteryear has to a large extent become a mere fitter in the true sense of that word. Again, few carpenters and joiners employed on building sites are now required to make window-frames or staircases, and doors are almost universally factory-made by semi-skilled labour. So skills requirements are changing, yet training time changes only slowly and often only after considerable effort on the part of the industrial training boards' (Hall and Miller, 1975: 48).

The continuous dilution and transformation of skills originally believed to be well entrenched in the employment hierarchy by those wishing to acquire craft skills, represented a serious structural inadequacy within the craft tradition. It meant that no craft occupation was guaranteed to exist into perpetuity. It implied that the protection enjoyed as a result of the control and regulation of skills could now be undermined through job fragmentation and job dilution. Even traditionally secure craft occupations were not immune from some form of fragmentation or dilution which occurred by means of a gradual simplification and standardisation of complex and difficult tasks. The reason for the dilution and fragmentation of skills, as I showed in the introduction was that through changes in the organisation of work, new skills could be assembled more cheaply to perform similar functions.

Restrictive age limits imposed barriers on individuals who had missed the chance of doing an apprenticeship at the specified age and by their late teens or early twenties were considered too old. Since union rules prevented their indenture, they were 'condemned to remain semi-skilled workers for the remainder of their working lives' (Williams, 1963: 6). Exceptions to this ruling were seldom made - admittance was only made for 'dilutees' but according to Williams only after prolonged negotiations and with great reluctance, since the divisions between 'skilled' and 'unskilled' remained rigidly intact in Britain (Williams, 1963: 6)

These intensely regulated divisions featured more prominently according to Williams (1963) in the larger and more industrial enterprises, despite skill being performed and defined along a narrower range of operations in these enterprises. In contrast, within smaller enterprises, a broader performance of tasks was required from a smaller selection of individuals. On this basis Williams (1963) pondered whether individuals who underwent a long costly training for a narrower but more specialised range of skills ever exercised them in reality. The rigid lines of demarcation between job types tended to reduce job mobility which she perceived as a wastage of skills.

In Britain, the barriers which complicated apprenticeship training contrasted sharply with a lack of an effective national apprenticeship training programme. Quality remained a stark deficiency and so did mechanisms for the proper instruction, testing and evaluation of apprentices.

According to Williams:

> 'There is no supervision of training by any outside authority, and as there is no test at the end it is impossible to know how many apprentices reach a minimum standard of competence. A young man who finishes his five-year training period automatically attains skilled worker status. His employer may have kept him on one or two types of job throughout the whole time; he may never have attended a technical class or have been either too idle or stupid to learn if he had; he may have picked up slovenly methods from those with whom he came into contact etc. etc. Whatever his experience he is considered skilled after five years' (Williams, 1963: 7)

Little provision was made for actual on-the-job instruction. Apprentices were expected to learn by watching others. Provision for instruction was made through the system of day-release at a technical college or institution, but since it was not compulsory it was estimated that only 30 per cent of apprentices obtained it during the 'sixties.[3] The absence of compulsory trade tests generally made it difficult to evaluate the quality of training obtained by apprentices. Enquiries undertaken by the Crowther Report (1959) showed that of the craft students who entered the City and Guild examinations only a small proportion were successful in reaching the intermediate standard and the proportion passing the final standard was insignificant (Williams, 1963: 8).

On the other hand, Williams showed that the apprenticeship system in Germany had been more coherently structured. Since it aimed to meet national requirements, the training which was provided in Germany adhered to detailed specifications for each occupation. Emphasis was placed on achieving a uniform standard on the skills taught and external evaluation of the content and supervision of training was performed constantly. Finally, a nationally recognised trade test with a uniform standard of competence was established (Williams, 1963: 18). Germany remains a very credential conscious society. These features of the social structure contributed partially to the radically distinct industrial achievements registered between Britain and Germany.

Whereas industrial training in Germany was fashioned to facilitate large-scale application and utilisation of skills, it also contained a more generalist orientation. Apprenticeship training in Britain remained inflexible and restrictive - too many restrictive lines of demarcation between trades coupled with institutional taboos and exclusionary practices plagued the system. Training was strongly dependent on obtaining an apprenticeship position. Apprenticeship positions were not automatically guaranteed but was in turn dictated by the immediate needs and means of employers; in essence by the conditions of the market.

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[3] Even here sharp variations were recorded. Attendance at day release was high in certain branches of engineering but practically unknown in other fields.

1.3.2 Reforming Apprenticeship Training in Britain

After the end of the Second World War the reform of apprenticeship in Britain received more government attention. 'Attempts have been made to loosen the rigidity of the system and to increase its adaptability to modern conditions' (Maclure, 1979: 48). Loosening its rigidity could only be achieved by curtailing if not destroying the power of the craft unions. Increasing its adaptability meant regulating the entire system from above if necessary without the co-operation of the unions. But within the British context it was almost impossible to resolve this issue through compromise - it needed an outright victor to be successful. Success meant reorganising the system from above as it was understood by the government and employers. To attempt to do so at the time, however, would have been politically unwise as the craft unions remained powerful and were not without allies in the organised labour movement.

The promulgation of the 1964 Industrial Training Act in Britain enabled the state to impose more control over industrial training. It did not threaten the apprenticeship system directly, but subtly under the guise of addressing and responding to the serious skills shortage perennially confronting the British economy - which was indeed real - it made provision for the expansion of company and industry based training schemes. The finance for this was derived from payroll levies imposed on companies within a given industry. These were paid into a fund from which grants to companies which undertook training as stipulated by the Industrial Training Board were made. It led to the development of modularised training which occurred in conjunction with colleges of higher education (Maclure, 1979: 48). The Industrial Training Act also enabled government training centres to extend and expand their realm of activities. In this way, institutionalised training slowly began to encroach on a terrain which traditional apprenticeships or ancillary schemes had previously covered.

Mass production techniques increasingly caused the traditional forms of apprenticeship to become obsolete. This led to an expansion in the growth of institutionally based technical education.[4] Despite the bureaucratic obstacles imposed on a diluted entry into the craft

[4] In this thesis, institutionally based training refers to the training performed in private or government training centres or technical colleges. Institutionally based training is most often carried out on a full-time basis over a variable time period (a week, a month or a quarter). Institutionally based training is normally

establishment, apprenticeship training did make provision for upgrading from unskilled to semi-skilled status. 'Upgrading was the practice of promoting (normally to semi-skilled tasks) labourers, or other semi-skilled workers, who had gained some knowledge of the trade by working in association with skilled operatives' (J.Sheldrake and S.Vickerstaff, 1987: 5). Institutional training, like that being performed at the government training centres, was beginning to replace craft regulated upgrading schemes in importance. It was also executed on a far greater scale.

Significant doubts, if not criticisms have been expressed about the quality of training undertaken at the Government Training Centres. For instance, evidence accumulated by Hall and Miller during the 'seventies, shows that a significant portion of trainees at Government Training Centres did not necessarily use the skills acquired there after re-entering the labour market (Hall and Miller, 1975: 91). Two-thirds (63.6%) of these trainees did however enter the labour market, immediately after leaving the training centres. Nonetheless for the period of the seventies, a sizeable proportion (36.4%) did not necessarily obtain employment immediately after leaving the Government Training Centres. Their sample yielded the following profile in table 1.

Table 1: Length of Unemployment and Extent of Skills Usage in First Job after leaving Government Training Centre

Period Unemployed	Using Skill %	Not Using Skill %	Total %
None	70.9	21.6	63.6
Less than 5 Weeks	17.7	16.2	17.4
5-26 Weeks	10.5	48.6	15.9
More than 26 Weeks	0.9	13.5	2.7
Still Unemployed	-	-	0.4
Total	N = 220 % = 100	37 100	258 100

Source: *Hall and Miller, 1975, p.91, table 8.1.*

The sample showed that the longer trainees remained unemployed, the less likely were they to use the skills acquired at the Government Training Centres when they did eventually enter the labour market. These criticisms were reinforced in the 'eighties with evidence showing that

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contrasted with training which occurs at the place of work of trainees. In this thesis, work based training is also referred to as firm-based training.

not only was the quality of training at Government Training Centres generally poor, with more training being undertaken at the basic and preparatory levels and being of limited application in later working life, but it was difficult for trainees who had qualified to obtain employment in jobs for which they had undergone training (See Sheldrake and Vickerstaff, 1987: 22). Often, existing training programmes, especially public financed training programmes were not designed to keep pace with new technological and structural developments which were continuously emerging at the point of production. Structural and technological developments were already slowly beginning to redefine traditional craft boundaries, a trend which also precipitated the replacement of traditional craft skills with that of the multi-skilled or flexible craft worker. The emergence of flexibility in the workplace - which is also a global phenomenon - is also encouraging the standardisation of craft qualifications (See Sheldrake and Vickerstaff, 1987: 61-62). Not only will the reform of the apprenticeship system as it prevails in Britain increase the flexible entry into previously craft controlled jobs but the standardisation of qualifications required to do the job will make it easier as Sheldrake and Vickerstaff correctly argue 'for people to retrain at various points in their working lives to reach different skill levels' (Sheldrake and Vickerstaff, 1987: 61-62).

More broadly, problems experienced with regard to industrial training were also a product of the completely inadequate and poorly co-ordinated nature of industrial training in Britain. According to Sheldrake and Vickerstaff this is rooted in British ambivalence to training which at the public policy level has resulted in the implementation of ad hoc measures and programmes that has solved very little but fuelled more contradictions and tensions in the system. They write:

> 'British ambivalence to training remained firmly rooted. In the period 1964-1979 attempts to reform the training system foundered on historically entrenched barriers to change. Employers remained unconvinced of their obligation to contribute to the wider skills base of the economy and maintained their short-term planning horizons. Trade unions continued to equate training primarily with apprenticeship and see their major aim as the maintenance of craft traditions and "skilled" status. The distinction between "education" and "training" continued and initiatives from the education lobby did not successfully penetrate the training policy community. The ethos of voluntarism had been transposed into the new policy initiatives, state intervention was

circumscribed by governments' acceptance of the basic tenet that training was industry's business. Unable or unwilling to devise measures to alter training practice at the level of the firm public policy took refuge in ad hoc special measures and programmes' (Sheldrake and Vickerstaff, 1987: 57-58).

It is clear that the attempt to reorganise industrial training after the war, actually accelerated the erosion of apprenticeship training in Britain. To understand why this occurred it is important to link industrial training to the entire educational structure in Britain, since industrial training only constitutes one facet of this broad issue. Industrial education and training probably constitutes the lowest rung in the status hierarchy played by education in the United Kingdom. Even unions have been led to believe that the vocational nature of education which would assist their members in the short term is a long term liability; and have therefore given ardent support - with the encouragement of teachers - for the adoption of a more general education.

Vocational education has been perceived to be narrow and more limiting and also lacks the status associated with a non-vocational general education. Maclure has been vociferously critical of this mentality which he argues has promoted, a peculiar bias into higher education in Britain, particularly in the universities and polytechnics where a greater emphasis is placed on the study of economics, law, sociology, business and commerce at the expense of production engineering. This has been mirrored and reproduced in other spheres of the educational system as well. Maclure attributes this to:

'...an increasingly irrelevant academic tradition, which gives pure science and research a higher status than applied science, technology, and production and which is orientated away from productive industry and toward the professions, the civil service, and the social services. This tradition is related to a history of elite education, once geared to the needs of a governing class and an overseas empire, which has never come to terms with the demands of manufacturing industry. Instead, it has enabled its educated elite to avoid manufacturing industry throughout their working lives and thereby enhance their own status' (Maclure, 1979: 91).

In fact, Maclure is mistaken to assume that this is an entirely British phenomenon. In Britain it may assume a specific character, but it is quite apparent that it is more pronounced where vested interests in the educational arena have gained control over the educational system and have used it as a vehicle to promote its own particular interests under the guise of the national interest. Similar perversions have emerged in developing countries including South Africa, and fashioning policies to challenge this process has remained a perplexing and very sensitive issue.

1.4 Training Costs: Institutional Versus Firm-Based Training

Studies by economists which show that institutionally-based training is more cost effective than firm-based training have elicited ambivalent responses, since these have been contrasted with those studies which support the reverse. The debate typifies the approach economists tend to use, whereby categorical reasons are advanced - with the aid of cost-benefit analyses - to explain why one method of training is more appropriate than the other. But cost efficiency is not the only criterion for evaluating training schemes. It may be more constructive to combine the two methods (i.e. institutionally-based training and firm-based training) so that they complement rather than compete with each other.

Ryan has constructed a model to depict theoretically the costs of job or in-service training (Ryan, 1980: 334). This approach is also followed by Metcalf (1985: 77-78). The model assumes that both the employer and the trainee may bear costs for job training. The cost the trainee bears is equivalent to the additional rewards that could be obtained by doing something different such as obtaining a job where wages are higher and the period of job training shorter. This cost also includes the spell the trainee spent in formal training at a company school or similar institution. 'The firm bears a cost for the training to the extent that it pays the trainee more than the value of his or her net contribution to output - net, that is, of the value of any incremental usage of materials, equipment etc., involved in the use of the trainee rather than experienced workers' (Ryan, 1980: 334-335). The training cost of the firm is measured over the period in which the value of the trainee was less than the remuneration and costs of keeping him or her employed in the firm. This could also be characterised as the learning period in which the trainee's contribution to output increases gradually if not uniformly.

Comparative evidence on the costs and benefits of both institutional and firm-based training has been brought to our attention by Metcalf (Metcalf, 1985). Metcalf cites a host of international evidence to support his argument that the expansion of institutionally based training is more cost efficient and therefore more sensible than firm-based training. On the other hand this evidence also shows 'that in Brazil and Peru short courses have a bigger pay-off than long courses of training' (Metcalf, 1985: 44).

Informal firm-based training tends to be more cost effective than that undertaken in industrial institutes and vocational secondary schools:

> '...training in industrial institutes and vocational secondary schools is less cost effective than more informal firm based training, at least in Kenya, India and Israel' (Metcalf, 1985: 44).

It is also suggested that institutionally-based vocational training is substitutable for formal schooling:

> '...the payoff to quasi-institutional vocational training in South America is higher for those who have only completed primary school than for those who have completed secondary school. This suggests that extra formal schooling may be substitutable for formal institutional vocational training' (Metcalf, 1985: 44).

While the findings of these studies might be correct, one example showing a contradictory pattern is from a World Bank study which compared the productive returns between institutionally based and firm based training in Malaysia. It identified a number of differences between the two systems. In my view it also highlights the danger of being overtly categorical on the basis of studies undertaken under different circumstances. The study showed that institutionally trained apprentices earned 12 per cent more than company trained apprentices, a factor which Metcalf largely attributes to their 'additional productive capability over company workers' (Metcalf, 1985: 25). Yet company trainees were more productive than institutional trainees during the training period, despite the fact that the training costs for institutional training were higher than those for company based training. Because firms did not directly bear the costs of institutional training, except through a levy and grant system, it was claimed that this route gave firms a larger return. However, seen in relation to the overall resources

expanded on training and the productive output of trainees, firm based training is more effective than institutionally based training.

What is generally true, is that institutionally trained workers have obtained more impressive credentials which are accepted or used to justify higher earnings than firm or company trained workers. The same study also showed that it was more difficult for firms to retain the services of institutionally trained graduates since they sought to increase their earnings by seeking employment elsewhere.

On the other hand, an exclusive reliance on firm based training may create other problems. Firm based training provides its recipients with skills and techniques that are directly translatable and applicable to productive and work related activities; skills that do not become obsolete the moment they are acquired. Applied orientation makes learning for those individuals who dropped out of the educational system more tolerable and interesting. However, as firms are often ill-equipped to provide theoretical instruction, it may be necessary to complement on-the-job training with a segment of institutional based training. By developing a more holistic emphasis - one which nonetheless discriminates in favour of firm based training and does not allow it to be superseded completely by institutional training - where a healthy balance is maintained between the two, a more vibrant system of technical education may evolve. Harbison (1973) argues thus, especially for developing countries where exorbitant expectations about the benefits of formal education were and still are often nurtured.

> 'Many developing countries expect too much from formal education. They want it to produce skills which are learned much better on the job. They hope that it will produce managers, administrators, and statesmen, without realising that such persons really acquire most of their skills in the crucible of experience on the job. As a rule the strength of formal education does not lie in training manual craftsmen, factory workers, or modern farmers. Here employing institutions and employment oriented non-formal training have a decided advantage' (Harbison, 1973: 128).

Harbison has provided an important motivation for the retention of firm-based or on-the-job training of which apprenticeship schemes is merely one case.

1.5 Informal Apprenticeship in Nigeria

The absence of detailed statistics generally makes it more difficult to assess the impact of apprenticeships in Africa. The relatively secondary contribution which manufacturing industries - traditionally associated elsewhere with more vibrant apprenticeship schemes - make towards national output appears to be a debilitating factor for formal apprenticeships on the African continent. Even in Nigeria, which after South Africa has the largest manufacturing sector in sub-Saharan Africa (World Bank, 1992), the maintenance and regulation of apprenticeships appear to function without formal state intervention. Institutional and legal requirements which establish the boundaries of apprenticeship training, as in South Africa, are largely absent. Analysing this issue is made more difficult in the way economic data is published. In Nigeria for instance, only firms which employ ten or more individuals are included in official statistics. It is therefore not possible to quantify the number of small enterprises which employ fewer than ten workers, many of whom are apprentices, or indeed the total number of workers employed in such enterprises.

This necessitates greater reliance on estimates obtained from researchers and academics. Two such studies on which I have drawn were undertaken in Western Nigeria at the end of the 'seventies. The first by Mabawonku covers apprenticeship training in modern small-scale industries in the towns of Oyo, Ijebu-Ode and Aiyepe (Mabawonku, 1979). The second by Oyeneye examines apprenticeship training in small-scale enterprises in both the modern and traditional industries within the towns of Oyo and Ede (Oyeneye, 1980).

Traditional or indigenous crafts and industries are those which existed in Nigeria long before British colonisation. It includes industries such as blacksmithing, weaving, pottery and calabash carving. Modern industries were introduced to Nigeria through colonial conquest and through Nigeria's gravitation to the world market. Examples of modern industries in the context of small scale enterprises are tailoring, carpentry, auto-repair, radio and television repairing and photography. According to Mabawonku 'apprenticeship in the more traditional industries is always restricted to only members of the household and is often subject to many taboos and rituals' (Mabawonku, 1979: 4). On the other hand, he argues that apprenticeship is less personalised in the modern industries and reflects more accurately the labour market

situation and returns to labour in the subsector (Mabawonku, 1979: 4). Because apprenticeships are practised in such an assortment of crafts, arts and occupations, apprenticeship training in Nigeria is very extensive. In the 'sixties it was estimated that there were around two million apprentices in Nigeria (See Oyeneye, 1980: 70). In both the modern small-scale industries and the informal sector of Nigeria, the apprenticeship system is entirely informal.

1.5.1 Apprenticeships in Modern Small-scale Industries

As is the case in many other African countries, young men in Nigeria enter the labour market at a relatively young age. Since statutes which prohibit child labour do not exist in Nigeria, many youths move to the cities in search of wage employment after completing their primary education. A large proportion of apprentices have parents who are in low-income occupations. Because they are often unable to afford the high cost of educating their children, they consciously 'send them to seek their fortune in the apprenticeship system where costs of training are lower' (Mabawonku, 1979: 15).

Most newly indentured apprentices are relatively young, with 70 per cent still in their teens with an average age of 14 years, while 80 per cent completed primary school education. The average level of education obtained was five years (Mabawonku, 1979: 11). For most youths with limited job experience, an apprenticeship in Nigeria remains one of the few entry points into the labour market. In Mabawonku's survey:

> '...nearly 90 per cent of the apprentices had no previous job experiences and about 60 per cent never sought wage employment, but instead moved from formal education to apprentice training. Of those who sought employment prior to training, about 29 per cent remained unemployed for 1 to 12 months. The relative unattractiveness of farming as an occupation to youths is shown [by the fact] that only 3 per cent of the apprentices were ever engaged in farming' (Mabawonku, 1979: 15).

It is the norm for young apprentices to spend more time in training than older ones. The parents, guardians or sponsors of the apprentice are required to pay the master an apprentice fee. This sum can be paid over a defined period but must be paid before the apprentice graduates. The master is also required to pay an allowance to the apprentice. It can be given

on a daily or weekly basis and is used to cover basic requirements of the apprentice such as midday meals and sometimes transportation (Mabawonku, 1979: 23).

Conventionally, once recruited within a firm the apprentice is not regarded as a normal worker with fixed hours and is therefore required to participate actively in the proprietor's household activities as well. This requires that the apprentice perform activities or chores unrelated to job specific training (Mabawonku, 1979: 18). Indenture agreements are mostly unwritten. In some cases however, written agreements are prepared and cover issues such as the length of the training period and the amount of fees to be paid (Mabawonku, 1979: 19). These agreements are not underwritten through the normal judicial process however, as is the case in many European countries where agreements are prepared through the courts or in the presence of lawyers. Consequently, 'disputes over the fulfilment of obligations are settled between the parties concerned without recourse to legal and judicial authorities' (Mabawonku, 1979: 22). Violations of agreements such as the non-payment of apprentice fees is constrained by the power masters wield, since they can refuse performing the freedom ceremony to errant apprentices or their financial sponsors who renege on pecuniary obligations. Failure to perform the freedom ceremony would mean that the apprentice would not be awarded with a certificate or any evidence of having received training. As informal as these credentials are, not being accredited with them would prevent the apprentice being recognised as an artisan in the Western Nigerian context. In reality without 'papers', the qualifying apprentice would lose a whole range of benefits as well as opportunities which artisans theoretically enjoy, such as higher wages or the right to hire apprentices after starting a business.

1.5.2 Institutional Training

Since the 'fifties, when it first started, institutional training has had a more prominent influence in the training of craftsmen. Between 1959 and 1963, five trade centres, one of which was a women's centre were established at different locations in Western Nigeria. Each centre offered specialised courses in many trades. Between 1962 and 1971, enrolment in these centres increased from 854 to 1853. Admission requirements to these centres are quite strict: candidates have to be between the age of fifteen and eighteen with a secondary school leaving certificate. In addition, they are required to pass an entrance examination to secure admission.

Training lasts for three years and although students are required to buy books and work clothes, the cost of the programme is heavily subsidised by the state (Mabawonku, 1979: 28).

1.5.3 The Informal Sector

Oyeneye's sample of informal sector apprenticeships includes firms in modern as well as traditional trades.[5] Apprentices in the indigenous or traditional crafts are generally younger than those in modern crafts. The reason for this phenomenon is explained by the fact that 'apprentices in the indigenous crafts were more likely to start learning in childhood, while those in the imported crafts often complete their primary education before they start an apprenticeship' (Oyeneye, 1980: 71-72). Oyeneye's survey showed that apprentices in the indigenous crafts have a lower level of formal schooling than those in the imported modern crafts:

> 'While half of the apprentices in these crafts had no schooling or only a few years in primary school, only one ninth of those in the imported crafts were in a similar situation' (Oyeneye, 1980: 72).

The need for greater numeracy for measurement, tool handling and so forth in the modern crafts, encourages masters to be more discerning in their selection of apprentices, favouring those with a higher educational standard. This was especially the case in radio and television repairing. None of the apprentices in this craft had failed the primary school leaving certificate examination, while one third had gone beyond this level (Oyeneye, 1980: 73).

Regarding the class origins of apprentices, Oyeneye's study substantiates similar conclusions in Mabawonku's, namely that apprentices were generally drawn from the poorer strata of society.

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[5] The different definitions of the informal sector used by Mabawonku and Oyeneye as well as the types of firms included in their surveys give rise to some degree of ambiguity. Mabawonku informs us that the survey in his study is drawn from small-scale enterprises in the modern crafts and trades of the economy. Oyeneye's survey includes small-scale enterprises in modern and traditional crafts and trades of the informal sector. However, just by comparing Oyeneye's sample with Mabawonku's, it is quite clear that a large proportion of firms in Mabawonku's sample are in fact informal sector enterprises in modern crafts and trades and not merely small-scale enterprises. It gives the incorrect impression that they are located almost exclusively in the formal sector, whereas the reverse prevails.

Using the occupation and education of the fathers of apprentices as an index of the social origins of apprentices, Oyeneye's survey showed that only 2 per cent of the apprentices had fathers who were in clerical or other white-collar jobs. The greater proportion had fathers who were farmers (34%), skilled workers (36%) and traders (14%) (Oyeneye, 1980: 74). The decision to enter trades where an apprenticeship is offered is dictated by perfectly rational calculations of future rewards, calculations derived on the basis of what could be achieved currently had they possessed a particular combination of skills.

> 'Though less desirable, many of the apprentices, like their masters, have taken to the informal sector apprenticeship system because of the hope that they will be better off than those in the lower echelons of the formal sector or those engaged in labouring or farming. For example, some of the apprentices see skill acquisition as providing more security with better long-term financial rewards than being engaged as house servants. Furthermore, many of them felt that once they were qualified and were able to set up workshops, they would become masters of themselves, control their time and take on their own apprentices' (Oyeneye, 1980: 76).

Whether the calculations yield anticipated effects or materialise as planned, is an altogether different question. Due to the prohibitive costs, which is also dependent on the nature of the craft, it is extremely difficult for newly qualified journeymen to start a business immediately. Even experienced journeymen who wish to set up in business experience difficulty in raising finance through normal credit channels such as government agencies and commercial banks and therefore have to build up a strong personal savings base before starting on their own. For newly qualified artisans (journeymen) heavy reliance is therefore placed, often with expectation, on family members as a likely source of capital (Oyeneye, 1980: 78).

1.6 Apprenticeship Training in Germany

Vocational training in Germany is highly organised, being separately co-ordinated by a separate Ministry of Vocational Training. The type and quality of training is also dictated by labour market requirements. In Germany, firms are usually separated through membership to either an industry chamber [*Industriekammer*] or a craft chamber or guild [*handwerk* guild], to which they are required to belong by law. Generally, it is the smaller firms with a median size in manufacturing of just under ten employees who belong to the craft chamber. Usually,

because the owners of these firms had previously qualified by examination for the masters certificate of the trade guild, these firms are also entitled to train apprentices in a particular trade. Larger firms are affiliated to the industry chamber to which they are also required to pay an annual subscription (See Prais, 1981: 29-30).

Using the 1967 census as a basis, Prais showed that although the craft sector (*handwerk* sector) accounted for only about a tenth of all employees in manufacturing, its contribution to training was more significant, since between 16 and 42 per cent of trainees, depending on the category and scope of activity, were found in this sector. In comparison to Germany, the extent of vocational training in smaller firms in Britain is almost non-existent. Small firms in Britain generally rely on the training provided by large firms for their supply of craftsmen (Prais, 1981). However, the training provided in the small craft sector in Germany has often been criticised for providing 'too narrow a range of technical experience' (Prais, 1981: 31). Yet, the contact with wider business responsibilities which training in small firms provide, enables many trainees to move to larger firms, while others remain in the small-firm sector, until an appropriate opportunity eventually arises for them to set up their own craft enterprises (Prais, 1981).

The evidence assembled by Prais implies that the small scale sector in Germany has had a more significant impact on the training of artisans, a trend which was not evident in the United Kingdom. Within the context of individual training, Prais' argument gives a rationality for the existence of small firms, such that, relative to their contribution to gross economic output, small firms contribute more to training than larger firms. However, trends observed during the 'eighties rudely contradict Prais' postulates. In fact, a study by Casey (1986) reveals something diametrically contrary to that identified by Prais in Germany.

During the 'seventies large industrial and commercial enterprises in the FRG invested a larger per capita amount on apprentice training than did smaller firms or artisan enterprises. Furthermore, in smaller enterprises, training is usually given by the foreman or owner of the firm at the workshop, 'whereas in larger enterprises special training workshops are established' (Casey, 1986: 67). This phenomenon leads Casey to two interlinked propositions on the political economy of apprentice training. In the first of these, since small or artisan enterprises

are more inclined to derive an immediate return from apprentices, and since the quality and costs of training are lower than those in large firms, young apprentices in small firms tend to be hired as cheaper substitutes for skilled adult labour. Empirically, confirmation of the substitution of cheaper apprentice labour for more expensive artisan labour is demonstrated by the stark differences in the extent of training between small-firm sectors and large-firm sectors. 'Thus, it has been calculated that in 1970 [in Germany] firms with less than 50 employees provided some 57 per cent of all apprentice places but only 30 per cent of all jobs in the economy' (Casey, 1968: 68).

The validity of this proposition is confirmed by empirical studies which also demonstrate the existence of an additional and closely related proposition. Empirical studies, in Germany in particular show that business cycles exert a profound impact on the degree of apprentice training in both large and small firms. In relation to the business cycle, large firms tend to vary their volume of apprentice training pro-cyclically, whereas small enterprises vary their training volume counter-cyclically (Casey, 1986: 69). This means that large firms expand the number of apprentices in training during the upswing of the business cycle, whereas small firms expand their intake of apprentices during the downswing. Logically, small firms can only do so effectively if they substitute young apprentice labour for older artisan labour and utilise the savings in wages to offset the losses in output which would necessarily be sustained by employing younger, inexperienced but cheaper labour substitutes. With more empirical data we could test whether these propositions have any explanatory significance for South Africa, especially in the light of the large numerical decline of apprentices which has occurred since 1979 in some sectors.

1.7 The Significance of the Three Systems of Apprenticeship to South Africa

This thesis explores the evidence and processes which have led to the decline and transmutation of the apprenticeship system. Despite regulating access points to skilled occupations at the workplace in South Africa for over a century, the role of the apprenticeship system in South Africa is not as prominent as it was in the past. International evidence shows that the apprenticeship system in countries such as Britain, which was a model adopted in most British Dominions or British Protectorates, the decline in the system of craft orientated

apprenticeship training has been equally pervasive. In fact, what has occurred in South Africa merely mirrors the trends which have occurred in Britain.

Even comparatively late starters such as Nigeria, whose apprenticeship system is still largely confined to craft occupations in pre-industrial enterprises (e.g. calabash making, wood-carving etc.) has experienced similar tensions between the independent and self-regulated preservation of apprenticeship traditions, regulations and occupations on the one hand and some form of state intervention which has tended to threaten and disrupt the established craft hierarchies on the other. This tension has been manifest through the provision of craft skills to service the human resource needs of modern occupations (e.g. craftsmen in mechanics and electronics) and state intervention to provide skills training for economic development through institutional training at government training centres and tertiary institutions (e.g. technicians in mechanics and electronics).

In terms of its overall trajectory, South Africa's system of apprenticeship training occupies an intermediate stage between the apprenticeship system of Britain and Nigeria. It is neither completely institutionalised as in Britain nor is it completely craft regulated as in Nigeria. A crucial difference however is that ideological and institutional discrimination on the basis of racial stereotypes in South Africa have largely excluded black employees from artisan positions and occupations for the most part of the twentieth century. In a comparative sense, the extent to which change and restructuring in British economic development has occurred has been closely monitored in the academic, practitioner and popular media literature. One example of this is to compare the extent to which contributors in the South African management journal *Human Resources Management* are aware of management systems that have been introduced in the United Kingdom and the consequences of these. One can therefore conclude that both employers and administrators responsible for contributing to a stable human resources climate in South Africa will be influenced to some extent in the way these issues have been dealt with in the United Kingdom, principally because it remains the easiest shorthand from which to draw upon.

Compared to Nigeria, apprenticeship training in South Africa has been thoroughly institutionalised and the entire system of apprenticeship training has been regulated by various

legislative provisions and Acts of Parliament. (These will be discussed in greater detail in Chapter 2). The various legislative provisions gave the craft workers power, autonomy and protection to guard access to craft occupations. This was achieved through various craft trade unions. Contrary to Britain, the reduction in the power of the craft unions in South Africa combined with the state's policy of publically funded tertiary educational institutions was less rapid. Nonetheless, considering the very close historical affinity between the apprenticeship system of the two countries, a great deal of what has been implemented in Britain tends to resonate as a concrete experiment in South Africa at a slightly later juncture.

The system of apprenticeship training in Germany on the other hand differs in fundamental ways from that in Britain, as Williams (1962) and Prais (1981) aptly showed. Most importantly, the state's interest in apprenticeship and vocational training in Germany was not to compete and undermine the activities of the traditional craft organisations but to establish a common partnership between the craft organisations and the state. Consequently, the apprenticeship system in Germany has been much stronger and coherent than in either Britain or South Africa and has shown itself to be more adaptable to changes over time. The De Villiers Commission on Technical and Vocational Education was particularly influenced by the system of apprenticeship and vocational training in Germany and in fact the basic architecture of the COTT system, which will be discussed in the following chapter, emerged out of this influence. However, in South Africa, COTT represented a limited partnership between the state, employers organisations and labour organisations. It was a limited partnership because it effectively excluded the vast majority of employees from its ambit on racial grounds. It is this theme which will be elaborated in more detail in chapter two, where the contradictions in apprenticeship training will be explored in greater depth.

CHAPTER TWO: A BRIEF HISTORY OF APPRENTICESHIP TRAINING IN SOUTH AFRICA

2.1 Introduction

Historically, since the industrial revolution, the prime and most affordable way in which technical and vocational training was open to a large segment of individuals wishing to become skilled workers was by indenture through a system of apprenticeship. This was shaped by the history and craft legacy of trades in which a skill or occupation could be acquired. It applied predominantly, to male individuals within a certain age limit prepared to abide by a clear set of rules. The system of apprenticeship through indenture was imported to South Africa with the early craft and industrial workers who arrived from Britain during the mining revolution in the latter part of the nineteenth century (Union of South Africa, 1935: para. 691). The need for a regular supply of skilled workers, many of whom emigrated to South Africa from Britain, became evident to industry and state at an early stage. Few apprentices were employed outside the mining industry and the state railways however (Union of South Africa, 1935: para. 691).

This chapter traces the evolution of apprenticeship training in South Africa, from its consolidation in the Apprenticeship Act of 1922 until the beginning of the 1990s when modularised training for apprentices was introduced. It does this, firstly, by providing an overview of the legislation which impacted on apprenticeship training. Secondly, it documents the attempts to institutionalise apprenticeship training after the Second World War through the Central Organisation of Technical Training. Thirdly, it explores the way in which a complex set of forces mediated by the interests of employers and white artisan unions, as well as the engagement of the apartheid state, from the late 1950s systematically served to erode and undermine the legislative and institutional fabric of apprenticeship training which had been established with the promulgation of the Training of Artisans Act (1951). It shows how the aims and intentions of a whole battery of legislation was unable to halt the erosion of apprenticeship training.

2.2 Legislation

The first comprehensive attempt to legislate and regulate apprenticeship in South Africa was contained in the Apprenticeship Act of 1922. Prior to this, apprenticeship training was governed by a host of disparate legislation, chief of which was the Regulation of Wages, Apprentices and Improvers Act (1918). The 1918 Act empowered a wage board to regulate the ratio of apprentices to skilled workers. However, only in the commercial distributive trade and in the clothing industry, both on the Witwatersrand, were ratios prescribed (Union of South Africa, 1935: para.692). Provisions in the Apprenticeship Act of 1922 enabled employers in designated trades to employ minors for an indefinite period, provided they 'did not serve on probation for more than six months with any one employer; at the end of that period, a formal contract had to be entered into' (Kooy, 1952: 6). Kooy records that this system was highly abused by employers who discharged their apprentices just before the completion of the six months probationary period, merely re-engaging them soon after 'in order to avoid payment on a higher scale of wages or to avoid being bound by a contract' (Kooy, 1952:6). Kooy remarks:

> 'This process was repeated again and again, and it was often found that prospective apprentices worked for years in one or more designated trades without ever being indentured' (Kooy, 1952: 6; Union of South Africa, 1935: para. 740).

This subsequently led to the Apprenticeship Act being amended in 1924 and again in 1930. But, the evidence of the Industrial Commission in 1935 showed that minors were still being dismissed at the end of their probationary periods only to be re-employed in other occupations (Kooy, 1952: 6). Paraphrasing official inquiries into these malpractices, de Broize (1977) notes:

> 'Alternately the employer would dismiss his employee before he is scheduled to complete his apprenticeship. Because of the absence of a signed contract the employee would have no evidence of having done his apprenticeship. In some cases it might be necessary to repeat another term of apprenticeship with another employer' (de Broize, 1977: 93).

The amended Act was replaced by the new Apprenticeship Act 37 of 1944 which according to Kraak was passed 'primarily to co-ordinate the training of thousands of young white workers employed in the ammunitions' and manufacturing industry during the war years' (Kraak, 1988: 215). The severe shortage of skilled labour experienced during the post-war boom led to the promulgation of the 1950 Training of Artisans Act which 'allowed for the training of adult workers (those over the apprenticeship age of 21) to meet these shortages' (Kraak, 1988: 215). The Apprenticeship Act 37 of 1944 was in turn replaced by the Apprenticeship Act 46 of 1963 where extensive changes to the apprenticeship system were made (Thompson & Benjamin, 1991). By the end of the 'seventies, a multitude of laws covered apprenticeship training. These included the Training of Artisans Act 38 of 1951, the Black Building Workers Act 27 of 1951, the Black Employees In-Service Training Act 86 of 1976 and the In-Service Training Act 95 of 1979 (Thompson & Benjamin, 1991). The Black Building Workers Act of 1951 'prohibited the employment of blacks on skilled work in [white] urban areas without ministerial permission' (Thompson & Benjamin, 1991: C1-2 n.4). The Wiehahn Commission recommended the consolidation of these laws but also argued that African workers be indentured as apprentices throughout South Africa, including white urban areas, although it preserved racially separate state training facilities.

The recommendations of the Wiehahn and Riekert Commissions also prompted the enactment of the Manpower Training Act 56 of 1981. This Act did not cater exclusively for apprentice training but covered the promotion and training of employees in all sectors of the economy. The conditions specified in the Act relating to apprentices included a minimum age requirement of 16 years and a minimum qualification of a standard seven certificate. It also set a prescribed period of indenture, (depending on the industry) of up to four years (Kraak, 1988: 215). The Manpower Training Act 56 of 1981 was amended further by the Manpower Training Amendment Act 39 of 1990. The new Act significantly reduced the state's role in training and enabled industry to play a greater role in training than previously. It also replaced the previous time-based system of training for artisans which had been the hallmark of apprenticeship training in South Africa with a system of modularized competency-based training. With a modular system, apprentices will now be required to pass regular tests before they can proceed with further theoretical training (Thompson and Benjamin, 1991).

With the growth of secondary industrialization in South Africa the apprenticeship system played an indispensable part in the training of new artisans. Although the promulgation of the Black Building Workers Act in 1951 dealt a severe blow to the possibility of Africans being indentured as artisans, Kooy indicates that even before this occurred, white artisan unions attempted to preserve racial exclusion within their ranks and strenuously resisted the training of black artisans (Kooy, 1952: 9-12). Whites undergoing artisanal training increased rapidly during the period preceding the Second World War nearly doubling from 6103 in 1933 to 11583 in 1939 (Davies, 1979b: 257). This trend continued uninterruptedly during and immediately after the war. According to Davies 'the number of whites undergoing apprenticeship training rose from 15671 in 1944 to 21513 in 1948 - an increase of 37 per cent' (Davies, 1979: 310).

2.3 The Organisation of Technical Training in South Africa

One of the first systematic attempts to address the shortage of skilled labour, especially artisan labour in South Africa was undertaken with the establishment of the Central Organisation of Technical Training (COTT), in 1940 which operated under the Director-General of War Supplies (HSRC/NTB, 1985: 16). Fashioned as a short-term measure, its initial purpose was to address the large-scale shortage of skilled technicians being experienced at the time in the Defence Force. According to Kooy, another intention was to 'supply industry with technicians needed for post-war industrial expansion' (Kooy, 1952: 77). Potential trainees were required to sign a service contract, 'undertaking to serve, if so required, for four years from the date of completion of their training or for the duration of hostilities, whichever was the shorter, either in a military or a non-military capacity' (Kooy, 1952: 79).

COTT provided intensive technical training courses in the following fields: Fitting (16 weeks), machine tool operating (12 weeks), gas and electric welding (8 weeks), blacksmithing and springsmithing (12 weeks), instrument repairing (12 weeks), electrical repairing (12 weeks) and metal working (12 weeks). At the end of each course, trainees were examined by head office inspectors and classified according to performance (Kooy, 1952: 79-80). Thus, through centralised planning and large scale state intervention, a large bulk of individuals obtained technical training during the Second World War. The HSRC/NTB *Investigation into the*

Training of Artisans in South Africa states that by November 1943 some 22 417 persons had been trained under this scheme. In 1945 however,

> 'the accent was changed to the training of ex-servicemen for civilian re-employment. This system continued to function under the Union Education Department until 1948' (HSRC/NTB, 1985: 16).

At the end of the war in 1945, it was envisaged that COTT would continue functioning through the training of selected ex-volunteers but, as Kooy (1952: 81) indicates, 'gradual assimilation of COTT by the Technical Colleges was to be the essential aim of the post-war organisation', and the intensive nature of the training programme was maintained. Initially a scheme for the training of 5000 ex-volunteers was instituted by the Government. Applicants were required to be white males between the ages of eighteen and thirty-five with a standard six or corresponding certificate. As an incentive, trainees 'were to be provided with tools and overalls at the beginning of their course and were entitled to retain these tools after the completion of their period of training' (Kooy, 1952: 81). Intensive training was provided to bricklayers, painters and plasterers (13 weeks), bricklayer-plasterer, carpenter and plumber (17 weeks) and electrician (20 weeks). The syllabus for the courses was drawn up by COTT and the National Trade Testing Board. The first part of the training had to be undertaken in the COTT workshops and thereafter continued in various private workshops under the supervision of qualified inspectors (Kooy, 1952: 82-83). The theoretical training was undertaken at local technical colleges.

On successfully completing this intensive course, trainees were placed with suitable employers for a period of further training not exceeding three years. After the first year, the trainee was entitled to sit for a trade test and 'on passing (or on completion of the full period of three years' apprenticeship), was deemed to have reached artisan status' (Kooy, 1952: 83).

It was part of the state's plan as Kooy states, for there to be a gradual integration and disappearance of COTT into Technical Colleges. Kooy notes that the contribution made to the training of artisans was acknowledged by both employers and unions who wanted to see a continuation of the programme.

'The reason given for this was that South Africa, as a young country, faced a period of industrial expansion comparable, in its need for skilled workers, to the state of emergency experienced during the war. COTT, with its system of intensive training, seemed the most suitable way to remedy the inevitable shortage of artisans prevalent under these circumstances, and should therefore be adopted in all trades in which a period of apprenticeship was deemed necessary' (Kooy, 1952: 84).

Since an adequate supply of artisans could not entirely be fulfilled through immigration, these bodies favoured the continuation of the scheme through COTT. COTT functioned under the Union Education Department until 1948. In 1951 the Training of Artisans Act was passed. Among other things the 'Act provided for a one year of full-time intensive institutional training followed by three years of training with an employer approved by the Minister of Labour' (HSRC/NTB, 1985: 17) With the passage of the Training of Artisans Act of 1951, COTT served as a training centre. In 1952, it was converted to a trade test centre. On 1 April 1982 COTT was transferred from the Department of National Education to the jurisdiction of the Department of Manpower, and has since served as the only recognised trade test centre for designated trades (NTB, 1991).

2.4 The Viljoen Commission

A very important official commission of inquiry established to explore policy relating to the protection of industries in South Africa also drew attention to the problems which were generally associated with the system of apprenticeship training. Through its chairman, it became known as the Viljoen Commission and submitted its findings in 1958 (Union of South Africa, 1958).

The Viljoen Commission attempted to address the question of the shortage of white apprentices in the manufacturing industry by recommending experimentation with a policy of immigration and decentralisation. The framework adopted by the Commission was effectively to perfect the system of grand apartheid. In some instances it recommended steps which would later create explosive tensions within the entire institutional fabric of the apprenticeship training system as it existed then in South Africa. Some of the shortcomings which the Viljoen Commission associated with the apprenticeship system were to resonate in future commissions

of enquiry and official investigations, particularly that completed by the Human Sciences Research Council and the National Training Board in 1985 (Union of South Africa, 1958: para. 270).

The Viljoen Commission argued that there were a number of reasons for the general apathy exhibited by white youths against entering into apprenticeship contracts (Union of South Africa, 1958: para. 252). First, statutory wages for apprentices were too low. Second, employers in the motor and metal industries tended to demand higher qualifications from prospective apprentices. Third, argued the Commission, a large number of apprenticeship positions in the building and furniture trades were perceived to be passing into the hands of 'non-Europeans', particularly in the coastal provinces which created a reluctance for white youths to be indentured as apprentices in those sectors. The requirement of compulsory attendance at technical classes as well as a preference for white collar employment were further reasons for a disinclination of white youths to enter apprenticeship training programmes.

It is interesting to note that the system of day release of apprentices first developed in the mining industry was initially on a voluntary basis so that apprentices could attend technical classes. As an incentive, an arrangement was made to refund school fees on the satisfactory completion of classes (Solomon, 1967: 46). When the system of technical training for apprentices was incorporated into the Apprenticeship Act of 1922, it was adopted almost in its entirety from the practice in the mining industry.

As a means to alleviate the problems it documented, the Viljoen Commission recommended that the Government 'adopt a positive and effective immigration policy, with the appropriate financial assistance of the State' (Union of South Africa, 1958: para. 279 and 280), so that 25 000 European or white immigrants could immigrate to South Africa annually. As a corollary to the accommodation of industries which were more dependent on cheap African labour, the Commission proposed the decentralisation and favourable location of these industries, which included textiles and allied industries. These industries were largely dependent on 'Native employees', and because they also faced competition from industries in low wage countries, it was presumed imperative that the racial composition of the work force

remained unchanged. The Commission envisaged that the dilution and fragmentation of jobs performed by 'non-European employees' in areas closer to the reserves, would alleviate the shortage of skilled labour. 'This could be facilitated by the break down of skilled processes into semi-skilled functions in order to achieve the maximum utilisation of the available labour force' (Union of South Africa, 1958: para. 281). A key assumption of the Viljoen Commission was that decentralisation was to be built largely on a semi-skilled cheap black labour force engaged in fragmented jobs using diluted skills.

An interesting interpretation of the effect of the Apprenticeship Act was advanced by Hutt in 1964. According to Hutt, while the Apprenticeship Act of 1922 was designed to assist white youths to acquire industrial skills, it had the opposite effect in practice. By extending the ambit to civilised labour policies which enabled better remunerated employment to be reserved for white employees, it also 'weakened the incentive for self improvement among them' (Hutt, 1964: 74). While training facilities were developed at technical colleges and attendance at these were made compulsory for apprentices, it was not compulsory for a qualifying examination to be passed in order to qualify as an artisan. Hutt lamented this wastage where the majority of apprentices never used the expensive facilities at their disposal, merely being satisfied with becoming journeymen by the passage of time. An amendment to the Apprenticeship Act in 1963 delayed the period of qualification of apprentices who did not pass the trade test examination by one year, during which they were paid 70 per cent of the journeyman's wage (Hutt, 1964: 75).[6] Hutt noted that the Minister of Labour at the time described the wage sanctions of this policy as tough (Hutt, 1964: 75).

2.5 The 'Sixties and 'Seventies

Throughout the 'sixties and 'seventies elements within the more liberal fractions of big business were engaged in a persistent, organised and vitriolic ideological battle with white artisan unions the majority of which were ardent defenders of the system of job reservation. An array of interesting and convincing arguments were advanced to demonstrate the irrationality of these practices. Chief of these was that unless the more severe forms of job reservation were abolished immediately, the consequent skills shortage which could develop, and indeed was

[6] S.M.C.Harmese (1980: 30) notes that it was compulsory for all apprentices intending to be admitted as journeymen to sit for the artisan trade test for all industries, within four years of being indentured.

apparent in some instances, would constitute a severe obstacle to the country's rate of economic growth. Job vacancies which could not be filled by whites further confirmed the contention of employers that a skills shortage did indeed exist. This ideological battle was fought as employers attempted to pressure the reactionary white artisan unions to open up certain categories of reserved jobs to black labour. It inadvertently put these representatives of business at the public forefront in the struggle to end job reservation and take advantage of black labour by using it more effectively. In response to this challenge, according to Webster, the artisan unions granted employers limited exemptions at Industrial Councils to employ non-union labour (i.e. black labour). Webster notes that it was exceedingly difficult for unions to question the 'perennial prediction of skills shortage', since it had by 1970 become a pillar of conventional wisdom (Webster, 1985: 157).

Throughout this period a fervent and virtually uninterrupted process had been set in motion, instituting more and more vigorous forms of job fragmentation at the point of production. Cullinan was blunt in describing the process:

> 'Such fragmentation made previously white jobs available to blacks on a less skilled level. The fact that blacks could be paid lower wages for performing these fragmented jobs lowered the costs of the wage bill. Fragmentation was thus seen as the most suitable strategy to adopt in order to get around the institutionalised exclusion of the black labour force from the categories of labour reserved for whites' (Cullinan, 1980: 30).

Job fragmentation and labour substitution were being instituted along a wide spectrum of occupations where cost benefits were obtainable. For instance, Webster remarks that in the late 'seventies the average wages of lower skilled operatives and labourers were lower than apprentice rates, except first year apprentice rates (Webster, 1985: 162). Despite the levies and grants paid to individual employers to employ and train apprentices, it was still more economical for employers to employ cheap black labour instead of apprentices. As Charles Meth put it:

> 'Apprentices' wages cannot be driven down low enough to make them competitive with the lower paid blacks' (Meth, 1979: 86, cited in Webster, 1985: 162).

The irony of the process as Webster points out, was that while the uneconomic nature of apprenticeship training encouraged employers to bypass the apprenticeships for cheaper non-unionised black labour, they (employers) still 'argued that a skill shortage existed' (Webster, 1985: 162).

A skilled shortage existed precisely because job reservation largely limited the training of artisans to whites. Because blacks could not be trained as artisans, it was more difficult for white artisans who had the potential to enter managerial and supervisory positions to be released from normal artisanal functions (SAIRR, 1966: 209). The skilled shortage was shaped through the prerogatives and restrictions of employers to use potentially available sources of labour. It was artificially constructed, but it had visible manifestations.

By the early 'sixties at least, it was generally acknowledged within many business enterprises and within particular state institutions that the shortage of skilled labour was serious enough to compel revisions in capital expenditure programmes. The *Survey of Race Relations* for 1964 contained the following information:

> 'According to a Press report [*Star*, 4 April 1964] because of the shortage of skilled workers the Government has asked local authorities to curtail capital expenditure programmes. Various industries have been similarly affected: Mr H.F. Oppenheimer, Chairman of African Explosives and Chemical Industries, said in April [*Rand Daily Mail*, 6 April 1964], "Our company has been actively considering projects to be undertaken during the next few years at the cost of R90 million. Some of these projects will quite certainly have to be dropped or postponed because there will not be the men available to carry them out". Some of the collieries in Natal have had to close sections furthest away from the haulage systems because of a shortage of fitters and electricians' (SAIRR, 1965: 235-236).

One of the measures employers devised to cope with the situation of a skill shortage involved the increase of overtime working for skilled and unskilled labour alike, in some cases to the limit of human endurance (SAIRR, 1975: 257). Other measures were the process of job fragmentation and dilution and where the law exempted it, labour substitution.

The leadership of the white artisan trade unions was clearly aware of the strategy employers had embarked upon: using the skills shortage to advance job fragmentation and renege on the obligation to train additional apprentices. As Ben Nicoholson, general secretary of the South African Electrical Workers Association expressed it:

> 'The apprentices are there for the taking. They want to use the shortage of artisans to force the trade unions into accepting the fragmentation of skill - cheap labour that can be exploited' (Ben Nicolson, quoted in *Rand Daily Mail* 22/1/80 and cited in Cullinan, 1980: 103 and Webster, 1985: 158).

The leadership of the Iron Moulders Society perceived it as a psychological war between craft workers and employers:

> 'In the foundry industry, the employers granted 100 certificates of apprenticeship in the last ten years. Such a small increase in the intake of apprentices is difficult to understand at a time of expansion in the foundry industry. We believe that the argument of a shortage of skilled labour is the kind of psychological warfare waged by the employers against all workers to frighten them and make them work harder if they want their jobs' (Bloomkort Harris, cited in Webster, 1985: 163).

Furthermore, as noted by Van der Walt of the South African Boilermakers, Iron and Steel Workers, Shipbuilders and Welders Society, employers could bypass training white apprentices by training Africans under the Black In-Service Training Act of 1976 which also reimbursed them for all training costs incurred.

> '...under the Black In-Service Training Act of 1976 the employers prefer training blacks because of the tax concession which reimburses the employer for all training costs - including equipment, salaries and materials. This was particularly advantageous where the need for the rapid training of various jobs was concerned. Previously, the employer would have had to train an apprentice for three to four years, at considerable cost, in order for that task to be done. A cheaper black worker with three months intensive (effectively cost free) training could perform a specific coded welding task, that an experienced white apprentice would merely encounter as an aspect of his three year training' (Van der Walt, cited in Webster, 1985: 167).

Because employers constantly alerted friend and foe alike to the existence of a skills shortage, the state was compelled to take some sort of remedial action. But since the artisan unions which sat on the apprenticeship boards vetoed the notion of African and in general black artisan training, the state passed the Black In-Service Training Act in 1976. The act appeased both employers and racist artisan unions alike, enabling employers to train black workers in semi-skilled and operator occupations just below the artisan level, while it preserved the basic bastions and power of the white reactionary artisan unions by leaving the Apprenticeship Act intact. However, it unintentionally gave employers space to begin to undermine the apprenticeship system through the fragmentation and dilution of jobs. In 1976, eight public training centres were built by the government at a cost of between R250 000 and R300 000 each, to train black employees. As an incentive to encourage employers to send their workers to these centres, the government enabled employers to recoup a large bulk of their expenses through tax deductions. One source noted that 'employers can claim 98 cents out of every one rand spent on the training of workers at these centres by way of tax concessions' (*Star* 12/4/77).

The sentiments expressed by Van der Walt in an interview with Cullinan was symptomatic of the agonies and frustrations white craft unions experienced with major features in the regulation of apprenticeships.

> 'There is absolutely nothing wrong with the Apprenticeship System per se in this country. It is in fact a very good system, and of high calibre... The problem lies with the regulation of it. Now, while we feel that the apprentice is entitled to receive the kind of training that will equip him to do his specialised trade well,...the training schedules are not always adhered to in the training of apprentices. The number of apprentices I know who have spent three years drilling millions of holes into little bits of metal, day after day....what kind of skill training is that?... On the other hand our apprentices are cheated at the other extreme....where they acquire specialised skills very rapidly in some trades and are employed to do a fragmented part of the artisan's job at apprentice rates of pay. Obviously this is no good to us. We cannot have our artisans undercut, our apprentices underpaid and the state of craft training undermined' (Van der Walt, cited in Cullinan, 1980: 72-73.)

While the mentoring syndrome in apprenticeship training, informally referred to as the 'sit-by-Nellie' system, was open to abuse by employers who failed to train apprentices adequately and according to the agreed conditions laid down in the contract of apprenticeship, new forces stemming from the workplace were systematically undermining the influence of apprenticeship training and beginning to threaten the preserve of craft exclusion and privilege which was associated with the apprenticeship system. Despite the political influence they were able to wield as a skilled segment of the labour force, they had no effective solutions to the structural traumas they faced.

Van der Walt claimed that the regulation machinery was hopelessly understaffed. In most provinces there were too few inspection officers to police and monitor the adherence to prescribed training schemes in the Apprenticeship Act. According to Van der Walt the entire Metal and Engineering Industry of the Transvaal only had two inspectors at the time of the interview, while the Orange Free State had none. 'Besides which', Van der Merwe remarked to Cullinan, 'everyone knows when they're coming. They phone us months before. The employers then put the apprentices into prescribed training until he's gone. Meanwhile, when the inspector asks the poor bloke who's been drilling holes for months, whether he's happy, he grins from ear to ear because for the past two months he's been doing interesting work' (Cited in Cullinan, 1980: 73). Log books into which apprentices were supposed to record the details of work performed every day were more often not filled in; but then they were seldom demanded by inspectors.

Despite the fact that these problems had already begun to plague the apprenticeship system, the government continued with its perennial back-patting or arrogant outbursts whenever confronted by critics. In 1974, in response to an opposition party spokesperson in the House of Assembly criticising the government's racially exclusive policy on vocational and apprenticeship training, the Minister of Labour responded in the following way:

> 'Are we doing enough to train people? I think one can never do enough to train people, but that we are doing a great deal within our means, is most definitely the position. If one considers that we have 31 apprenticeship committees and that we have the National Apprenticeship Board in which the employers and the trade unions are represented....then it is a sign that we are not asleep' (SAIRR, 1975: 260).

Many employers criticised the trade unions as being the last obstacle to the maintenance of exclusion at the workplace and for being responsible for perpetuating the skill shortage. However, a large bulk of employers themselves did not respond as quickly to state provisions that allowed other forms of workplace or in-service training to be conducted. Armed with the 1976 Black In-Service Training Act, employers were given the liberty to train as many African employees, virtually at no extra cost to themselves at government training centres. Since many employers were too small to provide training themselves, the rationale was that they would make use of the facilities at government training centres and similar institutions. Nonetheless employers tended to underutilise the facilities at these government training centres. State officials remained concerned at the lackadaisical approach to training most employers seemed to have adopted (*Argus* 10/5/80; *Star* 20/8/80; *Financial Mail* 20/3/81). Yet, employers could make taxable claims for wages paid to apprentices, including class fees and the costs of on-the-job practical training undertaken by apprentices, but which were borne by employers (HSRC/NTB, 1985: 196). Roly Clark, the vice-chairman of Chamdor[7], a training centre run by industry with government financial assistance, complained that many firms were unclear what their training needs were. He said:

> 'We go to them and ask them what kind of courses they want us to run, and their answer is: "Well, what kind of courses have you got"' (*Sunday Times, Business Times* 4/4/76).

Although difficult to measure, the problem of some firms poaching trained workers from other firms was equally severe (*Star* 12/4/77). 'Most of the poaching occurs at the expense of public sector organisations and the large monopoly corporations who train substantial numbers of artisans. It is thus not surprising that these organisations have also experienced the most severe skill shortages. This poaching of skilled labour is accentuated by the problem of high turnover rates amongst artisans - estimated to be 32% per annum. High apprentice and artisan turnover rates simply induce a higher level of poaching and a vicious circle is thus set in motion' (Kraak, 1988: 255).

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[7] Chamdor was one of three such training centres opened in 1975. The *Sunday Times Business Times* of 4/4/1976 noted that: 'Government provides the initial building costs and basic equipment, which in the case of Chamdor came to R250 000. It also grants 200 per cent tax deductions for all expenses associated with black training, which means that for every R1000 spent on training, R820 is deducted from tax'.

In 1977, despite the availability of massive tax incentives, only 3663 African workers were trained at government training centres, while the centres had the capacity to handle 14000 trainees a year (*Rand Daily Mail* 15/1/79). This complaint was voiced several times thereafter (*Sunday Times Business Times* 3/2/80). Among some of the problems identified which gave rise to poor utilisation of these training centres were:

* Some industrial sectors refused to use the centres because they were in the process of setting up their own.
* The centres were too far from the factories of some industrialists and the provision of daily transport to the centres for their workers constituted a major problem.
* A shortage of suitable instructors at the centres (*Sunday Times Business Times* 22/10/78).

It is therefore quite clear that the training strategy of the government and employers was haphazard, uncoordinated and very disorganised during the 'seventies. Whether facilities and resources were duplicated or under-utilised it reflected the existence of ad hoc training measures in general and indeed the absence of a coherent industrial training strategy for labour. In 1974 P.J. van der Merwe, an academic at the University of Pretoria lamented the absence of an active manpower policy in South Africa (and he emphasised training in this equation) which he characterised as 'essentially passive and very traditional' (Van der Merwe, 1974: 196) Some of the measures used to deal with the shortage of skills included the relaxation of immigration rules and the token lifting of restrictions on the training of blacks (Cullinan, 1980: 111).

In 1980 'faced with the skills shortage, the government announced its intention in January to recruit skilled workers from overseas. In order to promote this, immigration regulations were streamlined so that skilled overseas workers no longer needed a firm job offer if they fell into work categories where there was a proven shortage. The Minister of the Interior reaffirmed the government's policy that immigrant workers would not be allowed to fill jobs where South Africans were available for the work. He also announced as part of the streamlining process that the assistance to immigrants would be raised above the current R 275. He stated that all immigrants except those from neighbouring states would receive a government contribution

towards passage costs amounting to 80% of the actual fare from April 1. This figure would be automatically adjusted in accordance with air tariff increases' (SAIRR, 1981: 93).

Since 1960, the South African labour market experienced severe shortages of skilled labour. Skills shortages created a long term bottleneck in the economy that became really serious during periods of economic growth. A significant part of this problem was caused by a severe shortage of artisanal labour in South Africa, though in many instances even available sources of artisanal labour remained extremely deficient in quality. In this context, the shortage of artisan labour had a direct impact on work undertaken by technicians and engineers. Shortages of artisan labour required technicians to do work which would normally have been undertaken by artisans. It resulted in engineers doing work which would normally have been undertaken by technicians. As Mr Naude of the National Training Board explained:

> 'At least 20% of the work of engineers should be done by the technician. But there are too few technicians... To complicate things further, the artisan should be doing some of the managerial work technicians have to do, but they are obliged by law to do work that the operator could do. This is where the skill shortages arise... The engineer should only be involved in the research, planning and future development of production in the industry. The technician could fill the gap at the (High Level Manpower) HLM (managerial, administrative, supervisory) level... The artisan should also move up to fill this gap' (Interview, cited in Kraak, 1989: 30).

Similar views were articulated to Kraak by Mr Burkes, Training Officer for Scaw Metals who wanted to see an increase in job fragmentation:

> '90 % of present artisanal training is wasted... what needs to be done is that the 90% be broken up into semi-skilled components. The more semi-skilled work you can take off the artisan, the more you can allow him to advance into other skill areas... allow him to become a better manager, a better organiser, a better planner... Our problem is not so much a skills shortage problem as much as it is a mismanagement of manpower problem' (Kraak, 1989: 30).

While the state hoped to address the skills shortage dilemma by giving employers greater incentives to undertake training and through incentives to immigrants in possession of the

requisite skills, employers sought to tackle the skills shortage predominantly through job fragmentation and dilution. Unfortunately this raised the ire of the craft unions who vigorously resisted these incursions. The state was required to mediate these tensions which it did, haphazardly.

Prior to the passage of the 1981 Manpower Training Act, a limited number of Africans could be trained as artisans in the 'independent' homelands. But apprentices trained in the homelands could only become artisans in South Africa after taking out homeland citizenship (*Star* 21/5/79). A Department of Education and Training spokesperson confirmed this to a Financial Mail reporter:

> 'We administer trade tests to black artisans, but their certificates are issued by homeland governments. They would obviously have to get citizenship papers to get the certificate' (quoted in *Financial Mail* 19/10/79).

However, as de Clercq (1984) later showed, apprenticeship training in the homelands was an extremely precarious and dubious exercise. De Clercq maintained that such training remained poor, underdeveloped and inappropriate.

> 'The trade schools or technical institutes suffered from inadequate funding, poor workshop equipment and a shortage of qualified instructors and technical teachers. Above all, given the limited industrial development of the homelands, there were very few apprenticeship opportunities for these students to gain practical on-the-job experience under the supervision of a qualified artisan (with the exception of the handling trade). As a result, these technical institutes ended up producing semi-skilled operators and industrial workers' (de Clercq, 1984: 8).

At the level of post-school technical education these problems, especially that of adequately qualified instructors, were equally severe in the homelands. Critics concluded that the facilities provided for African technical training were not equal to those received by whites and therefore also strengthened the white unions' unwillingness to accept African apprentices from such colleges (SAIRR, 1982: 129).

Guidelines emanating from the Department of Manpower and the National Training Board during the mid-eighties anticipated that for apprenticeship training to be effective, it would be determined to a greater extent by the private sector in the future.(Department of Manpower & National Training Board, 1986) These guidelines stated cogently:

> '... training institutions and employer and employee organisations offering training should comply with the training standards determined by the industry concerned' (Department of Manpower and the National Training Board, 1986: para. 2.1).

It was to lay the basis for the introduction of modularised competency-based training which underpinned amendments to the Manpower Training Act in 1990. Essentially, this is the system which regulates apprenticeship training currently and while it would be interesting to assess its impact, the limited information at my disposal makes it difficult to do so adequately.

2.6 Conclusion

Despite the racially exclusive character of apprenticeship training which developed in South Africa, the institutional and organisational trajectory of apprenticeship training in this country bore strong similarities to that recorded in Britain. The entrenchment of racial segregation in the organisation of apprenticeship training gave the apprenticeship system in South Africa a specific character. But racial segregation within the apprenticeship system merely delayed the responsiveness of the system to straight forward cost considerations. Skilled jobs which could be performed more cheaply by semi-skilled workers but which were being preserved by discriminatory legislation had a greater chance of being systematically eroded through job fragmentation.

Moreover, because firm-based training (on-the-job training) often proved to be ineffective and disjointed, as was the case in Britain, institutional training in South Africa also came to be recognised by the state as a complement to firm based training. An example of this was the important role institutional training received in the Training of Artisans Act (1951). At the workplace, artisan occupations were being fragmented and diluted and were being undertaken more cheaply by semi-skilled non-union operators. Employers justified this process which it engineered, as a consequence of shortages of skilled labour. In its fight with the white artisan unions over the extension of the boundaries of reservation of jobs to skilled artisan labour,

employers often masqueraded as the altruistic champions of black labour. However, the real motive of employers was to cheapen the price of labour even if it meant destroying the artisan system and the system of training it embodied.

From the late 1950s to the early 1990s, the trajectory of artisan training in South Africa was mediated by complicated struggles over the price of labour and the definition of skills. Chapter 3 continues the analysis of this trend by addressing the empirical regularities and anomalies in apprentice and artisan employment between 1969 and 1992. It analyses the extent to which these trends represent an erosion of apprenticeship training in the metal and engineering industry of South Africa.

CHAPTER THREE: EMPIRICAL INDICATORS OF ARTISAN AND APPRENTICESHIP EMPLOYMENT IN THE METAL AND ENGINEERING SECTOR, 1969-1992

3.1 Introduction

Studies on the occupational structure of South Africa's labour force have tended to offer a broad and generalised approach to occupational changes in the economy. Using government estimates of labour force participation, which are by no means unambiguous, these studies have often addressed the extent to which a modification of the racial composition of the division of labour have become discernible. Whether it served as proof of the irreconcilable tensions between capitalism and a system of job colour bars on the one hand[8] or as an expression of the outcome in the structural contradictions and imperatives of capitalism in South Africa on the other,[9] these analyses offered very little insight into the modification of the racial division of labour as it affected particular industries of the manufacturing sector. Consequently, one was unsure if the racial employment hierarchy was being eroded in high capital intensive industries at the same tempo as in low capital intensive industries. Nor could one aggregate the effects of this phenomenon in stagnant and declining industries compared to vibrant and growing industries. Therefore one was really at a disadvantage in accurately determining the precise nature of the modification in the racial division of labour. The exercise in tabulating this phenomenon also tended to be extremely pedantic and the statistical methods employed were difficult to reconcile with events taking place in reality.

An exception to this trend is contained in a recent discussion of the changing structure of South Africa's workforce which appeared in the *South African Labour Bulletin*, (Hindson and Crankshaw, 1990) where some attention is given to changes in the occupational and racial structure of the metal industry. Simkins and Hindson (1979), showed that in the period between 1965 and 1985:

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[8] *Cf.* Bromberger (1974) for a classic statement of this position.

[9] A good example is Davies (1979a).

'Semi-skilled employment grew enormously, skilled work (artisanal) grew relatively slowly and unskilled actually declined in absolute and relative terms over the period. There was also very rapid growth in semi-professional, supervisory and routine white-collar work' (Simkins and Hindson, 1979: 30).

In this chapter attention will be focused on the structure of artisan and apprentice employment within the metal industry over the past twenty years

3.2 Disaggregating Employment Trends Using the Manpower Surveys

Although the Manpower Surveys represent the most comprehensive and up to date statistical surveys from which inferences on the occupational structure in the manufacturing sector can be drawn, uncritical tabulation of this data may seriously misconstrue concrete analysis.[10]

Serious deficiencies are evident in constructing an occupational grid for a specific industry on the basis of the Manpower Surveys. This does not mean that an occupational grid for all the sectors represented in the Manpower Surveys cannot be derived. What it does mean is that an industry occupational structure (i.e. micro-scenario) cannot be established without encountering serious difficulties, whereas a broad macro-scenario (all industries and sectors contained in the Manpower Surveys) can be adequately derived without sacrificing much coherence.

The first difficulty emerges when an attempt is made to numerically tabulate non-manual occupations for specific industries. The Manpower Surveys are arranged occupationally. Occupations in turn are grouped functionally. For instance under code 01 are grouped professional, semi-professional and technical employees - a categorisation which adheres to professional and technical attributes. Examples of occupations which fall within this group are: Chemical engineer, mechanical engineer, metallurgical engineer, aeronautical technologist, architect, dentist etc.. Under code 02 are grouped managerial, executive and administrative

[10] Despite being constructed from a sample basis, the use of Manpower Surveys can be a tedious and terrifying experience to the uninitiated user of labour statistics. For those who wish to derive maximum benefit from them, it is advisable to consult those surveys drawn up between 1981 and 1985 first (i.e. Manpower Surveys Nos. 14 to 16), since the data there is more precisely set out and clearly demarcated. The more recent surveys are published by the Central Statistical Services and although containing much more detail, are clearly more difficult to use, mainly because the layout is poor.

employees; under code 03 are grouped clerical employees and under code 04 employees engaged in sales and related work. With the exception of employees under code 01, none of the occupations within these groups are connected to shop floor organisation or manual activities. It is also virtually impossible to determine the number of occupations located within these four groups which would also be found in a specific industry such as the metal industry. This problem of 'correspondence' can only be addressed if one was absolutely certain that occupational description was a sufficient criterion in the distribution and allocation of jobs to specific industries. However, a cursory glimpse at the Manpower Surveys will quickly dispel this conclusion. Using the illustration above listing examples of occupations within group 01, it is quite obvious that a chemical engineer does not necessarily have to work within the chemical industry. The chemical engineer may be engaged as a chemical analyst, analysing the texture of metals in the metal industry or could be engaged as a chemical analyst in the textile industry. Similarly, there is no necessity for a mechanical engineer to be engaged in the metal industry, despite the metal or automobile industry deploying these personnel on a larger scale. This difficulty is much more serious for occupations listed in groups 02, 03 and 04. It is important to be aware of such pitfalls, especially when an attempt is made to construct an occupational profile for particular industries because the findings postulated may exaggerate the conclusions drawn. Hindson and Crankshaw (1990:30) have attempted to do this for the metal industry.

A second problem which appears to raise difficulties, one that is fairly common in studies on occupational mobility, is the juxtaposition and reduction of skilled and unskilled occupations, but more so skilled occupations, into a general unambiguous category when constructing typologies of occupational profiles within specific industries.[11] It would seem that occupations commonly associated with particular and specific industries cannot be unproblematically juxtaposed or reduced into a general descriptive and classificatory category such as 'artisanal' or 'semi-skilled' etc. without masking very important features. For instance, numerical tabulation of black artisanal employment masks the access of artisans to particular artisanal occupations. A detailed analysis becomes appropriate and necessary to rectify this oversight.

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[11] Simkins & Hindson, 1979 and Davies, 1979a are good examples of this trend.

3.3 Artisans, Apprentices and Semi-skilled Workers

Between 1969 and 1991, the growth in artisan positions in South Africa's metal and engineering trades has been relatively sluggish, increasing by only 23.5% over this twenty-two year period. Since 1981, the overall growth in artisan numbers has generally been static. There has however been a slight alteration in the racial composition of artisan employment during this period as can be observed from table 2.

Table 2: Artisans in the Metal and Engineering Trades 1969-1991

Years	White	'Coloured'	Asian	African	Total
1969	64831	1657	210	-	66698
1971	71409	1889	621	-	73919
1973	74516	2364	455	-	77335
1975	75343	3398	566	473	79780
1977	72428	5027	778	360	78593
1979	75613	5184	887	717	82401
1981	77446	6650	1131	1915	87142
1983	75513	9145	2040	2324	89022
1985	70746	6306	1697	2731	81480
1987	67367	6419	2079	4458	80323
1989	71008	7360	2950	8481	89799
1991	63355	8589	2900	7540	82384

Source: *Manpower Surveys 1969-1991*

Although the number of white artisans has remained fairly constant, the growth in the total artisan labour force which has occurred, has led to a decline in the proportion of white artisans in the industry from just over 95% at the beginning of the 'seventies to 76.9% by 1991. This shortfall has been made up by an increase in the employment of black artisans, particularly African artisans who increased their portion of artisan employment from 0.6% in 1975 to 9.2% by 1991. A similar trend occurred in 'coloured' and Asian employment. A peak in employment was reached in 1983. It was followed by a sharp reduction thereafter to recover only by 1989 but falling again in 1991. The data assembled in the Manpower Surveys and reproduced in table 3 show that the employment of apprentices increased dramatically between 1977 and 1985, only to decline to little more than the 1969 level by 1991. This evidence tends to corroborate the argument that is being advanced about the erosion of apprenticeship training by the 1990s. The static nature of artisan employment has also contributed to the systematic decline in apprenticeship numbers.

Table 3: Apprentices in the Metal and Engineering Trades 1969-1991

Years	White	'Coloured'	Asian	African	Total
1969	15079	195	42	-	15316
1971	15649	317	48	-	16014
1973	15423	446	134	-	16005
1975	13953	982	73	72	15080
1977	15675	1719	242	22	17658
1979	15419	1075	566	146	17206
1981	18045	2175	639	718	21577
1983	18720	3548	959	1498	24725
1985	17429	2225	701	2571	22926
1987	12428	858	411	1712	15409
1989	12028	1137	667	2135	15967
1991	12446	1594	791	1896	16727

Source: *Manpower Surveys 1969-1991*

Small, though significant changes in the racial composition of apprentices occurred during this twenty-two year period. In 1969, whites constituted 98.5% of all apprentices employed in the metal industry, whereas this ratio had declined to 74.4% by 1991. Only since 1975 have Africans been taken in as apprentices, but by 1991 African apprentices constituted 11.3% of the apprentices in the industry, the balance being made up of 'coloureds' (9.5%) and Asians (4.7%) who each experienced an equally significant increase. The data assembled in the Manpower Surveys only provide a relative distribution of apprenticeship numbers but because it provides racial breakdowns of employment patterns, it highlights important trends which the actual data has been unable to illuminate.

Table 4 depicts the actual number of apprentices employed in the metal industry since 1969. Although year to year fluctuations in numbers have occurred, these have not been extreme.

Table 4: Apprenticeship Contracts in Operation in the Metal Industry 1969-1992

Year	Number
1969	9435
1970	9198
1971	9126
1972	9485
1973	9928
1974	10272
1975	11059
1976	11605
1977	10456
1978	9795
1979	9424
1980	10002
1981	11033
1982	12983
1983	12604
1984	11790
1985	10289
1986	9555
1987	9059
1988	8522
1989	10971
1990	8202
1991	9567
1992	8472

Sources: *CSS, South African Labour Statistics, 1986, 1990 and 1993. Reports of the Director-General of Manpower (various).*

During this period, the highest employment was recorded in 1982, but this was only 37.6% greater than in 1969 when 9435 apprentices worked in the industry. Since 1982 however, there has been a gradual but systematic decline in the numbers of apprentice employment recorded. The number of apprentices in 1992 was - 10.2% lower than that recorded 23 years before in 1969. It is quite obvious when comparing table 3 with table 4 that the number of apprentices in the industry as it is estimated in the sample (Manpower Surveys) and that of the actual data (South African Labour Statistics) either do not correspond or the Manpower Surveys tend to overestimate the actual number of apprenticeship contracts in existence in the

industry. Since the data in the Manpower Surveys are obtained through sampling, the deviation may be the result of sampling errors`.[12]

Between 1976 and 1992, the metal industry accounted for roughly one-third of all newly indentured apprentices in the manufacturing sector.[13] Furthermore, a large proportion (approximately one-third) of actual apprentices employed in the industry consisted of newly indentured apprentices. Apart from some lag and despite shifts in the business cycle, trends in newly indentured apprentice employment do reflect the pattern of apprentice employment in the metal industry generally. For instance, in 1982 high points were reached in the number of new apprentices indentured and in the total number of apprenticeship contracts operating in the industry. However, from 1983 to 1992 there has generally been a consistent decline in the total number of apprenticeship contracts. Though not as clear-cut, if not becoming more static, there has been a gradual decline in the number of newly indentured apprentices in the industry since then, as can be seen from table 5.

[12] In Manpower Survey 1990, the Central Statistical Services note: 'The Survey does not include all enterprises, but is undertaken by means of samples. A stratified systematic sample design is used for the selection of the samples'.(Manpower Survey 1990. Occupational Information, p.ix.).

[13] Calculation, self.

Table 5: Newly Indentured Apprentices According to Population Group in the Metal Industry

Year	White	'Coloured'	Asian	African	Total
1970					2532
1971					2769
1972					2970
1973					2960
1974					3103
1975					3662
1976					3592
1977	3233	249	167	-	3649
1978	2627	177	132	-	2936
1979	2979	278	101	-	3358
1980	3145	439	211	27	3822
1981	3115	534	297	238	4184
1982	3894	807	426	390	5517
1983	2723	383	176	295	3577
1984	2872	392	233	262	3759
1985	2840	316	278	331	3765
1986	2694	250	168	258	3370
1987	2322	247	153	269	2991
1988	1990	230	146	289	2655
1989	2877	388	294	471	4030
1990	-	-	-	-	1942
1991	-	-	-	-	3911
1992	-	-	-	-	1940

Source: CSS, *South African Labour Statistics 1986 and 1990*; *Reports of the Director-General of Manpower (various).*

If the trends in the racial distribution of newly indentured apprentice positions are to have any bearing on the racial character of artisanal employment in the metal industry in the future, it will be imperative for the proportion of black indentured apprentices, particularly African being enlarged quite considerably. In 1980 the proportionate racial distribution of newly indentured apprentices was as follows: White (82.3%), 'Coloured' (11.5%), Asian (5.5%) and African (0.7%). By 1989 - the last year for which racial breakdowns are provided - the situation had only altered slightly and the number of whites in this category was six times greater than that of Africans with the distribution being as follows: White (71.4%), 'coloured' (9.6%), Asian (7.3%) and African (11.7%). Absolute numerical values of this relationship are depicted in table 5.

The indenture of apprentices does not as a rule dictate the tempo at which the ranks of the artisan category are being augmented. For this, one is required to examine the number of trainees who completed contracts of apprenticeship which is exhibited in table 6.

Table 6: Number of Newly Indentured Apprentices and Number of Trainees who completed contracts of apprenticeship in the Metal Industry 1970-1992

Year	Newly Indentured Apprentices	Trainees who completed contracts of Apprenticeship
1970	2532	2194
1971	2760	2303
1972	2970	2046
1973	2960	1910
1974	3103	2057
1975	3662	2219
1976	3592	2364
1977	3649	4199
1978	2936	3043
1979	3358	3125
1980	3822	2607
1981	4184	2378
1982	5517	2883
1983	3577	3248
1984	3759	3987
1985	3765	4570
1986	3370	3551
1987	2991	2974
1988	2655	2571
1989	4030	1042
1990	1942	2052
1991	3911	2067
1992	1940	1977

Source: CSS, *South African Labour Statistics 1986 and 1990; Reports of the Director-General of Manpower (various).*

From this information we can deduce that the number of newly indentured apprentices generally exceeded the number of trainees who completed contracts of apprenticeship and were hence qualified to perform artisan duties. In fact for every ten newly indentured apprentices for any single year between 1970 and 1992, approximately eight trainees under apprenticeship were admitted as artisans.[14] Clearly, on the basis of this evidence it means that

[14] Average for the period 1970-1990. Calculated self.

should the numbers of newly indentured artisans decline, it will ultimately lead to a corresponding drop in the number of apprentices who qualify later as artisans. The evidence marshalled thus far appears to substantiate the point that this is indeed happening currently in the South African metal industry.

Apprenticeship training in South Africa tends to be strongly influenced by business cycle activity. The HSRC/NTB Report on artisan training observed that the demand cycle for the employment of artisans lags the business cycle (HSRC/NTB, 1985: 69). The intake of apprentices is directly related to the business cycle. The Report notes:

> '...in the downturn employers cut back on their apprentice intake because there is no work for them to do and because funds that could be used for training have become limited' (HSRC/NTB, 1985: 70-71).

However, the only impact that business cycle activity is likely to exert on qualifying artisans is to delay their prospects of landing a job as skilled workers and becoming fully absorbed into the labour market. For potential apprentices the onset of a downturn in the business cycle may limit opportunities of securing an apprenticeship altogether.

The largest occupational category in the metal industry consists of operators and semi-skilled workers. Black workers constitute the bulk of semi-skilled and related employment as is shown in the data presented in table 7.[15]

[15] A shortcoming of the data is that it includes operatives in the motor industry too, which would tend to inflate figures for the metal industry, but however inflated the figures, its inclusion leads to a degree of consistency.

Table 7: Operatives, Semi-Skilled and Related Workers in Processing of Metal, Plastics or Machine Parts in any Industry Including Operatives in the Motor Industry 1969-1989

Year	White	'Coloured'	Asian	African	Total
1969	32603	23124	3848	80366	139941
1971	30862	27844	5573	96243	160522
1973	31319	29800	5798	114484	181401
1975	31172	31098	6284	131450	200004
1977	25394	27062	5772	160427	218655
1979	24404	32912	6196	133854	197366
1981	27769	41442	8198	177224	254633
1983	29219	33500	6472	166616	235807
1985	18912	36977	6616	177415	239920
1987	14058	26773	5412	127075	173318
1989	21346	28694	5982	206876	262898
1991	22725	36043	5587	201145	265500

Source: *Manpower Surveys*

In 1969 the racial employment distribution among semi-skilled and related occupations was as follows: white (23.3%), 'coloured' (16.5%), Asian (2.8%) and African (57.4%). The growth in total employment from 1969 to 1991 within this category according to the Manpower Surveys was 89.7% and amounted to more than double that recorded for artisan employment. In the same period the African proportion of the labour force increased from 57.4% in 1969 to a massive 75.8% in 1991. This proportionate increase in African employment was accompanied by declines for the remaining groups; in 1991 these proportions were: white (8.6%), 'coloured' (13.6%) and Asian (2.1%). Of this period, Hindson and Crankshaw correctly note:

> 'The perpetuation and possible deepening of the racial division of labour in this industry was accompanied by an astonishing transformation of the African workforce from a largely unskilled to a semi-skilled operative workforce over the period' (Hindson and Crankshaw, 1990: 31)

What is the significance of this evidence? It demonstrates that semi-skilled occupations represent a large reservoir from which the ranks of skilled employment categories can be replenished and expanded given appropriate training and industrial strategies. The growth of semi-skilled occupations at the expense of unskilled occupations proves that however haphazard and minuscule, a transference and an improvement of the skills pool in the metal

industry has taken place since the 'sixties. This trend is corroborated by the work of Hindson and Crankshaw (1990). Moreover there has been an improvement in the racial distribution of occupations, particularly within semi-skilled categories.

A question which is important to ask at this stage, one that has a direct bearing on the themes the thesis is attempting to address, is why under conditions of a massive increase in the numerical composition of the labour force in semi-skilled occupations in the metal and engineering sector has there not been an equivalent increase in skilled occupations, particularly in the artisanal trades? What are the tensions and contradictions which mediate the differences between these two poles? Although we are not attempting to answer these questions directly, some of the substantive evidence assembled thus far indicates in which direction an argument can be developed in order to give an explanation to these questions.

3.4 Wages and Wage Differentiation

If one can determine precisely the extent to which statutory regulated industrial council wage rates in the metal and engineering industry of South Africa mirror actual wages paid to skilled, semi-skilled and unskilled employees covered by industrial council agreements, interesting inferences can be drawn about the nature of employment in the industry. This determination is important, because statutory regulated wages are the minimum wages paid. It is often the floor protecting unorganised and non-unionised employees. Subject to a host of intervening conditions, actual wages paid to employees can therefore be higher than statutory regulated wage rates. Table 8 shows the nominal wages (current rand amounts) for labourers, apprentices and artisans as regulated by the industrial council for the metal and engineering industry of South Africa.

Table 8: Nominal Minimum Weekly Wages (in Rands) of Labourers, Apprentices & Artisans as Regulated by the Industrial Council of the Metal and Engineering Industry of South Africa

Year	Labourer	Apprentice First yr.	Apprentice Second yr.	Apprentice Third yr.	Apprentice Fourth yr.	Artisan
1976	24.78	38.01	42.77	52.27	85.52	95.03
1977	26.56	39.46	44.40	54.26	88.78	98.65
1978	31.43	45.25	50.91	62.22	101.81	113.13
1979	35.96	49.78	56.00	68.44	112.00	124.44
1980	41.40	56.85	63.96	78.17	127.91	142.29
1981	47.75	63.72	71.69	87.62	143.37	159.30
1982	64.37	76.60	85.05	104.72	171.36	190.40
1983	68.90	81.44	91.62	111.98	183.24	203.60
1984	77.85	89.52	100.71	123.09	201.42	223.80
1985	85.50	93.78	105.50	128.95	211.01	234.45
1986	99.90	105.25	118.40	144.72	236.81	272.12
1987	117.45	122.61	136.13	168.59	275.87	306.52
1988	135.90	131.22	147.62	180.43	295.25	328.05
1989	156.78	151.76	170.73	208.67	341.46	371.78
1991	196.99	176.46	198.52	242.64	355.70	453.88

Source: *Government Gazettes*

Although these are only statutory minimum wage rates, it does provide us with a rough indication of the trend in actual wage rates, since these are negotiated between organised labour and employers within the industrial council. Using this data, one can calculate the wage differentials between labourers and other categories of the workforce such as apprentices and artisans. This data is reproduced in table 9.

Table 9: Differentials between Labourers Wages and that of Apprentices and Artisans

Year	Lab/App1	Lab/App2	Lab/App3	Lab/App4	Lab/Art
1976	1.53	1.73	2.11	3.45	3.83
1977	1.49	1.67	2.04	3.34	3.71
1978	1.44	1.62	1.98	3.24	3.60
1979	1.38	1.56	1.90	3.11	3.46
1980	1.37	1.54	1.89	3.09	3.44
1981	1.33	1.50	1.83	3.00	3.34
1982	1.19	1.32	1.63	2.66	2.96
1983	1.18	1.33	1.63	2.66	2.96
1984	1.15	1.29	1.58	2.59	2.87
1985	1.10	1.23	1.51	2.47	2.74
1986	1.05	1.19	1.45	2.37	2.72
1987	1.04	1.16	1.44	2.35	2.61
1988	0.97	1.09	1.33	2.17	2.41
1989	0.97	1.09	1.33	2.18	2.37
1991	0.90	1.01	1.23	1.81	2.30

Source: *Calculated from table 8.*

From table 9 we can see very clearly that labourer/apprentice differentials over all four levels of training and labourer/artisan differentials have declined systematically over the period since 1976 for which data is used. In 1976, first year apprentices earned one-and-a-half times more than a labourer, but by 1988, marginally less. In 1991 this had shrunk even further with a first year apprentice earning nine-tenths of the labourer's wage. The same trend applied to second, third and fourth year apprentices. In view of the reputed shortage of skilled artisans, it was surprising that labourer/artisan differentials declined in the same manner. In 1976 an artisan earned almost four times the weekly wage of a labourer, but by 1991 this differential had been reduced to about two-and-a-third.

Correspondingly, as table 10 illustrates, declining wage differentials have also been associated with a decline in the real wages of apprentices and artisans.

Table 10: Real Minimum Industrial Council Weekly Wages (in Rands) of Labourers, Apprentices and Artisans Calculated According to a 1985 Base Year

Year	Labourer	Apprentice First yr.	Apprentice Second yr.	Apprentice Third yr.	Apprentice Fourth yr.	Artisan
1976	75.09	115.18	129.59	158.39	259.16	287.95
1977	72.57	107.81	121.30	148.24	242.57	269.52
1978	77.79	112.00	126.01	154.02	252.01	280.01
1979	78.69	108.92	122.54	149.76	245.07	272.29
1980	79.77	109.54	123.23	150.62	246.46	274.16
1981	79.84	106.56	119.88	146.52	239.75	266.39
1982	93.83	111.66	123.98	152.65	249.80	277.55
1983	89.36	105.63	118.83	145.24	237.67	264.07
1984	90.52	104.09	117.10	143.13	234.21	260.23
1985	85.50	93.78	105.50	128.95	211.01	234.45
1986	84.23	88.74	99.83	122.02	199.67	229.44
1987	85.29	89.04	98.86	122.43	200.34	222.60
1988	87.45	84.44	94.99	116.11	189.99	211.10
1989	87.98	85.16	95.81	117.10	191.62	208.63
1991	83.83	75.09	84.48	103.25	151.36	193.14

Source: *Derived from Table 8 using a 1985 base Consumer Price Index*

Using a 1985 base year, wage increases awarded to labourers in industrial council agreements in the metal and engineering sector between 1976 and 1991 increased by 11.6% in real terms. Diametrically the reverse occurred for apprentices and artisans: between 1976 and 1991, the real wages of first, second and third year apprentices declined by 35%, while that of fourth year apprentices and artisans declined by 42% and 33% respectively. A number of factors may be responsible for this trend but in our view it might be explained by the more forceful growth and impact which the progressive trade union movement has had among the unskilled and semi-skilled segment of the workforce in the manufacturing sector.

The declining wage differentials between skilled and unskilled workers and the declining real wages for skilled workers suggests that the substitution of skilled labour by unskilled and semi-skilled labour has been taking place. This applies particularly if the classical costs-of-job or in-service training model used by Ryan (1980) and Metcalf (1985) is used to advance an explanation about why the usage of a relatively higher priced labour input is declining. This is also why unskilled and semi-skilled labour has become more expensive in relation to skilled labour. As was shown in chapter one (section 1.3), the model used by Ryan (1980) and Metcalf (1985) assumes that the costs of training are borne by the employer as well as the

trainee. The costs borne by the trainee is equivalent to the additional rewards which could have been earned by doing a different job. The costs of the employer is calculated for the period in which the trainee contributes less to the output of the firm than a fully functional worker who has already been trained. Employers are therefore inclined to substitute skilled labour for unskilled and semi-skilled labour, particularly if it represents a net gain from the costs of training.

At some point though, this trend should have been reversed, because employers could have benefitted by engaging more skilled artisan labour at lower real wage rates. The statistics on employment trends show that the level of artisan employment has been roughly static over the twenty years since 1970. The cheapening of the price of apprentice labour in relation to unskilled labour has not resulted in an increase in new contracts for apprentices. Instead the number of contracts registered for new apprentices appear to be lower than what they were at the beginning of the 'seventies.

Referring once again to tables 2 and 7, interesting trends can be observed in the growth of total employment. From 1975 to 1991, total artisan employment in the industry increased by a sluggish 3.3%. Over the same period, employment for operators and semi-skilled workers increased appreciably by 32.7%. Although data is not available for labourers, a SALDRU study revealed a net shedding of unskilled labour in the industry throughout the eighties (SALDRU, 1990: p.162), which undermines the thrust of Ryan (1980) and Metcalf's (1985) model in this instance, since the usage of a potentially cheaper input is also declining comparatively. This evidence corroborates that presented by Hindson and Crankshaw which is discussed at the beginning of this chapter.

Despite the prevalence of economic forces which have favoured the preservation and prolongation of apprenticeship training in South Africa, the very opposite has occurred. Even though apprentice and artisan labour has become cheaper in relation to unskilled labour, there has been an overall decline in the number of artisans and apprentices in the Metal and Engineering Industry of South Africa. But as was shown in chapter two of this thesis, the forces of job fragmentation and skills dilution have systematically eroded the content of craft training.

3.5 A Description of Artisanal Occupations

Before proceeding to discuss the structure of artisan and apprentice employment in the industry, it would be appropriate for the clarification of the reader to give a brief description of the major artisanal occupations found in the metal and engineering industry.[16] Broadly, these may be separated into maintenance occupations and fabrication or construction occupations. The most important maintenance occupations among artisans embrace mechanics, fitting, mill-wrighting and welding.

'The **fitter** maintains and repairs machines' and 'must be able to strip a machine, identify the fault and reassemble the machine in good working order'. The ability to do 'maintenance work on a variety of machinery' is essential. A fitter must be thoroughly conversant with 'hand tools and measuring instruments, as well as have an understanding of hydraulic and pneumatic systems' (Bryce, 1989: 570).

The **mill-wright** is chiefly responsible for production machines and equipment being in good working order so that production is not hampered by breakdowns. A mill-wright therefore traces and repairs faults in equipment. A mill-wright must have a comprehensive electrical and mechanical knowledge in order to dismantle and repair 'electrically driven machines and electronic control gear'. Often the mill-wright is required to 'make temporary repairs until the right parts are available' (Bryce, 1989: 572). The mill-wright is also responsible for the mechanical and electrical installation of machines.

Among the chief construction and fabrication occupations in the metal and engineering industry are: boiler-making, fitting and turning, moulding, pattern-making, structural plating, tool, jig and die making, turning and welding.

'**Boilermakers** work in the heavy engineering, construction and pressure vessel manufacturing industries amongst others'. They are trained to 'make structures from steel plate' which can

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[16] This section is drawn from the section 'Metal and Engineering Industry' in A.Bryce, 1989,pp.564-576,and contains information supplied by the Metal and Engineering Industries Education and Training Board.

'range from boilers for steam engines and pressure vessels for power stations and petrochemical plants to mine head-gears, bridges and oil-drilling platforms'. Besides being able to do mechanical drawing, boilermakers also cut steel plate to specified dimensions and bend it 'into the right shapes, using hand tools, bending brakes, rolling machines and heating procedures'. Finally the boilermaker 'assembles the various parts and prepares the object for welding' (Bryce, 1989: 566).

Fitting and turning involves the machining and precise construction of metal components for machinery and installations. It also includes assembly and fitting. For example, the fitter and turner 'may dismantle a gearbox, inspect the gears and gear shafts for wear, faults and damage'. If necessary, a new shaft will be turned, aligned and reassembled with the gearbox. The fitter and turner 'works from drawings or models in a variety of materials and uses a lathe to produce parts such as shafts, threads, bushes and couplings' (Bryce, 1989: 570).

'**Moulders** work in foundries and similar establishments. They form moulds in special sand, into which molten metal is poured to produce castings. Castings range in shape and size from aluminium motor car engine blocks to bogies for under-frame locomotives. It is the moulder's job to ensure that moulds are technically correct, so as to produce castings of a high standard' (Bryce, 1989: 573).

Pattern-making involves the making of patterns 'from materials such as wood, plastic, fibreglass and metal' using woodworking machines, sawing machines and lathes. The patterns are used to manufacture 'castings for products such as pumps and bearings. The pattern-maker works from drawings, selects the material and marks it to size. It is then cut or sawed, finished off and assembled into the pattern or model which is used by the moulder to form moulds or castings' (Bryce, 1989: 573). Webster has described the pattern-maker as the 'architect of the foundry process' (Webster, 1985, plate 3).

The **structural plater** 'fabricates and constructs structures of steel plate'. After marking the steel plate, the structural plater cuts it into the correct dimensions 'using cutting torches or guillotines', after which it is bent 'into the right shapes, using either hand or mechanical tools' (Bryce, 1989: 575). Thereafter, the different parts are assembled and prepared for welding.

A **tool, jig and die-maker** is generally regarded as a highly skilled craftsman and 'makes various metal dies which, when fitted into a press, will enable a component to be manufactured quickly and to exact measurements. A "tool" in this trade is a device which cuts a sheet of metal to the required shape and size, the "die" bends the component into a three-dimensional shape and the "jig" holds it so that it can be accurately machined. The tool, jig and die-maker uses a large number of machines, including milling machines, lathes, drilling and boring machines and surface and cylindrical grinders' (Bryce, 1989: 575). For each component to be exactly the same, it is important that the tools are made to the exact required specifications.

A **turner** uses lathes of different sizes to '"turn" metal objects into the required shape' (Bryce, 1989: 576). These can range from screw threads, axles, crankshafts and bearings.

The work of a **welder** can range from repair and maintenance welding to construction and fabrication welding on many types of metal. Examples of jobs where welders may be engaged are 'the building and maintenance of pipelines, boilers, nuclear reactors and motor cars' (Bryce, 1989: 576). Welding may be seen as a finishing process with very wide applicability in the industry.

Without unnecessary over-simplification, it can be suggested that on the basis of the occupations described above, certain occupations such as tool, jig and die-making and pattern-making would require a more thorough training and greater skills to fulfil than boiler-making or fitting and turning. An occupation such as welding may be taught and functionally acquired in a shorter space of time than numerous other occupations described above, even though it would take long experience and a greater length of supervision to gain absolute mastery of it. Another dimension may be added to the discussion. Woodward for instance argues that skills can be further viewed along two dimensions.

> 'Firstly, there is the depth of skill. This reflects in the time taken to complete a given task. Secondly, there is the breadth of skills. This reflects the range of jobs that can be carried out' (Woodward, 1975: 38).

Experienced workers in most job categories would therefore have a greater skill depth as they can accomplish tasks more speedily. Highly skilled occupations, especially the craft occupations would exhibit a greater job breadth. When we discuss the modification of the racial division of labour in South Africa in terms of the structure of artisan and apprentice employment in the 'eighties, it will become quite clear that black artisanal employment and apprenticeship training is heavily concentrated in occupations where functional attributes and skills are acquired sooner. In fact, the job breadth of these occupations is qualitatively less than for the more skilled occupations where white artisans are more concentrated proportionally.

3.6 The Structure of Artisan and Apprentice Employment in the 'Eighties

Evidence contained in the Manpower Survey of 1987, which provides more systematic breakdowns of employment categories than those contained in later surveys, reveals that the bulk of artisan employment in the metal and engineering trades are concentrated in a limited number of occupational types, or job categories. Occupational types for white artisans cover a wider spectrum - 74.05% of white artisans in 1987 were to be found in only five different occupational types, the largest being boilermakers/platers (13.63%), fitter and turners (31.83%) and fitters (15.64%). Despite this, the wide occupational spectrum, as I argue below, presents white apprentices with greater occupational choices when embarking on a career.

Job categories for black artisans are more narrowly demarcated. Black artisans therefore tend to be located in more limited number of occupational types. A high occupational concentration ratio is evident from the following statistics: five occupational types account for 83.25% of 'coloured' artisan employment, eight for 89.56% of Asian artisan employment and six for 72.06% of African artisan employment. The majority of 'coloured' artisans worked as boilermakers (26.53%), fitter and turners (13.29%) and welders (31.01%). Asian artisans appear to be gradually holding more skilled positions proportionally than other black artisans but are mainly employed as boilermakers (10.49%), construction steel/architectural metalworkers (15.54%), fitter and turners (14.91%), instrument makers and repairers/mechanics (11.93%) and sheet metalworkers (14.72%). The majority of African artisans are employed as boilermakers (13.16%), fitter and turners (7.9%), fitters (8.99%),

sheet metalworkers (8.36%) and welders (28.45%). The rapid introduction of new technological applications to the metal and engineering industry such as robot arc welders[17] implies that workers in job categories where robots are being used, and who are not retrained for other occupations may well be the first segment of skilled workers to experience retrenchment and redundancy.

New job entrants, particularly black entrants whose perceptions of labour market employment are shaped by prevailing limitations and opportunities are therefore presented with fewer occupational choices. Their points of entry into the industry as apprentices would therefore be more limited.

Although the majority of white apprentices in 1987 were being trained as boilermakers (12.18%), fitter and turners (32.04%), fitters (10.04%) and millwrights (9.96%), white apprentices generally were being trained on a larger scale numerically in occupations covering the entire range of job types. The converse prevailed for black apprentices. Black apprentices were almost confined and rigidly trapped within particular types of occupations. For instance, the majority of 'coloured' apprentices were being trained as boilermakers (25.29%), fitter and turners (24.94%), fitters (17.72%) and as toolmakers, tool and jigmakers and toolsetters (11.07%) while the majority of Asian apprentices were being trained as boilermakers (19.46%), fitter and turners (27.01%) and fitters (25.06%). The majority of African apprentices (78.84%) were being trained in only three types of occupation. These were: boilermaking (22.27%), fitting and turning (27.47%) and fitting (29.11%).

If we change the basis of our calculation slightly, it becomes quite clear that according to the Manpower Survey of 1987, white apprentices still constituted 80.66% of all metal industry apprentices in training, while 'coloureds' made up 5.57%, Asians 2.67% and Africans 11.10%. In comparison to its proportion of artisans (5.55%), the proportion of African apprentices in training was more favourable. Although the actual reasons may be more complex, this skewed distribution may be attributed in no small measure to the more flexible approach adopted by

[17] Kaplan (1991: 19-20), notes that robot arc welders are very popular in South Africa and their usage can be expected to spread rapidly in the near future.

some enlightened representatives of capital[18] to address the shortage of skilled labour in South Africa by training blacks, in trades that were previously not open to them.

3.7 Conclusion

This chapter has provided substantial empirical evidence showing changes in the structure of artisan and apprentice employment in the metal industry over the past twenty years. It empirically consolidates the core argument the thesis makes, namely that the apprenticeship system in South Africa has experienced a gradual and systematic erosion. However, the erosion of the apprenticeship system has not been an even process. Particular spheres of the artisan system have only been marginally affected by this process and old hierarchies between artisans (predominantly white artisans) and unskilled labourers (predominantly black labourers) have been preserved. Within artisan occupations which are characterised by a narrower skills breadth (e.g. welding) and which therefore require a more limited set of generic skills (for a job to be undertaken competently and efficiently), the erosion has been more severe. In these sectors, the seperation between skilled and semi-skilled occupations has become much narrower, signifying that the erosion of artisan trades has been more dramatic. This evidence is reflected in the growth of semi-skilled occupations in many metal and engineering trades.

In chapter four, an even more microscopic dimension of apprenticeship training is analysed in order to ascertain the extent to which the institutional fabric of the apprenticeship system was itself undergoing severe strains. This is done by studying data on trade test results in order to show how these results reflected the structural tensions of the apprenticeship system. Attention is also drawn to the constraints and limitations which the size of firms and the nature of the industrial organisation within such firms impose on the training regimes that can be implemented at the workplace.

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[18] The chairman's review of Highveld Steel's operations in 1986 carried the following statement: 'For the period under review the corporation continued to train apprentices at the same rate as in 1985. The total number of apprentices remained at 300, of whom 53 were black' (i.e. African P.L). (Reproduced in *Argus* 11/3/1987).

CHAPTER FOUR: ARTISAN TRADE TEST RESULTS AS AN INDICATOR OF THE EROSION OF APPRENTICESHIP TRAINING

4.1 Introduction

This chapter has three aims. First, it sets out to analyse trade test results in the metal industry between 1971 and 1992. Second, it addresses the influence of the size and organisation of enterprises in the metal industry on the trade test pass rates of apprentices who were in the process of qualifying as artisans. Third, it gives an insight into the testing procedures of artisans in the metal and engineering industry.

The reason why this is done, is to show that while the apprenticeship system was enduring severe strains as an instrument of industrial training as has been shown in chapters two and three, other contradictory features were being exhibited within the system. These took two distinct forms. In the one form, the internal mechanisms for assessing the quality of artisans produced was inconsistent, because potential artisans were being examined for an inflexible set of reasons. In the other form, the assessment of artisans ignored the industrial and organisational milieu in which apprentices were being trained. Yet these structural features of the apprenticeship system had a debilitating effect on the output of artisans. The important elements in the equation were the large variation in the size of firms and the strong variation in the complexity of production organisation within these firms. In fact, contradictory signals were being emitted about the reasons for low trade test results of artisans. The focus of attention tended to be directed almost exclusively towards the quality of apprentice that was being indentured, ignoring a whole host of other contributory causes. Institutional inertia in responding timeously to crises in apprenticeship training (and the low level of trade test successes was merely one manifestation of it), was itself a symptom of crisis. It represented a crisis in the institutions of the state to govern and manage human resources development effectively.

4.2 Trade Test Results in the Metal Industry

One index which has served commentators with a stark barometer of the health of artisan industrial training in South Africa have been the results obtained from trade tests

(HSRC/NTB, 1985: 13; Meth, 1979). The incidence of low trade test results can lead to one of two interpretations. Either, the standards set by examining bodies are too high or the standard of learning of the examinees is dismally low. The literature surveyed has not recorded any evidence which proves the validity of the first proposition and has therefore focused more attention on the latter proposition. Statistical evidence shows that the pass rate, particularly for apprentices in the metal industry was exceptionally low. Roughly more than half of apprentices in this industry who sat for their trade test examinations failed. While it was permissible to have two attempts at passing the examination, those who were unsuccessful or chose not to do the examinations again, qualified as artisans by what was then referred to as the 'effluxion of time' when the contract of apprenticeship came to a close and they were automatically awarded a trade certificate. Since it reflected the quality of skilled workers in South Africa, it was viewed with deep consternation by employers dependent on highly skilled artisanal labour. Yet, little was done to rectify it until the 'eighties when educational entry requirements for apprentices in some industries were raised in some instances, after the appointment of a commission of enquiry under the auspices of the Human Sciences Research Council(HSRC) and the National Training Board(NTB).

However, the precise reasons for the phenomenon of low trade test pass rates are rather more complex and varied. Indeed it relates to the institutional fabric governing artisan training in South Africa and ranges from the politically inspired entrenchment of job reservation and the lukewarm commitment of the majority of employers to training, to the lackadaisical statutory enforcement of training requirements, as has been shown in chapter two of this thesis.

Table 11: Trade Test Results in the Metal Industry

Year	Trade Test Results Undertaken	Passes Number	Passes Percentage
1971	3536	958	27.1
1972	2708	789	29.1
1973	2849	879	30.9
1974	3284	1009	30.7
1975	3172	986	31.1
1976	3221	1166	36.2
1977	4107	1422	34.6
1978	4652	1822	39.2
1979	4023	1714	42.6
1980	3302	1534	46.5
1981	3552	1700	47.9
1982	4154	1900	45.7
1983	5360	2343	43.7
1984	5944	2494	42.0
1985	5972	2709	45.4
1986	4588	2045	44.6
1987	4016	1971	49.1
1988	3653	1823	49.9
1989	3663	1842	50.3
1990	3403	1795	52.7
1991	3579	1824	51.0
1992	4262	2240	52.6

Source: *CSS, South African Labour Statistics 1986 and 1990; Reports of the Director-General of Manpower (various)*

Table 11 depicts the pass rate among apprentices in the metal and engineering industry since 1971. Throughout this period the level of trade test passes has generally been below fifty per cent. Ironically, the results recorded during the 'seventies, when job reservation and racial exclusion was rigorously enforced were much lower than the 'eighties when the Manpower Training Act made provisions for the acceptance of more black, particularly African, candidates to apprenticeship training programmes.

Throughout this period technical colleges where apprentices were required to obtain theoretical instruction remained racially segregated.(Bot, 1988) Despite efforts by big business to sponsor private training institutions that provided accredited training for black apprentices, a significant number of African apprentices received their theoretical instruction at technical colleges and institutions based in the homelands. Although the statistics do not give

a breakdown of the industries from which apprentices taking the trade test were located, the total number of apprentices successfully completing the trade test in the homelands was very small and the pass rate was much lower than in the remainder of the country. This data is reproduced in table 12.

Table 12: Trade Test Results in the Independent Homelands and Self-governing territories, 1986-1992

National States	1986		1987		1988		1989		1990		1991		1992	
	Passed	%	Passed	%	Passed	%	Passed	%	Passed	%	Passed	%	Passed	%
Transkei	57	23.1	64	30.0	43	26.4	37	19.5	40	21.1	29	22.8	41	30.4
Bophutatswana	103	29.3	172	27.5	73	29.1	33	18.1	37	24.8	44	28.9	61	36.1
Venda	28	20.6	64	22.2	15	15.0	24	27.0	22	17.9	28	31.1	39	33.1
Ciskei	57	39.0	74	35.6	19	25.0	16	26.2	22	27.8	18	31.6	9	20.0
Self-Governing Territories														
Kwazulu	85	31.8	151	33.0	54	37.0	20	17.7	42	31.8	32	25.8	69	43.4
Lebowa	45	23.1	79	25.5	57	31.5	28	18.8	22	20.0	21	23.9	32	29.1
Gazankulu	40	20.9	73	21.0	28	16.8	15	13.6	34	23.0	34	29.8	31	25.0

Source: *Annual Reports of the Department of Manpower (various).*

4.3 The Influence of Enterprise Size and Organisation on trade test pass rates

Trade test results in South Africa hide much more than they actually reveal. Apprentices are trained in large and small enterprises, in parastatals and in private concerns - all under distinctly different training regimes. Although it is quite difficult to draw conclusive inferences on the extent of training in different concerns, one can develop conclusions on the quality of training undertaken on the basis of the little bit of evidence that has been assembled over the past decade with regard to training facilities and the commitment these concerns have had towards artisanal training.

A study by Meth (1979: 58-59), suggested that public sector firms (parastatals) provide a higher level of training to apprentices than do private sector firms. This conclusion was reached after comparing the trade test results of apprentices indentured at private sector metal firms during 1976 and 1977. In 1976 the pass rate for ISCOR's apprentices was 49.6% and for those indentured at private sector metal firms it was 31.9%. As a parastatal, ISCOR's

standard of training was of a better quality than that offered at private metal firms. Because ISCOR accounted for such a high proportion of metal and engineering apprentices, this raised the average percentage pass rate in the industry to 36.2%. A similar situation prevailed in 1977. Whereas the pass rate of ISCOR's apprentices taking the trade test increased over the previous year, that for apprentices in private metal sector firms declined to 29.9% in 1977. Similarly, the decline in the pass rate for trade tests in private metal firms in 1977, contributed to a decline in the average trade test pass rate for the industry over the previous year. Data from Meth's study is reproduced in table 13 below.

Table 13: Comparative Trade Test Results in the Metal (Engineering) Industry

	Total Metal (Eng)	ISCOR	The Rest
No. Entering: 1976	3221	776	2445
No. Entering: 1977	4107	797	3310
No. Passing: 1976	1166	385	781
No. Passing: 1977	1422	432	990
Pass Rate (%): 1976	36,2	49,6	31,9
Pass Rate (%): 1977	34,6	54,2	29,9

Source: *Meth, 1979, p.75.*

On the basis of this study Meth came to the following conclusion:

> 'These results seem to bear out the widely-held belief that public sector apprentice training facilities and programmes, are in general superior to those offered by the private sector'.(Meth, 1979: 75)

In a footnote to this discussion Meth indicated too, that ISCOR (at the time a fully fledged parastatal) employed approximately 18% of the workers in the industry but trained roughly 33% of the apprentices.(Meth, 1979: 89, *n*.34)

Almost ten years later a study by Kraak produced evidence which confirmed that large firms tended to train a greater proportion of apprentices than small firms.

> '...SEIFSA, the employer association in the industry, reports that of the few large corporations in the metal industry, 12 of them are responsible for recruiting almost 33% of the metal apprentices per annum. Only 60 firms, all mostly large or medium sized companies, have their own training centres. Of the 8000 members, 1000 do full

apprenticeship training, 5000 do minimal training, and 2000 small companies do no training whatsoever'.(Kraak, 1988: 88-89)

Juxtaposed, despite a ten year hiatus, these statistics indicate roughly that twelve large corporations from a sample of 8000 employers were responsible for the training of approximately one-third of all apprentices in the metal and engineering industry in South Africa.

Two very significant points are raised in the work of Meth and Kraak: firstly, that nationalised enterprises are more inclined to engage in the training of artisans than non-nationalised enterprises; secondly, that large companies are more likely to train artisans in South Africa than small companies.

Certainly, the relationship between company size and plant size is not unilinear. Large companies could contain small plants, while small companies could constitute a few large plants. The Metal sector consists of five separate though inter-related industries.(Central Statistical Services, 1982; 1985 and 1988). These industries are: Basic Iron and Steel, Basic Non-ferrous metal, Metal Products, Machinery and Equipment and Electrical Machinery. It is interesting to observe that the Basic Iron and Steel Industries account for the largest proportion of output of Metal sector industries but together with Basic Non-Ferrous Metal contains the smallest proportion of firms.

Table 14: Relation between Industry sizes and firm numbers in metal sector

Industries in Metal Sector	% Proportion of output (1985 data)	% Proportion of Firms			
		1979	1982	1985	1988
Basic Iron and Steel	30.39	3.55	4.04	3.51	2.90
Basic Non-Ferrous Metal	9.18	2.22	1.90	1.84	1.67
Metal Products	25.83	51.99	50.03	49.14	49.16
Machinery & Equipment	19.25	27.82	29.85	31.47	31.17
Electrical Machinery	15.35	14.42	14.18	14.04	15.1 0

Source: *Calculated from Manufacturing Census Statistics.*

In 1985, 3.51% of all Metal sector firms were located in the manufacturing of Basic Iron and Steel and accounted for 30.39% of output. In contrast to this 49.14% of the firms were concentrated in the Metal Products and 31.47% in the Machinery and Equipment Industries. However, in terms of output they only generated 25% and 19% respectively. By 1988 these figures still remained roughly the same: Metal Product firms accounted for 49.16% of firms in the metal and engineering sector, but 24.52% of output, while firms in Machinery and Equipment constituted 31.17% of firms but contributed to 20.5% of output in the sector. (Calculated from Central Statistical Services, *Census of Manufacturing, 1988*)

This evidence suggests that there are a large proportion of small firms in the Metal Products and Machinery and Equipment Industries and that the overall size of firms is smaller than would be the case in Basic Iron and Steel Industries.

Table 15 defines the size of a plant in terms of the numbers employed. The table demonstrates that in the Metal sector on the whole, the majority of firms employ less than one hundred employees. The number of firms operating in Basic Iron and Steel and Basic Non-Ferrous Metal Industries are far fewer than the number operating in the other sectors of the Metal Industry. The average size for both sectors ranges between 20-99 employees. For all the other sectors the plant size is much smaller and ranges between 0-19 employees. In 1988, more than half of the firms in the Fabricated Metal Products Industry (64%), the Machinery

Industry (64.9%) and the Electrical Machinery Industry (59.9%) had less than twenty employees. Small firms thus dominate production in the Metal sector.

Table 15: Plant Sizes According to Employment Levels

Iron and Steel	Basic Industries			
No. of Employees	1979	1982	1985	1988
0-19	41	59	52	41
20-99	62	90	79	85
100-499	58	66	54	54
500-999	11	16	12	13
1000+	14	13	14	13
Total	186	244	211	206
Non-Ferrous	Metal Basic	Industries		
No. of Employees	1979	1982	1985	1988
0-19	35	35	30	47
20-99	45	42	47	35
100-499	27	26	25	28
500-999	3	6	3	3
1000+	6	6	6	6
Total	116	115	111	119
Fabricated	Metal Products			
No. of Employees	1979	1982	1985	1988
0-19	1675	1786	1831	2236
20-99	771	907	840	980
100-499	235	287	253	251
500-999	28	26	24	18
1000+	12	17	10	11
Total	2721	3023	2958	3496
Machinery,	except Electrical			
No. of Employees	1979	1982	1985	1988
0-19	821	1083	1132	1439
20-99	459	541	588	606
100-499	152	144	149	145
500-999	20	23	17	19
1000+	4	13	8	8
Total	1456	1804	1894	2217
Electrical	Machinery			
No. of Employees	1979	1982	1985	1988
0-19	427	476	469	643
20-99	211	245	254	304
100-499	87	103	89	91
500-999	20	19	24	23
1000+	10	14	9	13
Total	755	857	845	1074
Metal Sector	Overall			
No. of Employees	1979	1982	1985	1988
0-19	2999	3439	3514	4406
20-99	1548	1825	1808	2010
100-499	559	626	570	569
500-999	82	90	80	76
1000+	46	63	47	51
Overall Total	5234	6043	6019	7112

Source: *Manufacturing Census Statistics*

The difference in the size of firms (i.e. defined by the number employed) between various sectors of the metal industry, can be explained by the following: In the Basic Iron and Steel and the Basic Non-Ferrous Metal Industries more processing of raw materials takes place in the foundries and blast furnaces thus requiring a larger workforce than would be necessary in the remaining industries where more specialised machine-cutting, boring and finishing processes are performed by a numerically smaller but technically more skilled workforce. Hence the structure of the industry determines the optimum plant size. These comparisons are drawn to ascertain the generality of capital intensity and choice of technique because ultimately these two factors would have a bearing on the quality of the training regimes at the enterprise level.

An ideal situation for an apprentice who wants to become a well trained and effective artisan is to do an apprenticeship in a large firm which undertakes specialised manufacturing activities. This is because there is a greater probability for large firms to train its apprentices according to guidelines laid down by the Apprenticeship Act. There is also a greater probability for apprentices who are employed in firms which undertake specialised activities to be trained in one or other specialised craft. It is more likely that had statistics been available, it would show a greater propensity for apprentices in such firms successfully passing the trade test.

Both Meth and Cullinan have proffered reasons for the apparently low trade test results that have been experienced in South Africa, particularly in the metal industry. Meth argued that the enforcement of job reservation implied that suitably qualified coloured, Asian and African candidates were excluded from admission to apprenticeship training programmes. Yet, entry requirements for white apprentices were flouted continuously, not only in the metal industry but in a spectrum of industries, to enable employers to indenture the number of apprentices they were able and willing to adopt. Using data to support his thesis of the inherent structural deficiencies and inefficiencies in the training arena, Meth noted with apprehension:

> 'If Junior Certificate had been enforced as an entry qualification in 1962 in the Durban area, fully 80 per cent of the indentured motor mechanics and 72 per cent of the general engineering apprentices of the time would have been ineligible for apprenticeship. Of 267 apprentices who attended college for at least 3 years, 37.5 per

cent never passed any trade theory subject and a further 32.5 per cent passed only NTC I Trade Theory' (Meth, 1979: 63-64).

Similarly:

> 'The practice of granting wholesale exemptions to whites who had not attained the very modest entry qualifications necessary for entry to a trade, coupled with exclusion of suitably qualified Africans, coloureds and Asians, throws into sharp relief, the inequities of the present system. The building industry, picturesquely described as having gone "black" provides an example of the first practice. Gibson quoting the Master Builders and Allied Trades Association (Durban) Report of the year ended 31 December 1969, shows that 94 per cent of "non-white" apprentices (466 out of 496) could meet the entrance qualification of standard VII whereas 50 per cent of the whites (85 out of 170) had to be exempt' (Meth, 1979: 64).

Cullinan drew attention first to the large number of designated trades in the metal and engineering industry which were seen to contribute to the low pass rate for trade tests. Because these trades are covered by statutes which regulate wages, conditions of employment and training standards, they are referred to as designated trades. More than half of the forty-three designated trades were in the metal and engineering industries. It constituted a problem, because each designated trade followed a different curriculum and set different practical requirements for training. Firms which engaged artisans in a number of designated trades found it difficult to spare these in each designated trade to supervise apprentices in each of them. The second problem encountered was that of the wide industrial dispersal of apprentices undergoing training in this industry. Because of the complexity of industrial organisation, firms often tend to employ artisans and apprentices in operational activities which would not necessarily be classified as part of its core functions. For instance, it is not uncommon for firms in the building industry to employ electricians and to take on apprentice electricians as well. The same applies to welders in the mining industry and machine mechanics in the garment industry. Employers argued that they were compelled to provide their apprentices with the prescribed training in the designated trade irrespective of the industrial sector in which their apprentices operated. As Cullinan paraphrased the argument:

'Thus, the construction industry would, for example, have to give their apprentice fitters, platers, welders etc., the same training as the equivalent apprentice would receive if he were to be trained within the Metal and Engineering Industries. Therefore all apprentices regardless of whether they operate in mining, chemicals, plastics or metal have to undergo the same test at the COTT centre. The COTT system thus provides for the testing of undifferentiated apprentices' (Cullinan, 1980: 63).

One can give a litany of reasons that partially explain the incidence of low trade test results in South Africa. However, a great deal more is required to understand the reasons for this phenomenon. These reasons as Williams has shown in her comparison between the apprentice training systems of Germany and Britain are structural and institutional. Only by coming to terms with the institutional fabric of training in a particular country can effective structural and remedial changes be made which can reverse ill-conceived and ill-defined training systems.

There is an institutionally regulated discrimination against ill-qualified and non-certified tradesmen in Germany which serves as an inducement and motivation for them to enter the industry with the appropriate qualifications. Since Germany is an extremely credential conscious society, certification gives individuals greater access to skilled jobs and also enables them to be employed with greater security of tenure.

At the time of writing, Williams noted that a journeyman who had reached the age of 24 in Germany could submit to theoretical and practical tests of a higher standard to acquire a master's patent. It enabled journeymen to obtain registration at the Chamber of Handicrafts. Without such a registration it was forbidden for anyone becoming an employer or to take on apprentices. This requirement guaranteed 'that those who set up in business in those trades have acquired a certain standard of competence which protects the public employing their services or buying their products' (Williams, 1963: 32).

It created pressure both on employers and their apprentices to strive towards the achievement of success.

'The employer knows that, if there is a more than proportionate rate of failure among his apprentices, questions will be asked which may lead to his name being removed

from the register of those to whom apprentices may be contracted. And the apprentice recognises that he will not acquire skilled status unless he sets himself to master the work. Those who are familiar with both German and British conditions say that the German apprentice is more driven to learn because both he and his instructor know that any failure to do so cannot be hidden. In British firms, even where training is taken very seriously, there is not the same drive because there is no established goal of achievement' (Williams, 1963: 39).

Similar to the British system, the system of apprenticeship training in South Africa made provision for apprentices to become artisans, enabling them to automatically acquire a trade certificate through a time-based system. This situation prevailed until the introduction and statutory formalisation of competency based modular training for apprentices in 1990.

Closer examination of the evidence in South Africa however showed that apprenticeship training reveals nuances not recognised in the statistics. As a response to variations in the standards of training, artisans might have unintentionally stimulated job mobility to rectify deficiencies in training standards. On the basis of some common-sense experience and intuition, Van Gass (1972) argued that such a trend might have manifested itself in South Africa. Van Gass suggested that well trained apprentices who had been trained under modern and sophisticated technical conditions in advanced firms and became competent artisans were more likely to migrate to smaller industries where they could enjoy greater respect and earn higher wages. This meant greater authority and responsibility at the workplace. It was the less competent and less versatile artisan who had been trained in smaller, ill-equipped plants who tended to move to advanced firms, where the more modern and sophisticated technical conditions gave them an opportunity to expand their training. (Van Gass, 1972: 34). Our examination of the British, German and Nigerian apprenticeship system in chapter one showed that this trend was highly prevalent in Germany.

This argument suggests that large firms in South Africa who have trained the bulk of artisans, and still do, would ultimately not experience a shortage in the recruitment of artisans, despite losing most of them to poachers. This is because many qualified artisans would still be prepared to work for such firms. These firms would however experience a shortage of

competent artisans - competent to the level and standards to which its own apprentices and artisans were trained.

An in-depth study by Kraak showed that the very low trade test pass rate for artisans had quite a dramatic impact on production efficiency, especially in small firms and enterprises engaged in contractual and jobbing operation. Many of these firms often required well qualified and versatile artisans to undertake difficult and complex operations which could not easily be mechanised. According to an employer interviewed by Kraak:

> 'So many welders today have been trained in only one specific welding process for one job application. They are partially trained. This is a problem for us smaller companies, for we need the all-round welder who is capable of doing our high quality pressure welding' (Cited in Kraak, 1988: 149)

To substantiate this point further Kraak mentions the fact that when ICAL (an engineering firm in South Africa) advertised in newspapers at the beginning of 1986 for qualified welders, only 12 passed ICAL's stringent entry tests, although 560 had applied. In the opinion of the ICAL training officer whom Kraak interviewed, this low pass rate was 'surely a good measure of the extent of the quality and deficiency we face today'.(Cited in Kraak, 1988: 149)

This evidence reveals enormous subtleties, which can partially be explained by drawing on literature which discusses the industrial organisation of modern firms. Groover identifies three distinct types of production organisation that will greatly influence the structure of the labour force in the plant as well as the training regimes that can be implemented with firm-based training (Groover, 1987). These types of production organisation are general to the manufacturing sector of all industrial economies. The first of these he refers to as job-shop production. It is characterised by low volume but flexible outputs. The work-force is characterised by a relatively high level of skill in order to undertake a range of different work assignments. Examples of products produced using such a type of production organisation are: space-vehicles, aircraft and machine-tools.

The second type of production organisation is known as batch production. Batch production makes use of general purpose manufacturing equipment. Batch production plants include

machine shops, casting foundries, plastic moulding factories and pressworking shops. Under this manufacturing regime skill requirements are generally less specialised and more generalised. After initial induction and training, tasks can be performed by labour drawn from a broader segment of competent job applicants.

The third type of production organisation is referred to as mass production or continuous flow processes and is characterised by the manufacture of identical products. Since there is a high demand for the product (e.g. light-bulbs or beer) the rate of production is very high. 'Not only is the equipment dedicated to one product, but the entire plant is often designed for the exclusive purpose of producing the particular product. The equipment is special purpose rather than general purpose. The investment in machines and specialized tooling is high. In a sense, the production skill has been transferred from the operator to the machine. Consequently, the skill level of labour in a mass production plant tends to be lower than in a batch plant or job shop' (Groover, 1987: 19-20). It is quite obvious too, that skilled labour will merely be engaged in routine functions such as plant maintenance.

The significance of the three types of production organisation has a direct bearing on the evidence assembled thus far. It suggests that a very significant correlation exists between the production organisation of firms and the type of industrial apprenticeship training regimes that these firms are able to implement. Firms engaged in job shop production which draw on a large number of specialised occupations are more likely to train selected segments of its labour force in the acquisition of skills in some of these specialised occupations than for instance firms whose production organisation is not dependent on such specialised labour. There is a stronger liklihood for artisan trades and occupations to be found in firms whose production organisation is characterised by job-shop production than in firms which either have batch production or mass production as an organisational characteristic. A similar characterisation will separate batch production firms from mass production firms. It is very unlikely for firms engaged exclusively in mass production activities to have the capacity to train its apprentices in trades such as welding or fitting and turning when these are only its maintenance and not its core activities, as will be the norm for mass production firms. This is particularly the case, when the conventional standards demanded are most likely to be set by firms (i.e. job production firms) whose central activities, welding and fitting and turning might be.

Differences in firm sizes as was noted in table 15 are closely related to differences in the production organisation of these firms. It is more likely that firms in the Basic Iron and Steel and the Basic Non-Ferrous Metal Industry will have a greater inclination towards mass production or continuous flow processes of production. Firms located in the Fabricated Metal Products industry, the Machinery industry and the Electrical Machinery industry will bear a closer resemblance to batch production processes and perhaps in certain cases to the job-shop production where low volume flexible outputs are not unusual. Ultimately, these differences in the structure and organisation of the production systems in firms exerts a dramatic influence on the type of training that each firm is able to provide to its workforce, especially those undergoing apprenticeship training.

Although there is no hard empirical evidence to illustrate the point, a strong argument can be advanced for the following conclusion: this is that the size of firms, the type of industrial organisation and production systems in these firms coupled with their sectoral location in the metal sector influences the type of training apprentices obtain in such firms. These effects will resonate in the outcome of trade test results, and although a categorically direct correspondence between the structural milieu that has been discussed and trade tests is not being argued for, there is indeed a very strong correlation between them. It is surprising that the HSRC/NTB *Investigation into the Training of Artisans* did not discuss this theme at all.

4.4 Testing Procedures

A large segment of non-academic literature produced mainly by industry linked evaluators of artisan training programmes has been critical of the theoretical orientation pervading artisan training in South Africa. This literature is critical of the way success at examinations is generally perceived as a test of competence. This disjuncture between theory and practice has been further entrenched through the system of trade testing which evolved in South Africa. This means that practical competences which existed outside the boundaries of assessment were not considered in formal testing procedures. An article discussing the shortcomings in the training and selection of apprentices aptly highlights this dilemma:

> 'For the skilled worker, technical knowledge and practical ability are supplementary. The courses and syllabi provided by theory schooling of apprentices seldom correlate

in a meaningful way with their practical work. The seeming irrelevancy of the theory courses is an important reason why very many apprentices perform poorly in their theory studies.'(Van Gass, 1972: 34)

A large component of apprenticeship programmes were designed to give its recipients training in manual occupations. In my assessment, many of these students had become alienated from the academic orientation of schooling and in many instances showed greater inclination to manual and practical training. Consequently, it appears that the very selection criteria which had been used to expel students from the academic stream, have also been used to assess how successful they were in manual and practical fields. It is contradictory because the illusion is created that pupils who were unsuccessful in academic streams in secondary education would be accommodated in manual and practical fields which would presumably have required different modes of assessment to those which redirected them away from the academic to the non-academic streams. A contributor to the magazine *People and Profits* recognised this clearly in 1974 when he wrote:

'There is no provision for the boy who fails every exam, but is marvellous in practice. This is illogical. The essence of trades is that they are manual occupations. And one of the results of the whole examination syndrome is that too few apprentices come from ordinary high schools - the technical school boys are put off by the thought of exams. We certainly do need some form of recognition of ability, but this must go far deeper than a mere mark in an irrelevant exam'(Beckett, 1974: 12).

Perhaps, it is no wonder that an American visitor to South Africa once remarked that: 'South Africa seems to be an examination-ridden state'(Spencer, 1937: 43).

It was this extremely uncritical attitude and veneration of examinations that allowed judgement to be levelled against the significantly low trade-test pass rate of apprentices to artisan occupations. This was the main motivation for the introduction of modularised testing. Pass rates were used as a criterion to assess the efficiency and success of the apprenticeship system in South Africa. Because the pass rate for trade tests were only modest at best, the broad sentiment from trade test evaluators and employers was that the system of apprenticeship training necessarily was deficient and in need of complete replacement.

However, as Steyn (1980) showed, a number of design criteria influenced the operation of trade tests which were performed by COTT. A tension was created between assessing incumbents for competence on the one hand and grading for results on the other. Tests for competence would be concerned with measuring competence, despite the results it reflected. A different judgement would prevail where tests were concerned with showing particular results. At the margins of success or failure, a test for results could either: mask incompetence or prejudice competence. A test for results would therefore use criteria which shifts from one test event to the other, criteria which carry a subjective orientation. This is confirmed by Steyn who maintains:

> 'During its original design, the trade test standards were manipulated until the results approximated a normal or chance distribution. This was obtained in 1957. Since then, the test design for the various trades was left to develop largely uncontrolled with regard to normalisation'.(Steyn, 1980: 75).

Steyn (1980) concluded that since no uniform approach existed between the criterion-referenced one which measured mastery and the purely norm-referenced one which graded apprentices, it actually meant that in the absence of a standard approach to trade testing, each of the test makers was defending their own design. Since COTT performed the periodic testing of tradesmen, it institutionalised and perpetuated these limitations. Even the HSRC/NTB *Investigation into the Training of Artisans*, adopted an uncritical attitude to the standard of testing undertaken by COTT. Standards specified in COTT examinations were accepted as a given and not subjected to any critical appraisal or evaluation in the report. Steyn argued that this problem manifested itself especially in the mining industry where the relationship between trade test results and on-the-job competence, particularly for fitters, was weak. Trade tests merely measured manufacturing ability whereas at least four-fifths of fitters in the mining industry were engaged in maintenance and repair tasks. Therefore trade tests results of fitter trades in the mining industry were actually a useless and misleading measure of potential on-the-job competence.(Steyn, 1980: 76) But the theory and principles of manufacturing ability were being measured and assessed in trade tests. So naturally, trade test pass rates in the mining industry were low. This is precisely what I have tried to show in section 4.2: that there is a very strong influence by the size and organisation of enterprises on

the trade test pass rates of apprentices. Exactly the same corrollary can be made when comparing different industries within a broader sector, as I have tried to illustrate in my discussion of the evidence in table 15.

In addition, if Steyn's evidence is correct, a large segment of trade test examination failures might have been severely penalised and prejudiced merely because the examining authorities (COTT) were intent on achieving a normal statistical distribution in the ratio of passes to failures. The low trade test pass rate in artisan training overall was used as a criterion to shift from a singular examination oriented trade test to one where continuous competency-based assessment would be the accepted mode of assessment.

In submissions made to the HSRC/NTB *Investigation into the Training of Artisans*, neither employers nor trade test officers were able to coherently identify the source of the problem which contributed to trade test failures. Each tended to advance monocausal explanations for this state of affairs. The test officers at COTT blamed the poor practical training of apprentices for failure at trade tests.

> 'It appears that inadequacies or shortcomings in practical training as well as the prescribed training schedules and training programmes which do not correspond with the schedules, are seen as the main reason for failure by trade testees. From interviews and other feedback it also seems that the relatively low literacy level of some testees contributes to the fact that they do not understand test instructions and/or cannot grasp plans and drawings. All evidence obtained indicates that better results can be expected from well-structured training programmes.'(HSRC/NTB, 1985: 140)

Employers in turn blamed communication problems as the major source of trade test failures.

> 'Communication problems sometimes occur between testees and test officers. The result is that testees are not always certain of exactly what is expected of them. According to the testees and some of their employers, the test questions are at times not clearly set and formulated.'(HSRC/NTB, 1985: 134-135)

The purpose of this chapter has been to debunk such singular and monocausal explanations for low trade test passes. While it can be seen that successful firm-based training is dependent on a host of factors, some of which have been discussed thus far, the design of trade tests themselves might also have contributed to the relatively low trade test pass rates. Consequently, one is given greater insight into the reasons for the disappointing trade test success rate in South Africa. The gradual introduction of institutionally based technical instruction in unison with the practical gathering of experience in industry as intended by the new promulgations contained in the Manpower Training Act is likely to have a positive impact on the success of artisans undergoing trade testing. But that can only be verified with the passage of time. Hopefully, later studies will shed more light on these phenomena.

4.5 Conclusion

How do artisan trade test results serve as an indicator of the erosion of apprenticeship training?

Taken on their own terms, trade test results actually reveal very little and are therefore a poor indication of the erosion of apprenticeship training. However, because trade test results in the metal and engineering industry have been consistently low, and prior to 1989, as is shown in table 11, these have been below 50%, it provides strong circumstantial evidence that either the pass rates or the testing procedures are a source of problems. If the pass rates are the source of the problem, it means that apprentices taking the trade test exams are ill-prepared for it. If the testing procedures are the source of the problem, it means that the standard of testing is too high. On the other hand, had trade test results been relatively high, it would also have provided strong circumstantial evidence about the reasonably good nature of artisan testing procedures. The only valid criticism that might have been levelled against relatively high trade test results would have been that the standards of assessment were unnecessarily low. The insufficient nature of the data on trade test results does not make it possible to move beyond either of the two assessments elaborated above. However, the fact that adequate reasons for this phenomenon were not advanced earlier was symptomatic of the institutional inertia in the regulation and management of apprenticeship training in South Africa. A commission of

inquiry into apprenticeship training was constituted only in the 1980s when the apprenticeship training system was already in deep crisis.

This chapter has argued that trade test results hide much more than they actually reveal. The data on trade test results do not show to what extent artisan training is affected by the size and organisation of enterprises. An assessment of the data on trade test results needs to be contextualised within a more detailed understanding of the nature of enterprises within which apprenticeship training occurs. Once this is achieved, it becomes more plausible to make stronger judgements concerning the erosion of apprenticeship training. Consequently, it is hard to understand how it was ever possible to use the low trade test pass rate as numerous commentators do (examples being Hutt (1964) and HSRC/NTB (1985). Meth (1979) is an exception) as a reason to declare that the artisan training system was in need of reform. The reason why I argue this point, is that the statistics on artisan trade test results do not constitute sufficient evidence to make such a point. It appears to be merely a gesture at pretending to be informed.

Within the context of an understanding of the size and organisation of enterprises in the metal and engineering industries, as well as an understanding of the problems experienced with the testing procedures for artisans, one can declare more positively that artisan trade test results in the metal and engineering industry for the period 1969 to 1992 did indeed serve as an indicator of the erosion of apprenticeship training. The nature of trade test results were an accompaniment to the crisis in apprenticeship training, which during the decades of the 'sixties and 'seventies had undergone systematic erosion. The fact that the institutional response to the nature of artisan trade test results was insignificant until the mid-eighties, demonstrates that the institutional regulation of apprenticeship training in South Africa was itself in turmoil. This institutional inertia mirrored the actual erosion of apprenticeship training at the workplace. It represented a crisis in the ability of the institutions of the state, empowered with the responsibility of human resources development, to govern effectively. That is the central point which this chapter makes.

CHAPTER FIVE: CONCLUSION AND TENTATIVE REMARKS ON REVERSING THE EROSION OF APPRENTICESHIP TRAINING

5.1 Summary

This thesis has explored the evidence and processes which have led to the decline and transmutation of the apprenticeship system in South Africa, particularly as it has been experienced in the metal and engineering industry. It has attempted to analyse the forces at the workplace and at a broader institutional level which have contributed to the erosion of apprenticeship training.

At the workplace, employers used claims of a skills shortage to redefine the boundaries of skill in artisan occupations. An intense contestation between employers and artisans occurred on this issue. These contestations were over the definition of skill. Its focal points were job fragmentation and job dilution, which often camouflaged the economic motives of the contestation - that is, a contestation about the price of skilled labour. An outcome of the process of job fragmentation and job dilution was the substantial and unhindered growth recorded in the ranks of semi-skilled employees. Yet as was shown in chapter one, the trajectory in the development of apprenticeship systems is not unilinear and one-dimensional. Although the path followed by the apprenticeship system in South Africa was closely influenced by the direction along which the apprenticeship system in Britain developed, it was unique in several ways. The political milieu, as well as the political and economic institutions were very different. The architects of the apprenticeship system were also aware of the strengths of comparative apprenticeship systems, especially that of Germany, which they tried to draw upon. These influences were captured particularly in Commissions of Inquiry (Union of South Africa, 1935; Union of South Africa, 1948) and influenced the organisation of the apprenticeship system. This occurred in particular within the Central Organisation of Technical Training (COTT) and remained pervasive at the National Training Board for instance, even into the late 1980s. In so far as the conflict over the definition of skill between employers and labour and the setting of the price of skilled labour was concerned, the apprenticeship system in South Africa and the practices with which it was preoccupied was akin to that which prevailed in Britain.

Institutionally, the basis of apprenticeship training in South Africa historically was flawed, because it codified and entrenched racial segregation in employment and training. This created serious contradictions and gave the protective and gate-keeping role of the apprenticeship system an overt racial discriminatory character. It precluded the development of tactical alliances between organised white artisan unions and emerging black progressive trade unions to preserve the apprenticeship system from its systematic erosion, particularly in relation to its strong firm-based components.

In addition to these institutional weaknesses, the regulation of apprenticeship training in the metal and engineering trades, as was shown in chapter two, was inefficient and unwieldly. The absence of compulsory trade testing and the notion of 'effluxion through time', captures the institutional weakness of the apprenticeship system. The empirical indicators which were highlighted in chapter 3, demonstrates the extent of the erosion of apprenticeship training. Since this is a record of events in the sector which trains the largest number of apprentices (altogether one-third of all apprentices in manufacturing activities) it is a highly representative case of trends within the apprenticeship training system. It has to be noted that the erosion of apprenticeship training has not been an even process. Even within the metal and engineering industry, old hierachies within particular job categories and job fields of artisan employment have remained intact; and the racially exclusive character of past employment practices is highly evident. On the other hand, job categories and job fields within artisan employment which require less specialised competencies, such as welding for example, have witnessed a noticeable influx and increase in black artisan employment as well as black apprentice recruitment.

As was shown in chapter four, the size and industrial organisation of enterprises had a negative influence on the effectiveness of the apprenticeship system. Even the testing procedures for apprentices who were on the brink of qualifying as artisans had severe limitations as was illustrated in chapter four. In addition, an institutional inertia resulted in limited and ad hoc responses to the symptoms of crisis in apprenticeship training, such as low trade test results. This institutional inertia mirrored the actual erosion of apprenticeship training at the workplace. The fact that such a crisis was being experienced suggests that the

crisis was symptomatic of the inability of the institutions of the state during the apartheid era, empowered with the responsibility of human resources development, to govern effectively.

5.2 The Tension between Inclusion and Exclusion

If the apprenticeship training system in South Africa is still considered as an important training arena, as most government publications on the subject declare, and if it is attributed with a strong role in the industrial skills training arena, then there is a logical need for the erosion of apprenticeship training in South Africa to be radically addressed. This has however not occurred as the previous chapters have attempted to show.

Though the apprenticeship system in South Africa catered historically for a racially exclusive segment of the population, it is being gradually changed, especially in industries where the ability to transfer skills can be accomplished in a shorter duration, such as the building industry.[19] The converse of this however, is that entry standards for acceptance to apprenticeship programmes have been systematically stiffened to the extent that the invisible portals of job reservation, especially in the more skilled trades, continue to thrive, as has been the case in the past.[20] The problem of inclusion and exclusion therefore remains severe. Currently, most apprenticeship programmes do not cater for individuals in need of them most, since selection criteria excludes them from its ambit altogether.

5.3 Raising the Hurdles

Previously entry requirements were ignored or overridden for white apprentices, particularly in parastatal enterprises and government and municipal institutions where, as part of 'civilised' labour policies, job reservation was rigorously enforced. The process was strenuously guarded by the white artisan unions who served as watch dogs on apprenticeship committees and persistently vetoed any exemptions to the Apprenticeship Act which would have given black trainees permission to be trained in jobs which were perceived to fall within artisan trades. This capacity and commitment enabled the white artisan unions to protect and defend

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[19] Of course a more detailed analysis is required to examine the forces which shape such phenomena.

[20] For a more detailed examination of this trend see Lundall and Kimmie (1992) and Mohamed and Kimmie (1992).

the interests of their privileged constituency but also enabled the apprenticeship system to resist the structural erosion it was experiencing, for a much longer period. The decline of the predominantly white and often racially exclusive artisan unions coupled with the weakness of the emerging independent progressive trade unions to represent an artisan constituency led to the gradual decline and eventual weakening of the system of apprenticeship training then prevalent in South Africa. These forces were discussed in detail in chapters two and three.

Not only did the apprenticeship system become gradually divorced from its constituency, as a result of changes in workplace organisation and trade union representation, the constituency, in terms of educational attainment, that had formerly fallen under the umbrella of apprenticeship training was systematically denied access to it. This was brought about by the periodic increase in educational requirements which were laid down as a standard of entry. For example, in 1983 Ike van der Walt, president at the time of the South African Boilermakers Society charged industry of denying Africans access to training skills. Van der Walt claimed that the entry standards for apprenticeships being demanded by employers was unnecessarily high and indicated that the 'trend towards high entry qualifications, combined with a reduced period of apprenticeship, was preventing large numbers of young people who would, given time, qualify as competent artisans, from doing so' (*Rand Daily Mail* 17/8/1983). These covert practices by employers served to reproduce and continue the discriminatory relations that formal job reservation in South Africa was tailored to entrench

Gate-keeping mechanisms, such as qualification requirements for jobs, denied a host of work-seekers with little other alternative of obtaining skills training, access to technical competence along craft lines. Not only were such individuals ejected from the school system on academic grounds, they were now excluded from receiving manual and technical instruction on similar grounds. Because of the general underdevelopment of African education, this situation was more onerous for this segment of potential apprentices, since they are generally required to possess a matric certificate with mathematics and physics before they are accepted into apprenticeship programmes. This convention was the norm, particularly in the engineering and related industries, whereas the prevailing entry requirement after 1985 was a standard eight certificate with mathematics and physics.

Table 16 gives an educational profile of work-seekers on the labour market in South Africa. The proportion of individuals with a standard seven and lower educational level and who are most in need of skill training programmes, account for 65.5% of male and 50.0% of female work seekers.

Table 16: Educational Profile of Work-Seekers on the Labour Market

Educational Level	Male	Female
Under Std.6	21.6%	22.5%
Std. 6-7	44.0%	27.5%
Std.8-9	22.4%	27.0%
Std. 10	10.0%	20.0%
Higher than Std 10	0.9%	2.0%
Special School	1.1%	1.0%
	100%	100%

Source: *Department of Manpower, Annual Report 1991.*

Yet, this does not even account for the seriously deficient level of education for those who already constitute part of the economically active population. According to a recent National Manpower Commission Report, 35.5% of the economically active population have an educational qualification of standard four or lower and may therefore be regarded as functionally illiterate.(National Manpower Commission, 1993: 45 & 50) How will the training needs of this segment of working people whose productive potential is far greater, be addressed in the short-term and in the long-term?

It is usually the case for administrators and policy investigators to accept that higher entry standards into apprenticeship programmes guarantees that individuals on such programmes will be more successful. Higher entry standards are perceived to be necessary to rectify poor standards of performance as represented in trade tests and the productivity and quality of output generally. These recommendations are often drawn from very narrow concrete conditions and in the past were made in the interests of a racially exclusive political agenda. For instance, in its inquiry into labour legislation, the Wiehahn Commission recognised that a large proportion of 'coloureds' and Asians were unable to obtain apprenticeship contracts because they did not meet the minimum education requirements for admission (Department of Manpower Utilisation, 1980, para. 2.12, p.15). However, the Commission cited evidence in

its final report in a way suggesting that it tacitly agreed with the gist of rather crass arguments made in a submission before it.

> '... Divergent views were expressed in regard to the minimum educational qualification of Standard 7. In general it was felt that the qualification should be raised to Standard 8 for certain trades. It was alleged that persons who left school with a Standard 6 certificate were normally irresponsible, lazy or mentally retarded. The main purpose of the training scheme was to train persons intensively, theoretically and practically, as artisans and the scheme as such was not a rehabilitation scheme. Furthermore, it was impossible to train a person adequately in certain trades if he only possessed a Standard 6 educational qualification' (Department of Manpower Utilisation, 1980: para. 3.23).

For the Wiehahn Commission there was very little debate about such an arbitrary raising of entry requirements for apprenticeship programmes. Naturally the artisan unions with representation on the Commission would have favoured such a step. This is because the majority of their own constituents had been recipients of a compulsory education and would not have been severely affected by such a gradual increase in the minimum entry requirements for admission to apprenticeship programmes. In any case such a move was designed to discriminate against the educational achievements of those who were outside the system, not those who were already inside. And as Kooy (1952) showed already in the 'fifties, compulsory early schooling to a specified age was a norm for white children and at least 90% reached standard seven (Kooy, 1952: 2).

For the apprenticeship system to have a broader vocational training objective, it is essential that it incorporates a greater number of individuals, who very often eventually pursue careers in craft trades and occupations. It is best achieved by extending contracts of apprenticeship to a wider segment of potential entrants to apprenticeship programmes. Apprentices who show aptitude and commitment will certainly benefit from an extension of their training at technical colleges. Apprentices who are disinclined to further their education through classroom based instruction will nonetheless benefit from exposure and training in a work based technical and manual stream, where they acquire solid manual and craft skills. There is a large segment of work-seekers who would certainly benefit from skills training where the testing of incumbents

revolves around the demonstration of manual skills acquired. The more manually oriented individuals will not necessarily become technicians or rocket engineers, but if incorporated into apprenticeship training programmes for a set period, will make an important contribution to the economic well being of their country.

5.4 Recasting Apprenticeship Boundaries

An analysis of the basic institutional fabric of artisan employment in South Africa reveals that the poaching of newly qualified artisans creates enormous financial loses for concerns genuinely committed to artisan training (See chapter 2, section 2.5). The prevalence of poaching remains a disincentive to firms which have periodically trained apprentices from doing so continuously, while it remains an incentive to firms who lack the inclination or capacity to train apprentices to continue operating as poachers or as economists refer to them: 'free-riders'. It is a system essentially geared for self-destruction. For the apprenticeship system to become more effective in the training of artisans, the practice of poaching must be curbed completely.

Perhaps the imposition of service contracts, equivalent to the duration of the apprenticeship contract should be compulsory for newly qualified artisans. It should apply especially to those artisans who have been trained within state (public) enterprises, since these enterprises carry an unfair burden utilising public resources for human resource development, but losing it via poaching to private beneficiaries.

Alternatively, it may be necessary to compel enterprises which do indenture apprentices, to become members of a training register as in Germany, so that the quality of training supplied may be open to scrutiny and greater monitoring. Firms unable to perform satisfactorily would be taken off the register and prohibited altogether from training or employing apprentices. Consequently, through its record of performance, a firm can develop a reputation as a reliable training agent. It will therefore be more likely to attract apprentices with a greater inclination to hard work.

Should firms which do not train apprentices, be denied access to newly qualified artisans, they will be compelled to utilise the available sources of artisan labour. The excess demand may

even bid up the real actual wages and eventually statutory wages of artisan labour. If this occurs, artisan occupations may be more attractive as a career path for young adults, especially when the predicted post-apartheid economic upsurge begins to be felt in the economy.

As it was shown in chapter three, the comparatively higher wages of apprentices to that of labourers during the 'seventies and 'eighties implied that during the first and second years of employment, while their contribution to output was not as significant, apprentices could theoretically be substituted by unskilled labour. If this were the only consideration, it would have been easy to reach the conclusion that the declining number of apprentices employed in the industry was due to the fact that the wages of apprentices was higher than that of unskilled labourers. Initially, the statutory minimum wages of apprentices were higher than those of labourers but since 1988 as has been shown in chapter three, the wages of first year apprentices have been lower than those of labourers. I have found no empirical evidence which shows that the decline in the number of apprentices was caused by the relatively higher wages paid to apprentices in relation to labourers prior to 1988. The point that needs emphasising though is that the reduction of minimum wages for apprentices, could be a greater incentive for employers seriously committed to training artisan labour to employ a larger number of apprentices. Combined with the systematic regulation of training performance which I have alluded to above, such an arrangement represents a trade-off between training, compensation and affordability. Such incentives should have a limited duration and should not be perceived as a licence to utilise cheap skilled labour ad infinitum.

BIBLIOGRAPHY

Government Publications

Central Statistical Services (CSS) (1982; 1985; 1988) Census of Manufacturing Pretoria: Government Printer.

Central Statistical Services (CSS) (Various editions) South African Labour Statistics Pretoria: Government Printer.

Central Statistical Services (CSS) (1988-1992) Manpower Surveys Pretoria: Government Printer.

Department of Manpower (RSA) (1983) White Paper on the Reports of the National Manpower Commission on Training in Labour Relations in South Africa and a Levy System for the Promotion and Financing of Industrial Training and the Principle and Application of a National Minimum Wage with Specific Reference to the Republic of South Africa (W.P. I-1983).

Department of Manpower (RSA) (1987) Report of the Director General for the year ended 31 December 1986 (RP79-1987).

Department of Manpower (RSA) (1988) Report of the Director General for the year ended 31 December 1987 (RP72-1988).

Department of Manpower (RSA) (1989) Report of the Department of Manpower for the year ended 31 December 1988 (RP67-1989).

Department of Manpower (RSA) (1990) Annual Report 1989 (RP58-1990).

Department of Manpower (RSA) (1991) Annual Report 1990 (RP51-1991).

Department of Manpower (RSA) (1992) Annual Report 1991 (RP70-1992).

Department of Manpower (RSA) (1993) Annual Report 1992 (RP57-1993).

Department of Manpower (RSA) (1994) Annual Report 1993 (RP74-1994).

Department of Manpower and Central Statistical Services (1969-1987) Manpower Surveys Pretoria: Government Printer.

Department of Manpower & National Training Board (1986) Guidelines for the Accreditation of Training (RP 111/1986).

Department of Manpower & National Training Board (1987) Guidelines for the Introduction of Modular Training for Apprentices

Department of Manpower & National Training Board (1989) Guidelines for Apprenticeship Agreements (Chairman: J.H. Galloway).

Department of Manpower Utilisation (1980) Report of the Commission of Inquiry into Labour Legislation, Part 2: Training (RP 38/1980) [Chairman: N.E. Wiehahn].

Human Sciences Research Council (1981) Investigation into Education Work Committee. Teaching of the natural sciences, mathematics and technical subjects. Report of the Subcommittee: Technical and Vocational Education Pretoria: HSRC.

Human Sciences Research Council(HSRC) and National Training Board(NTB) (1985) Investigation into the Training of Artisans in the RSA Pretoria: Human Sciences Research Council.

National Manpower Commission (1982) Report on Training in Labour Relations in South Africa and a Levy System for the Promotion and Financing of Industrial Training Report 1/1982 (RP 70/1982).

National Manpower Commission (RSA) (1989) Annual Report 1988 (RP51-1989).

National Manpower Commission (RSA) (1990) Annual Report 1989 (RP45-1990).

National Manpower Commission (RSA) (1991) Annual Report 1990 (RP49-1991).

National Manpower Commission (RSA) (1992) Annual Report 1991 (RP46-1992).

National Manpower Commission (RSA) (1993) 1992 Annual Report (RP42-1993).

National Manpower Commission (RSA) (1994) Annual Report 1993 (RP37-1994).

National Training Board (1991) Guidelines for the Decentralisation of Trade Testing (Chairman: J.A. Vorster).

National Training Board (1992) Annual Report 1991 (RP48-1992).

National Training Board (1994) Annual Report 1993 (RP73-1994).

Republic of South Africa (1982) Report of the Study Group on Industrial Development Strategy (Kleu Report).

Republic of South Africa (1986) White Paper on the Joint Report of the Human Sciences Research Council and the National Training Board on the Investigation into the Training of Artisans in the Republic of South Africa, with Comments, Standpoints and Decisions of the Government on the Recommendations (W.P. O-86).

Union of South Africa (1935) Report of the Industrial Legislation Commission Pretoria: Government Printer (U.G. 37/1935).

Union of South Africa (1948) Report of the Commission on Technical and Vocational Education (U.G. 65/1948) [Chairman: F.J. De Villiers].

Union of South Africa (1958) Report of the Commission of Enquiry into Policy Relating to the Protection of Industries (U.G. 36/1958) [Chairman: S.P. du T.Viljoen].

Secondary Sources

Abbott, G. (1958) The Child and the State, Volume One: Legal Status in the Family, Apprenticeship and Child Labour. Select Documents with Introductory Notes Chicago: University of Chicago Press.

Acton, C.J. (1972) 'Discussion', *FWP Journal*, vol.12 (8), August, pp.39-40.

Adler, D. (1986) 'Education and Training for and in South Africa beyond Apartheid', University of York, Centre for African Studies, *Conference Paper* (29 September-2 October).

Ainley, P. (1993) Class and Skill: Changing Divisions of Knowledge and Labour London: Cassell.

Archer, S. (1992) 'Technological development and the education and training of the Labour Force in South Africa', *Conference Paper* delivered at the Conference on Economic Growth and Human Development: The Economic dimension of Education in South Africa, hosted by the universities of Cape Town and Rhodes, (Cape Town: 4-5 September).

Ardington, E. & Nattrass, J. (1981) A Survey of Attitudes to Labour Relations and Labour Mobility in South Africa *Occasional Paper No.11*, Economic Research Unit, Department of Economics, University of Natal (Durban), December.

Author not stated (1991) 'German vocational training: how does it apply here?', *Human Resource Management, 7(9)*, September, pp.16-21.

Barker, F. (1989) 'Manpower Development: A Critical Element for Higher Economic Growth in South Africa', *Conference Paper* presented at The Lausanne Colloquium 8-13 July 1989, hosted by Institute of Social Development, University of the Western Cape, (Bellville).

Bas, D. (1988) On-the-Job Training in Africa Training Policies Discussion Paper No.27. Geneva: International Labour Organisation.

Beckett, D. (1974) 'Apprenticeship: An Outmoded System?', *People & Profits*. July, pp.11-17.

Behr, A.L. (1988) Education in South Africa: Origins and Issues and Trends: 1652-1988 Pretoria: Academica.

Bennell, P. (1991) Vocational Training in Sub-Saharan Africa: Lessons for Post Apartheid South Africa Johannesburg: Education Policy Unit, University of the Witwatersrand.

Bennell, P. (1992a) 'Industrial Training Boards in South Africa: Performances and Prospects', *Conference Paper* presented to the NEPI Conference on Human Resources Policy for a New South Africa, (Durban: 7-10 May).

Bennell, P. (1992b) 'Industrial Training in the New South Africa: Some Lessons from the LICs and MICs', *Conference Paper* presented to the NEPI Conference on Human Resources Policy for a New South Africa, (Durban: 7-10 May).

Berger, P.L. (1964) 'Some General Observations on the Problem of Work', in Peter L. Berger ed. The Human Shape of Work: Studies in the Sociology of Occupations New York: Macmillan, pp.211-241.

Berry, M.J. (1982) 'Towards an understanding of R and D and innovation in a planned economy: the experience of the machine tool industry', in Ronald Amann and Julian Cooper ed. Industrial Innovation in the Soviet Union London: Yale University Press, pp.39-100.

Berthoud, R. (1978) Training Adults for Skilled Jobs: Skill Centre Training and Local Labour Markets vol. 44, no. 575. London: Policy Studies Institute, (April).

Bird, A. (1990) 'Numsa's Vocational Training Project', *South African Labour Bulletin*, 15(1), June, pp. 11-16.

Bird, A. (1992) 'Redefining Human Resources Development within the context of economic and labour market policies - a Cosatu perspective', *Conference Paper* presented to the NEPI Conference on Human Resouces Policy for a New South Africa, (Durban: 7-10 May).

Bird, A. & Lloyd, C. (1992) 'The role of education and training in industry and economic policy - a South African trade union perspective', *Economic Trends Group Discussion Paper*.

Bot, M. (1988) Training on Separate Tracks Johannesburg: South African Institute of Race Relations.

Braverman, H. (1974) Labour and Monopoly Capital New York: Monthly Review Press.

Bromberger, N. (1974) 'Economic Growth and Political Change in South Africa', in Adrian Leftwich ed. South Africa: Economic Growth and Political Change London: Allison & Busby, pp. 61-123.

Bryce, A. ed. (1989) The A to Z of Careers in South Africa 2nd edition. Cape Town: Don Nelson.

Buckland, P. (1984) 'Technicism and de Lange: Reflections on the Process of the HSRC Investigation', in Peter Kallaway ed. Apartheid and Education Johannesburg: Ravan Press.

Casey, B. (1986) 'The Dual Apprenticeship System and the Recruitment and Retention of Young Persons in West Germany', *British Journal of Industrial Relations*, 24(1), March, pp.63-81.

Casey, B. (1991) 'Recent Developments in the German Apprenticeship System', *British Journal of Industrial Relations*, 29 (2), June, pp.205-222.

Centre for Community Organisation, Research and Development (CORD), Theoretically skilled but unemployed: A neglected aspect of Apartheid education Working Paper 5. Durban: University of Natal, CORD.

Chisholm, L. (1984) 'Redefining Skills: Black Education in South Africa in the 1980s', in Peter Kallaway ed. Apartheid and Education Johannesburg: Ravan Press, pp.387-409.

Chisholm, L. (1992) 'South Afican Technical Colleges: Policy Options', *Conference Paper* presented to the NEPI Conference on Human Resouces Policy for a New South Africa, (Durban: 7-10 May).

Clarke, S. (1990) 'New utopias for old: Fordist dreams and Post-Fordist fantasies', *Capital and Class*, 42, Winter, pp.131-155.

Clawson, D. (1980) Bureaucracy and the Labour Process: The Transformation of U.S. Industry, 1860-1920 New York: Monthly Review Press.

Commonwealth Expert Group. (1991) Beyond Apartheid: Human Resources for a New South Africa Report of a Commonwealth Expert Group prepared for the Heads of Government Meeting at Harare. Cape Town: David Phillip.

Congress of South African Trade Union (COSATU)/ Commonwealth Trade Union Council (CTUC) (1991) 'The Role of Trade Unions in Human Resource Development' (Document P) in Commonwealth Secretariat, *Human Resource Development for a Post-Apartheid South Africa: A Documentation*. Volume 2, Part 2. London: Commonwealth Secretariat.

Crankshaw, P. (1987) 'State Industrial Training Policy before Wiehahn and Riekert: ecomomic demands, reform and the differentiation of the African working class', *Conference Paper* presented to the Conference of the Association for Sociology in Southern Africa, University of the Western Cape: June-July.

Cullinan, M.A. (1980) 'Deskilling, Technical and Industrial Training and White Craft Unions', BA(hons) dissertation, University of the Witwatersrand.

Davies, R. (1979a) 'Capital Restructuring and the Modification of the Racial Division of Labour in South Africa', *Journal of Southern African Studies*, 5(2), April, pp.181-198.

Davies, R.H. (1979b) Capital, State and White Labour in South Africa 1900-1960: An Historical Materialist Analysis of Class Formation and Race Relations Brighton: The Harvester Press.

Day, C.R. (1980) 'Education for the industrial world: technical and modern instruction in France under the Third Republic, 1870-1914', in Robert Fox and George Weisz ed. The

organisation of science and technology in France 1808-1914 Cambridge: Cambridge University Press. pp.127-153.

de Broize, E. (1977) '1924 - A Victory for Capital: An Analysis of the development and effects of the Apprenticeship Act (1922) and the Industrial Conciliation Act (1924) on the Labour Movement of South Africa', B.Soc.Sc. (Hons) dissertation, University of Cape Town.

de Clercq, F. (1984) 'Education and training in the homelands: A separate development', *Carnegie Conference Paper* no.275. Cape Town: Saldru, UCT.

de Simone, D.V. ed. (1968) Education for Innovation New York: Pergamon Press.

Dobb, M. (1963) Studies in the Development of Capitalism London & Henley: Routledge & Kegan Paul.

Docherty, C. (1983) Steel and Steelworkers: The Sons of Vulcan London: Heinemann Educational Books.

Dowding, A.E. (1973) 'An Introduction to Vocational Training Using Modules of Employable Skill', *International Labour Review*, vol.107 (6), June, pp.553-557.

Dowie, F. (1979) 'The training of Black Industrial Workers in South Africa', *Development Studies in Southern Africa*, vol.1 (2), January, pp.104-144.

Doxey, G.V. (1961) The Industrial Colour Bar in South Africa Cape Town: Oxford University Press.

Ehlers, J.H. (1984) Attitude of a Group of White Artisans and Technicians towards vertical job mobility of other population groups Pretoria: Human Sciences Research Council.

Engelbrecht, S.W.H. (1992) 'The De Lange Report Revisited Ten Years Down the Road' in Robin & Anne McGregor ed. McGregor's Education Alternatives Cape Town: Juta, pp.495-513.

Erasmus, M. (1974) 'Letter to the Editor of *People & Profits*', September.

Ewert, J.W. (1990) 'The Political Maintenance of "Skill": Labour Process Changes and Artisan Domination in the South African Printing Industry', *Social Dynamics*, vol.16, no.2, December, pp.38-55.

Foster, P.J. (1968) 'The Vocational School Fallacy in Development Planning', in M. Blaug ed. Economics of Education 1: Selected Readings Harmondsworth: Penguin Books, pp.396-423.

Goodman, P. (1964) Compulsory Miseducation Harmondsworth: Penguin Books.

Groover, M.P. (1987) Automation, Production Systems and Computer Integrated Manufacturing Prentice-Hall.

Hall, K. & Miller, I. (1975) Retraining and Tradition: The Skilled Worker in an Era of Change London: George Allen & Unwin.

Harbison, F.H. (1973) Human Resources as the Wealth of Nations New York: Oxford University Press.

Harmse, S.M.C. (1982) 'Apprenticeship', *My Career*, 33(1), February, pp.29-30.

Haydu, J. (1988) Between Craft and Class: Skilled Workers and Factory Politics in the United States and Britain 1890-1922 Berkeley: University of California Press.

Hindson, D. & Crankshaw, O. (1990) 'New jobs, new skills, new divisions - the changing structure of SA's workforce', *South African Labour Bulletin*, 15(1), June, pp.23-31.

Human, L. (1992) 'Education, human resource development and redistribution', in Pierre Hugo ed. Redistribution and Affirmative Action: Working on South Africa's Political Economy Halfway House: Southern Book Publishers, pp.42-50.

Hutt, W.H. (1964) The Economics of the Colour Bar London: Andre Deutsch.

International Labour Organisation. (1985) World Labour Report 2 Geneva: ILO, pp.87-130.

Joffe, A. (1995) 'Human Resource Development and Workplace Innovation: An Intelligent Production Strategy for Industrial Regeneration', in Avril Joffe, David Kaplan, Raphael Kaplinsky and David Lewis, Improving Manufacturing Performance in South Africa: Report of the Industrial Strategy Project Cape Town: UCT Press, pp.186-236.

Jones, I.S. (1986) 'Apprentice Training Costs in British Manufacturing Establishments: Some New Evidence', *British Journal of Industrial Relations*, 24(3), November, pp.333-362.

Jones, R.A. (1979) 'Manpower shortages, Black advancement and job Africanisation in South African industry', *South African Journal of Labour Relations*, vol.3, no.4, December, pp.8-12.

Kaplan, D. (1991) 'Human Resource Implications of the Introduction of New Technology in South Africa', *Conference Paper* delivered to the Commonwealth Expert Group on Human Resource Development for a Post-Apartheid South Africa, (Ottowa: 15-18 April).

King, K. (1980) 'Education and Self-Employment', in Education, work and employment, volume 2, Paris: Unesco - International Institute for Education Planning, pp.217-283.

Knight, J.B. (1979) 'Black Wages and Choice of Technique in South Africa', *Oxford Bulletin of Economics and Statistics*, 41(2), May 1979, pp.117-144.

Kooy, M. (1952) 'A Survey of the Apprenticeship System in South Africa', MA Thesis in Economics, University of Cape Town.

Kraak, A. (1988) 'Restructuring Skills: Capital's Initiatives in the Black Education and Industrial Training Arenas since 1976', MA Thesis in Economic History, University of Cape Town.

Kraak, A. (1989) 'New Insights into the Skill Shortages Debate in South Africa', *Perspectives in Education*, 11(1), pp.19-36.

Kraak, A. (1991) Beyond the Market: Comprehensive Institutional Restructuring of South African Labour Markets, Education, Training and Work Johannesburg: Education Policy Unit, University of the Witwatersrand.

Kraak, A. & von Holdt, K. (1990) 'The Training strategies of business and government: new opportunities for unions?', *South African Labour Bulletin*, 15(1), June, pp.16-22.

Kraak, A. (1992) 'The National Training Strategy: The Triumph of Market Ideology', *Conference Paper* presented to the NEPI Conference on Human Resources Policy for a New South Africa, (Durban: 7-10 May).

Kraak, A. (1994) 'Lifelong learning and reconstruction. Can it deliver?', *South African Labour Bulletin*, 18(4), September, pp.32-39.

Krafchik, W.A. (1991) Small-Scale Enterprises, Inward Industrialisation and Housing: A Case Study of Subcontracting in the Cape Peninsula Low Cost Housing Industry Saldru Working Paper no.82. Cape Town: Saldru, UCT.

Kuhlche, K. (1992) 'Technical and Vocational Education in Cape Town: A Tracer Study of Graduates from Bellville Technical High School', BA (Hons) dissertation in Sociology, University of Cape Town.

Labour Research Department (1988) Training: A Negotiator's Guide London: LRD Publications.

Lane, C. (1990) 'Vocational training and new production concepts in Germany: Some Lessons for Britain', *Industrial Relations Journal*, vol.21 (4), Winter, pp.247-259.

Lee, D.J. (1972) 'Very Small Firms and the Training of Engineering Craftsmen - Some Recent Findings', *British Journal of Industrial Relations*, 10(2), July, pp.240-255.

Lee, D.J. (1979) 'Craft Unions and the Force of Tradition: The Force of Apprenticeship', *British Journal of Industrial Relations*, 17(1), March, pp.34-49.

Lee, D. (1987) 'The transformation of training and the transformation of work in Britain', in Patrick Joyce ed. The Historical Meanings of Work Cambridge: Cambridge University Press, pp.156-170.

Leistner, G.M.E. & Breytenbach, W.J. (1975) The Black Worker of South Africa Pretoria: Africa Institute.

Lever, J. (1986) 'Trade Unions and Black Advancement', in Roy Smollan ed. Black Advancement in the South African Economy Johannesburg: Macmillan, pp.52-70.

Levy, N. (1991) 'Matching education with employment: targeting the black labour force', in Elaine Unterhalter et.al. eds. Apartheid Education and Popular Struggles Johannesburg: Ravan Press, pp.19-34.

Lewis, J. (1983) 'Steelworkers, Craft Unions and Afrikaner Nationalism', *South African Labour Bulletin*, 8(6), June, pp.45-58.

Liepmann, K. (1960) Apprenticeship: An Enquiry into its Adequacy under modern conditions London: Routledge & Kegan Paul.

Lipson, E. (1937) The Economic History of England: The Middle Ages Volume One. Seventh Edition. London: Adam & Charles Black.

Lundall, P. (1991) 'Reflections on Minimum Wage Policies', *Saldru Paper* presented at the Budgeting for Redistribution Workshop organised by the Economic Research Project at the University of the Western Cape, Gordon's Bay, (24 February - 1 March 1991)

Lundall, P. & Kimmie, Z. (1992) 'Apprentice training and artisan employment: changing numbers - but maintaining "job reservation"', *South African Labour Bulletin*, 16(6), July/August, pp.40-46.

Mabawonku, A.F. (1979) An Economic Evaluation of Apprenticeship Training in Western Nigerian Small-Scale Industries African Rural Economy Paper no.17, East Lansing, Michigan: Department of Agricultural Economics, Michigan State University.

Mackay, D.I.; Boddy, D.; Diack, J.A. & Jones, N. (1971) Labour Markets Under Different Employment Conditions London: George Allen & Unwin.

Maclure, S. (1979) Education and Youth Employment in Great Britain Berkley, California: Carnegie Council on Policy Studies in Higher Education.

Macmillan, M. (1986) 'South African Education After Apartheid', University of York, Centre for African Studies *Conference Paper*, (29 September-2 October).

Marx, K. (1976) Capital: A Critique of Political Economy volume one, translated by Ben Fowkes. Harmondsworth: Penguin Books.

McCarten, P.J. (1983) The Demand for Skilled Labour in the Border, Ciskei, Southern Transkei Regional Economy Development Studies Working Paper, No.15. Institute of Social and Economic Research, Rhodes University.

McIntyre, D. (1984) 'An Economic Appraisal of the Provision of Education and Technical Training in South Africa', BA (Hons) dissertation in Economics, University of Cape Town.

McLaughlin, S.D. (1979) The Wayside Mechanic: An Analysis of Skill Acquisition in Ghana Amherst, Massachusetts: Centre for International Education, University of Massachusetts.

Metcalf, D.H. (1985) The Economics of Vocational Training: Past Training and Future Considerations World Bank Staff Working Papers no.713, Washington: The World Bank.

Meth, C. (1978) 'Are There Skills Shortages in the Furniture Industry', *South African Labour Bulletin*, 4(7), November, pp.7-40.

Meth, C. (1979) 'Trade Unions, Skills Shortages and Private Enterprises', *South African Labour Bulletin*, 5(3), October, pp.59-89.

Mills, D.Q. (1972) Industrial Relations and Manpower in Construction Cambridge, Massachusetts: MIT Press.

Mohamed, S. (1991) Electrical and Allied Workers Trade Union of South Africa: A History Saldru Working Paper No.81. Cape Town: Saldru, UCT.

Mohamed, S. & Kimmie, Z. (1992) Industrial Training: Artisan and Apprentice Statistics 1969-1989 Cape Town: Saldru, UCT.

More, C. (1982) 'Skill and the survival of apprenticeship' in Stephen Wood ed. The Degradation of Work: Skill, De-skilling and the Labour Process London: Hutchinson.

Morphet, T. (1983) 'Deconstructing Education: The Case of Skills Training', *Conference Paper* presented at the Kenton-at-the-Stadt Conference.

Mortimer, J.E. (1971) Trade Unions and Technological Change Oxford: Oxford University Press.

Nel, P.S. (1986) 'The Role of Trade Unions in Artisan Training', *Industrial Relations Journal of South Africa*, 6(3), pp.18-27.

Noble, D.F. (1986) Forces of Production: A Social History of Industrial Automation New York & Oxford: Oxford University Press.

Oatey, M. (1970) 'The Economics of Training with Respect to the Firm', *British Journal of Industrial Relations*, 8(1), March, pp.1-21.

O'Donovan, K.H. (1978) 'Apprenticeship', *South African Mechanical Engineer*, vol.28, no.9, September, pp.347-354.

Opperman, R.J. (1988) 'Guidelines for Competency-Based Modular Training', in National Training Board, *In-Service Training*, vol.3, Pretoria: NTB, part 3.

Oyeneye, O.Y. (1980) 'Apprentices in the informal sector of Nigeria', *Labour, Capital and Society*, 13(2), November, pp.69-79.

Palloix, C. (1976) 'The labour process: from Fordism to Neo-Fordism', in Conference of Socialist Economists, The Labour Process and Class Strategies CSE Pamphlet, no.1. London: CSE, pp.46-67.

Papadimitriou, Z. (1986) 'Changing Skill Requirements and Trade Union Bargaining', in Otto Jacobi, Bob Jessop, Hans Kastendick and Marino Regini ed. Technological Change, Rationalisation and Industrial Relations London: Croom Helm, pp.35-49.

Penn, R. (1985) Skilled workers in the class structure Cambridge: Cambridge University Press.

Prais, S.J. (1981) Productivity and Industrial Structure Cambridge: Cambridge University Press.

Prais, S.J. (1995) Productivity, Education and Training: An International Perspective Cambridge: Cambridge University Press & National Institute of Economic and Social Research.

Rautenbach, W. (1992) 'The Crucial Role of Technical and Vocational Education in the Restructuring of Education in South Africa', in Robin & Anne McGregor ed. McGregor's Education Alternatives Cape Town: Juta, pp.357-375.

Rootman, C. (1977) 'A Case Study in Apprenticeship Training', Report No.10, Labour Research Programme, University of the Witwatersrand, Johannesburg, January.

Ryan, P. (1980) 'The Costs of Job Training for a Transferable Skill', *British Journal of Industrial Relations*, 18(3), November, pp.334-352.

Rule, J. (1987) 'The property of skill in the period of manufacture', in Patrick Joyce ed. The Historical Meanings of Work Cambridge: Cambridge University Press, pp.99-118.

Ryrie, A.C. (1976) 'Employers and Apprenticeship', *British Journal of Industrial Relations*, 14(1), March, pp.89-91.

Sabel, C.F. (1982) Work and Politics: The Division of Labour in Industry Cambridge: Cambridge University Press.

Sadie, J.L. (1980) Labour Demand and Supply Stellenbosch: Kosmo Publishers.

Sadler, P. (1970) 'Sociological Aspects of Skill', *British Journal of Industrial Relations*, 8(1), March, pp.22-31.

Sarfati, H. and Cove, M. (1989) 'New Technologies: Skills "Mismatch" and the Challenge Ahead', in Greg J. Bamber and Russell D. Lansbury ed. New Technology: International Perspectives on Human Resources and Industrial Relations London: Unwin Hyman, pp.227-247.

SAIRR (South African Institute of Race Relations) (1962-1979) A Survey of Race Relations in South Africa 1961-1978 Johannesburg: SAIRR.

SAIRR. (1980-1984) Survey of Race Relations in South Africa 1979-1983 Johannesburg: SAIRR.

SAIRR. (1985-1993) Race Relations Survey 1984-1992/93 Johannesburg: SAIRR.

Sayers, A. (1991) 'The Labour Movement in South Africa: Undercurrents, Trends and Possibilities', in G. Naidoo ed. Reform and Revolution: South Africa in the Nineties Johannesburg: Skotaville, pp.165-204.

Schaffer, A.J. (1985) 'South African Industrial Training Discourse and Policy from 1977 to 1982', M.Ed. Thesis, University of Cape Town.

Schadler, K. (1968) Crafts, Small-scale industries and Industrial Education in Tanzania Munich: Weltfortforum Verlag; London: C.Hurst & Co.

Schneier, S. (1983) Occupational Mobility Among Blacks in South Africa Saldru Working Paper No.58. Cape Town: Saldru, UCT.

Seymour, W.D. (1966) Industrial Skills London: Pitman.

Sheldrake, J. & Vickerstaff, S. (1987) The History of Industrial Training in Britain Aldershot: Avebury [Gower].

Simkins, C.E.W. & Hindson, D.C. (1979) 'The Division of Labour in South Africa, 1969-1977', *Social Dynamics*, 5(2), pp.1-12.

Sitas, A. (1979) 'Rebels without a Pause: The MWU and the Defence of the Colour Bar', *South African Labour Bulletin*, 5(3), October, pp.30-58.

Solomon, A. (1967) A Comparative Study of the Systems of Technical Education and Training of Craft Apprentices, Technicians and Engineers for the Electrical Engineering Industries in Certain European Countries, the United Kingdom and the Republic of South Africa Unpublished D.Ed Thesis, University of South Africa.

Southern Africa Labour Development Research Unit (SALDRU) (1990) Industrial Council Wage Rates in South Africa 1978-1988 Second edition. Cape Town: Saldru, UCT.

Spandau, A. (1976) 'A Study in the Economics of Manual Skill Acquisition', *South African Journal of Economics*, vol. 44, no.1, pp.27-49.

Spencer, F.H. (1937) The Technical Colleges of South Africa New York: Carnegie Corporation.

Steyn, G. (1980) 'Competence-based training opens path to efficiency', *Coal, Gold and Base Minerals of Southern Africa*, vol.28, no.5, May, pp.66-83.

Steyn, F.G. (1988) 'Financing of In-Service Training', in National Training Board, Perspectives on In-Service Training volume 1. Pretoria: NTB. Part 13, pp.1-18.

Stromsdorfer, E.W. (1981) 'Training in Industry', in P.B. Doeringer ed. Workplace Perspectives on Education and Training Boston: Martinus Nijhoff Publishing, pp.39-54.

Sutherland, D. (1971) 'New Approach Needed to Apprenticeship Training', *FCI Viewpoint*, vol.5, no.6, June, pp.6-9.

The 1961 Education Panel (1963) Education for South Africa First Report. Johannesburg: Witwatersrand University Press.

The 1961 Educaion Panel (1966) Education and the South African Economy Second Report. Johannesburg: Witwatersrand University Press.

Thompson, C. & Benjamin, P. (1991) De Kock's Industrial Laws of South Africa Cape Town: Juta.

Touraine, A. (1972) 'An Historical Theory in the Evolution of Industrial Skills', in Louis E. Davis & James C. Taylor ed. Design of Jobs: Selected Readings Harmondsworth: Penguin Books, pp.52-61.

Trebous, M. (1970) Migration and Development: The Case of Algeria. Manpower requirements in Algeria and vocational training in Europe Paris: Development Centre of the Organisation for Economic Co-operation and Development.

Unterhalter, E. & Wolpe, H. (1990) 'Issues in Education and Training in South Africa', in Commonwealth Secretariate, Human Resource Development for a Post Apartheid South Africa: A Documentation London: Commonwealth Secretariat. Document E.

Van der Merwe, P.J. (1974) 'Labour Policy', in J.A. Lombard ed. Economic Policy in South Africa Cape Town: HAUM, pp.158-199.

Van der Merwe, P.J. (1978) 'The training of the labour force in South Africa', *Finance and Trade Review*, vol.13, no.2, December, pp.61-74.

Van der Merwe, P.J. (1979) Human Resouces Development in South Africa Paper no.2. Pretoria: Bureau of Economic Policy Analysis, University of Pretoria.

Van der Walt, J. (1990) 'Redistribution of wealth needs a redistribution of skills', *Human Resources Management*, vol.6 (6), June, pp.8-11.

Van Gass, H.E. (1972) 'The training and selection of apprentices: with discussion', *FWP Journal*, vol.12(8), August, pp.33-40.

Van Rooyen, A.S. (1988) 'In-Service Training of Artisans and Apprentices', in National Training Board, Target Groups and Educational and Training Institutions vol. 2. Pretoria: NTB. Part 3, pp.1-28.

Van Zyl, A.J. (1972) Optimum Use of Manpower through education, training and management Pretoria: Pretoria College for Advanced Technical Education.

Verwey, C. (1989) 'The Elusive Link: An Investigation into the Relationship between on-the-job training and earnings', Honours paper in Economics, University of Cape Town.

Webster, E. (1985) Cast in a Racial Mould: Labour Process and Trade Unionism in the Foundries Johannesburg: Ravan Press.

Webster, E.C. & Leger, J.P. (1992) 'Reconceptualising Skill Formation in South Africa'. *Perspectives in Education*, vol.13, no.2, Winter, pp.53-68.

Wellens, J. (1974) Training in Physical Skills London: Business Books.

Williams, G. (1963) Apprenticeship in Europe: The Lessons for Britain London: Chapman & Hall.

Woodward, N. (1975) 'The economic evaluation of apprentice training', *Industrial Relations Journal*, 6(1), Spring, pp.31-41.

Woodward, N. & Anderson, T. (1975) 'A Profitability Appraisal of Apprenticeships', *British Journal of Industrial Relations*, 13(2), July, pp.245-256.

World Bank. (1991) Vocational and Technical Education and Training Washington: The World Bank.

World Bank. (1992) World Trade Tables Baltimore & London: Johns Hopkins University Press.

Wrigley, J. (1982) 'The Division between Mental and Manual Labour: Artisan Education in Science in Nineteenth-Century Britain', in Michael Buraway and Theda Skocpol ed. Marxist Inquiries: Studies in Labor, Class and States American Journal of Sociology, volume 88, supplement. Chicago: The University of Chicago Press, pp.S31-S51.