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A F R I C A N S T U D I E S I N S T I T U T E

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by: E Webster

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CLASS STRUGGLE IN THE FOUNDRY

E. WEBSTER

DESKILLING AND THE TRANSITION FROM MANUFACTURE TO MACHINOFACTURE AMONG IRON MOULDERS IN SOUTH AFRICA

This paper is a preliminary attempt to locate the process of deskilling of iron moulders in foundries in South Africa between 1896 and 1950 within an analysis of the labour process. It is an attempt to engage in a debate with Braverman's impressive account of the capitalist labour process through a specific study.

There is a tendency in Braverman's work to conceptualise a switch from thorough-going craft controls to pervasive capitalist direction of the labour process. This both exaggerates the craft autonomy of the artisan in the period of "manufacture" and fails to appreciate the manner in which forms of expertise and craft competence may remain embedded within a complex structure. Furthermore, it underplays the importance of ideological struggle over the definition of "craft skill" and the way in which worker resistance can control the pace of deskilling through appropriating the definition of skill and through successful shop floor organisation. This is of particular importance in South Africa where the "craft unions" have established institutional leverage within the power structure, particularly through the Apprenticeship Act (1922) and Industrial Conciliation Act (1924) allowing them to control the pace of change.

More importantly Braverman fails to specify the relationship between forms of the extraction of surplus value in a process of capital accumulation with phases in the organisation of production. Thus, as Elger argues, Braverman establishes the basis for a general and abstract impulsion of capitalism towards the real subordination of labour and directly indentifies this abstract impulsion with the uniform process of degradation of craft skills. Palloix avoids this by situating the different labour processes as landmarks in the history of capitalism. But his over-

schematic account implies that capitalism resolves its problems of accumulation by progressively moving from one stage to the other. Wright overcomes this weakness by locating these transformations of the capitalist labour process as impediments to accumulation that contain within themselves new contradictions. But what are these contradictions and what effect do they have on the phases of transition?[1]

Essentially what is being suggested in this paper is that transition should not be understood in a simple chronological form - the phases delineated by Marx formed part of his model of capitalist development - they were abstractions and were not, therefore, meant to sum up any particular historical period. This paper is the unfinished portion of the early history of the iron moulders. In part one I deal with the transition from "simple co-operation" to manufacture in the period 1896-1930; in part two with the transition from manufacture to machinofacture between 1930 and 1950. "In manufacture", Marx writes, "the organisation of the social labour process is purely subjective, is a combination of detail workers; in machinofacture, large scale industry has a purely objective productive organism, in which the worker is nothing more than an appendage."[2] In certain crucial areas, particularly the struggle over piece work and the bonus system, this section is incomplete.[3] The argument is located in the context of the changing nature of accumulation in the engineering industry and the strategies of capital and how these interact with the Iron Moulders Society (IMS).

Little attention has been focused on deskilling in South African literature.[4] However, Jon Lewis has laid the foundations for a systematic analysis of the capitalist labour process in manufacturing in three separate papers.[5] In the first of these he points to the uneven transformation of the labour process through the deskilling of the light consumer product industry in the 1920s and only later in the 1940s of the engineering industry. "It is in regard to questions of capital requirements and technological conditions that it is necessary to distinguish sharply between sections of manufacturing industry - between basic metals and engineering, and the consumer product industries. The former, to establish themselves on a mass production basis, required massive capital investment and introduction of a complete new machine technology. Thus during the early twenties local private enterprise failed to establish the iron and steel industry on a large scale basis, and the task had to be completed by the state. When ISCOR was founded in 1928, it was with a capital of R7 million. Engineering, before World War II, was organised to undertake repairs and 'jobbing' work, largely for the mines and railways. Only the huge stimulus provided by war enabled the industry to establish itself on a mass production basis. In comparison, it was possible for the consumer products industries to

transform their "craft" basis with relative ease. The statistics indicate that the average value of firms involved in leather, furniture and wearing apparel was half that of those in the metal industries. In the clothing industry, entrance was comparatively easy. In the late 1930s a firm producing mens' clothing could be run economically with about 60 machines, which would involve an outlay of about £4 500 for production plant. In these industries, the reorganisation of production on the basis of specialisation and increased sub-division of labour was at least as important as new capital, or mechanisation. In the garment industry particularly, the advent of factory production was not marked by any breakthrough in sewing machine technology.[6]

THE TRANSITION FROM SIMPLE CO-OPERATION TO MANUFACTURE 1896-1930

Up to the outbreak of the Second World War, the engineering industry in South Africa was essentially a jobbing and repair industry and did not, with the exception of a few establishments, engage in the manufacture of engineering supplies.[7] In the early years, before South Africa's base mineral wealth was known, it was dependent on the importation of its requirements and was confined largely to the coastal areas.[8] The discovery of diamonds in Kimberley and gold on the Witwatersrand led to the spread of the engineering industry inland. However, prior to 1900 the 189 establishments that existed were either repair shops or blacksmith shops.[9]

It was in the context of this simple division of labour between artisan and unskilled labour that the Iron Moulders Society of South Africa was established as a classic craft union on 25th September 1896 "for the protection of the trade of iron, brass and steel moulders in the case of oppression and accident".[10]

At this stage of simple co-operation "real control of production is not yet firmly in the hands of capital. It is still a relationship between labour and the conditions of labour which provide labour with a degree of control and hence a lever with which to enforce its class objectives - (which may be) craft prerogatives over recruitment into the trades and over the content and performance of work".[11] A craftsman exercises control over production through his possession of the instruments of production, that is, the tools of the trade, which are an extension of his hands and over which he attempts to exercise exclusive control. Three tools are central to the moulders trade - the trowel and heart and squeeze, used for sleeking, and the cleaner used for blacking into the mould.[12] The IMS was involved in a constant struggle to maintain this monopoly of control and attempted to draw lines of demarcation between the

craftsman and his labourer. In 1918 the Executive Committee (EXCO) summoned Smith, a member of IMS, to account for his alleged breach of this line of demarcation by carrying castings. "Smith explained that he had not personally carried castings from Knox to Bonds but had merely directed a native to the latter shop. This explanation was considered satisfactory by the meeting". Similarly we find Jock Naysmith writing to the chairman of the shop stewards committee at East Rand Proprietory Mines (ERPM) warning them of the importance of maintaining this demarcation. "It has been brought to the knowledge of our society that in the making of white metal bearings...the usual moulders tools are used - by a plumber - we do not know how this has been initiated and allowed to continue by our moulders in the ERPM as my society has always considered anything of this nature as an infringement of our trade".[13] With the introduction of moulding machines during the First World War the society tries to draw the line of demarcation so as to include these machines, demanding exclusive jurisdiction over them. In 1918 a resolution is passed that, "our members should work machines and that we should take care that we do not lose the machines".[14]

The mechanism for establishing control over the job is twofold; the closed shop and the apprenticeship system. From its inception the IMS was concerned to establish a closed shop among moulders by ensuring that all moulders in the Transvaal belong to the Society. At the second recorded meeting of the IMS EXCO a dispute is recorded at a shop where a moulder refuses to join the union.[15] A meeting is held two days later when the men in the shop go out on strike and are supported by the embryonic IMS. The EXCO write to the shop informing them that one of the employees has scabbed.[16]

Similarly the shop stewards from Parry & Co. raise the case at the EXCO meeting of a man who had been taken on as a labourer but spent most of his time at moulding.[17] Part of the closed shop strategy involves establishing a recognised rate of pay. In March 1899 the EXCO decided to invite several moulders on the Rand to their next meeting because they were working for less than the recognised rate of pay (one week of 51 hours). Similarly in April 1905 a member was called to appear before the EXCO and questioned in regard to his working on the Sunday without receiving double pay. He said he was in ignorance of the society rules but would take care not to transgress them in future.[18] By May 1913 the chairman was able to claim that one hundred percent of the moulders in the Transvaal belonged to the Society and that no member of this trade was allowed to work under the standard rate of pay of £1 per day, whereas in other trades they worked for £4 per week.[19]

Initially the IMS responded to the challenge of Coloured moulders joining the union by defining the closed shop in racial terms. In 1906 a resolution was passed declaring

that if a Coloured person starts in the shop that the foreman should be told that it is "against the principles of the Society" and if the Coloured is not removed that "the shop has the full sanction of EXCO to cease work".[20] However, the increase in the number of Coloured moulders from 1910 divided the membership between those who saw the issue in traditional unionist terms (the unionist strategy) and those who believed that protection must take a racial form (separatist strategy). On 18th April 1913 a special general meeting was called to discuss the transfer of a Coloured man from Salt River in the Cape to the Pretoria Railway Foundry. Smart, putting the separatist case stated that he considered the government had introduced the thin end of the wedge by bringing Coloured moulders to the Transvaal. "We will be forced out of our jobs by these men".[21] Pomfert, putting the unionist case, said "he was prepared to work with any man provided he got the standard wages and lived under similar conditions as himself". Besides, he said, "the man was recognised to be a white man and had the same privileges as himself, he was a registered voter in the Transvaal and was served openly in any public bar. In fact, he had partaken in a European hotel, Pretoria, liquid refreshment with him". Smart replied that "it doesn't matter whether he was three generations removed or not, nor whether he was getting the same wages or more, we should keep the society white as these men were eventually going to do us out of our jobs and it should be put a stop to". Pomfert's response was that he could not stop the Coloured man's advance and proposed that if a Coloured man earns the same wages, he be accepted in the union. This motion was eventually withdrawn and the proposal accepted that if *this man* applies for membership he would be accepted.

The 1906 resolution seems to have been retained as the society's position throughout the First World War. In 1919 the secretary found it necessary to write to an employer reprimanding him for employing a Coloured man as a moulder. "If white men are going to employ Coloured men in preference to white men as skilled mechanics, the white standard is soon going to disappear in South Africa and future generations of whites are going to be left a legacy of a Coloured standard of life".[22]

No debate took place on Africans joining the Society during this period but sharp responses were made when the lines of demarcation were breached by Africans. The shop steward of Rand Foundry reported in May 1909 that "a native had been set to make cores in the Rand Foundry and that he had had an interview with the manager. The boy was stopped that afternoon".[23] The racial forms of union protection which emerged during this period were neither irrational nor permanent - they represented the contradictory nature of the white workers location in the labour process and society at large. On the one hand they are an index of their privileged position in the racially discriminatory hierarchy in

the division of labour and within a racially segregated society. On the other hand, it is also an index of their vulnerability - the different patterns of proletarianisation between black and white, the rigid controls over black workers which create the basis for a cheap and unorganised black labour force, ever ready to undercut the "privileged white worker". It is also important to understand that the racial basis of union protection is not permanent - in fact, the union responds to the forces of change, by first opening its doors to Coloureds in the 1920s, and then this year, with the amendment to the Industrial Conciliation Act, to Africans.

The second aspect of craft control over the job, the apprenticeship system, was established from the inception of the union. To become a moulder a period of six years apprenticeship had to be served. The ratio of apprentices to journeymen was strictly controlled - one to every three men, the average to be taken on a twelve month basis.[24] The society found it difficult to enforce the ratio rule. In 1909 a complaint was received from the shop stewards in Wright Boag & Co. that they were employing one over and above the number of apprentices allowed. EXCO moved that the apprentices be allowed to continue and that the shop steward ask the foreman as a favour to adhere to the society's rules as far as possible as the number of apprentices employed was altogether out of proportion to the requirements of the trade.[25] Similarly the society found it difficult to enforce the rule that the society can prevent an apprentice from starting at another foundry if he should leave his previous employer before completing his time.[26] On one occasion during this period EXCO threatened withdrawal of labour in a shop to enforce this apprenticeship rule.[27]

In the early period of transition from simple co-operation to manufacture, the craftsman still retains a degree of control over the content and performance of work. The major way in which the rate of exploitation can be increased is through the expansion of what is called absolute surplus value, that is, increases in surplus value resulting from the expansion of the working day and the intensity of work.[28] However, the limits of these increases are set by the strength of shop floor organisation which determines the extent to which unions can achieve their objective, as the IMS preface states, of "a fair day's work for a fair day's pay". Consequently during this period major struggles take place over the length of the working day, eventually culminating in a 13 week three day strike in 1918 over a demand for two weeks paid holiday. The other area of struggle over the intensity of work was over the piece work system, a forerunner of Taylorism and scientific management.

The IMS retained a constant opposition to the piece work system on the grounds that it ultimately forced moulders to work more for less money. In 1902 a dispute took place

over the piece work system when moulders refused to accept it at Crown Mines.[29] In 1909 the Railways, including the moulders, went on strike over piece work, arguing that their wages were being reduced and the working day lengthened by the system.[30] The IMS gave support for the strike and maintained opposition to the piece work system, even after the men went back on certain guarantees.[31] They argued that any acceptance of piece work was the thin end of the wedge.

The struggle over the length of the working day led in 1908 to the establishment of a select committee of the Transvaal Legislative Assembly which rejected the demand for an eight hour day.[32] In February 1910 the IMS called a general meeting in which a motion for a 48 hour week was proposed but defeated in favour of a demand for a 50 hour week.[33] In May 1916 the IMS collaborated with the Amalgamated Society of Engineers (ASE) and the Boilermakers Union in putting forward a joint demand for a 48 hour week.

However, it was the rising cost of living (the cost of living rose from 814 points in 1914 to 1 064 points in 1918) that led to the union's major confrontation with management in its history, when the IMS EXCO put forward five demands in December 1917 to the newly formed Engineering and Foundry Association. They demanded a minimum wage of £7.10s per week, a war bonus of ten shillings, a ban on all overtime, and two weeks holiday in full pay and no victimisation of Society's members. These were put to ballot and unanimously approved in January 1918. In February the employers conceded to the demands except the holiday pay which the chief magistrate McFee had conceded on arbitration. McFee found in favour of the Iron Moulders Society but the employers hesitated. IMS believed the employers were in a breach of faith and consequently went on strike in September, eventually winning their demands in November 1918.[34] The first Factory Act was passed earlier that year with less favourable holiday pay conditions than the IMS had won.

The First World War created a basis for expansion in the engineering industry in the next decade with the establishment of 132 new foundry and blacksmith shops. Capital investment in machinery almost doubled during the war years.[35] Optimism after the war was running at an all time high as regards the engineering industry, many products never previously made in South Africa, were being produced and by the end of the war solder and white metal were being produced on the Rand.

Yet engineering was to remain, in the 1920s, a labour intensive industry. In 1920, regarding the capital labour ratio in base metals, the value of machinery was 2.5 times smaller than the value of wages, suggesting that the industry was still highly labour intensive.[36] (See Table 1).

TABLE 1

BASIC METAL INDUSTRIES

YEAR	ESTAB-LISH-MENTS	£000 MACHI-NERY	EMPLOYMENT TOTAL	EMPLOYMENT WHITE	SALARIES TOTAL	SALARIES WHITE	NET OUTPUT
1918/19	229	1 152	16 181	9 680	2 593	2 298	3 530
1919/20	261	1 285	17 780	10 888	3 213	2 902	4 271
1920/21	260	1 523	19 159	11 597	3 840	3 445	5 001
1921/22	267	1 747	18 032	11 098	3 516	3 176	4 540
1922/23	269	2 166	17 778	10 623	3 246	2 904	4 167
1923/24	264	2 312	18 892	10 883	3 543	3 147	4 842
1924/25	270	2 442	20 112	11 684	3 835	3 388	5 381
1924/25	220	1 015	7 733	3 256	1 078	833	2 206
1925/26	223	985	8 265	3 546	1 197	921	1 057
1926/27	225	1 282	9 163	3 935	1 345	1 020	2 189
1927/28	234	1 380	9 633	4 017	1 437	1 135	2 330
1928/29	261	1 589	10 123	4 247	1 492	1 149	2 396
1929/30	272	1 614	10 784	4 374	1 610	1 233	2 533
1932/33	322	1 465	11 900	5 153	1 620	1 305	2 737

Reference: Union Statistics for 50 years: 1910-1960

The size of those establishments remained small with only 11% of them with more than 50 workers. (See Table 2).

TABLE 2

CLASSIFICATION OF ENGINEERING FACTORIES ACCORDING TO THE NUMBER OF WORKERS EMPLOYED

NO. OF WORKERS	UNDER 4	4	5-10	11-20	21-50	51-100	101-200	201-300	300 & OVER
No. of establishments	135	107	289	147	123	42	22	10	26

Furthermore, production remained organised on jobbing lines. Bosman, writing in 1929, despairingly concludes that "the conditions under which the engineering industry is working enable it to develop along lines of the general jobbing shop, while the other lines which might become more

lucrative and lead to developments of real national importance are entirely eliminated from its programme".[37] Jobbing implies that concerns do not "produce any one product, but involve themselves in the production of various products, usually markedly different. Production is only done to order, that is, very little stock of any one product is held. The products produced may necessitate different processes of production, depending upon the specific product involved. It is the non-specialisation on the part of engineering concerns that encourages the continuation of jobbing". For instance, Bosman says, "one plant may carry as many as 25 000 different patterns". Manufacture is done "on contract" - the result of a "sell and make" policy. Most of the orders are special in their character, and are given according to particular specification. No stocks of finished products are carried, and a steady production is not maintained. Thus the industry suffers "ups and downs and the idle machine factor becomes a great waste".[38] But with the increasing introduction of moulding machines, we now see the juxtaposition of two forms of production - the one remains based on craft work and is located in jobbing; the other involves the replacement of the craft moulder by the machine.[39]

This process of "deskilling" emerges during the First World War and becomes an issue within the union in the 1920s. In May 1921 the EXCO recommends to the general meeting that all machine moulders be approached in regard to membership of the Society. We feel, they said, that it is time we had *some control over the machines.*[40] The following week the EXCO instructed the secretary to write to the members of the South African Railways foundry in Pretoria to get their opinion on the admittance of machine moulders into the Society.[41] Again in 1925 the shop steward in Vereeniging reported that a moulder had started working on a machine and that he had informed members of the shop that he had no intention of applying for membership of the society. The shop steward also stated that two handymen were starting on Monday to work the other machine.[42] The EXCO decided to write to the manager of the works, asking him if he will meet a deputation from the society to discuss the rate of pay for moulders working the machines. It was recorded in the Minutes soon after this incident that the secretary had written a letter to the National Foundry Workers Union of Great Britain to obtain information on pay and conditions of machine moulders.[43]

At the next quarterly general meeting the secretary tabled the reply from the NFWU of Great Britain informing the moulders of their lost opportunity in not tackling the machine moulding issue in its infancy. He trusted that the moulders of South Africa would not make the same mistake as they had. This was followed by a letter from the Engineering and Foundry Association requesting permission to change the ratio of apprentices "on account of the development of

the industry". Naysmith then appealed to members to seriously consider what the employers were doing and take note of the warning that had come from the British Union. He said "our aim should be to grapple with the questions before us and not to think we are all powerful. We had the signs of the times around us in the aluminium works. African Steel Products, Denver, Dunswart, and Wright Boag were all introducing machines for moulding. He appealed to members not to rest in the position of false security, "but to face the question before it is thrust upon us unconditionally". Discussion seems to have ended when the secretary reported that "on account of the iron fields (a reference to ISCOR) opening up the number of journeymen today compared with the situation two years ago showed a good deal of increase. The sign of the times was that the moulding trade was developing".[44]

No further discussion took place on the question until six years later when the Minutes of the EXCO meeting record a decision on the possibility of changing the union to a Foundry Workers' Union. The Minutes record the following:

> The EXCO decided to draw up the following scheme to place before the next quarterly general meeting.
> 1. The organisation of all workers connected with foundries.
> 2. The name of the union be changed to the Foundry Workers' Union of S.A.
> 3. The reason for this was that in the near future the Pretoria Steel workers would be opening and the result would be the creation of a large army of unskilled workers who would eventually encroach on the various skilled occupations.
>
> The introduction of modern machinery would also tend to require semi-skilled supervision in the place of skilled mechanics.

There is no further record in the union Minutes of the outcome of this discussion.[45]

In 1926 the Society visited Dunswart to discuss with the foreman a dispute over who was to work a new moulding machine and at what rate. The foreman informed the secretary that it was his intention to keep a moulder working the machine at the standard rate of pay. The secretary replied that the Society intended keeping control of these machines and any member who is asked to work them must do so.[46] A month later the EXCO received an application from a machine moulder at Dunswart for membership. He stated that he had commenced work on the moulding machine in 1915 in South African Railways foundry in Pretoria and worked the machine until 1922. He was placed on the present moulding machine eighteen months ago and had been constantly on it while there was work for the machine. He was receiving £17.6s a shift and his overtime rates were one and a quarter. He said he

was anxious to be made a member of the society and claimed the same rate of pay.[47]

However, by the end of the decade, the pressure on the part of both capital and the state for transition to mass production was building up. Capital's strategy was to breach craft control by defining machine moulding and core making as operative work. In 1928 the secretary reported an invitation from the manager of East Rand Engineering Works to visit the shop to discuss a complaint from a moulder who was not satisfied with working the small squeezing machine. They considered that any moulder who had served an apprenticeship was too ambitious to be satisfied with machine moulding. They suggested that output would be increased if the handyman was employed because he would be a satisfied man. The secretary stated that it was an instruction from the society to our members to work these machines and that moulders could give the best result from these machines provided conditions were equal.[48]

A union meeting was held three weeks later with the men from this shop and the foreman present. The foreman told them that he did not feel that he was getting a fair return for a day's work from the men on the moulding machine. He was prepared to co-operate with the union by employing moulders if they would assist him by increasing output. The shop was being reorganised on a production basis and all the machines would be put in one place in the shop and some men would then be required to work permanently on the machine. Some of the men working on the machines confirmed their dissatisfaction, others were not dissatisfied. The secretary argued that these machines were on the increase and that we should devise a strategy that allowed us to control them by giving as little as possible of the unskilled and semi-skilled aspects of the job to operators. A form of job fragmentation was then accepted by the members.[49]

The intervention of the union in this shop seems to have strengthened shop floor resistance to management's strategy of employing non-moulders on the moulding machines. A year later the secretary reported that men in the East Rand Engineering Works were not prepared to accept management's attempt to employ a non-moulder on a machine. He said "the grievances of the members was that Barlow, (the new man) was an interloper, not having served an apprenticeship and so was not eligible for membership". The meeting proposed that he be not allowed to continue working there. This was accepted.[50]

By the end of the decade, the Society's fears that they would lose control of the machines were increasing. In September 1930 a delegation visited the SAR foundry in Pretoria, reporting back to Johannesburg on machine moulding. One alarmed member stated that the days of "white slavery" were not finished and the men completed a day's work with their hands covered in blisters. Furthermore, management were putting obstacles in the way of moulders working these

machines, while the unskilled labourers were getting every assistance.[51] In October the Minutes record the Society's successful designation of moulding in the Industrial Council Agreement to include core making and machine moulding. However, this was only after considerable battle within the Industrial Council established two years earlier. Discussing the proposed 1929 agreement the IMS delegates (the Industrial Council consists of joint employer and employee delegates) reported that the employers were pressing for core making and machine moulding to be classified as operative work. (The term 'operative' was first introduced in the 1928 Transvaal Agreement at a rate of 2s.1d an hour, artisans receiving 2s.9d an hour).

Similarly a request was presented at the meeting that a core maker employed at the Salt River workshop of the SAR, although a fully qualified moulder, was receiving less than the artisan's rate of pay because a lower schedule had been introduced. (Schedule B). This schedule rate, the report said, allowed the man to work as a core maker at lower rates and had been in existence for some years. "There was always a danger so long as it existed; it would be a way of employers overcoming the requirements for core making without the recognised period of apprenticeship. Every effort should be made to remove core making from Schedule B to Schedule A."[52]

The state's strategy towards scientific management first emerged in the Department of Labour's journal, *The Social and Industrial Review*, in the mid 1920s. Set up after the PACT government's victory in 1924, and following on the defeat of white labour in the 1922 strike, the Department of Labour rapidly became a highly articulate propagandist for scientific management. In January 1926 the journal commissioned an article titled 'Are Skilled Trades Dying Out or Growing?' After discussing the disappearance of some skills and the creation of new skills, the author concludes "that the belief that labour is being degraded by machinery is nothing but a myth. The field of skilled labour is now vastly greater than it ever was".[53] In December they report on an analysis into time and motion study in the Sweet and Confectionary industry suggesting ways of reducing the number of movements involved in making chocolate.[54] In 1927 scientific management was the major topic in the journal. In the May edition a new institute, The Institute of the Scientific Organisation of Industry, in Geneva is mentioned.[55] In July a mechanical engineer from Johannesburg, S. Couzens, describes the development and methods of scientific management in an article titled 'High Wages and Low Costs'.[56] He concludes by quoting Lenin's support for Taylor and feels that labour's attitude has now become sympathetic towards scientific management. In a later article the author considers the application of scientific management to South Africa. He gives examples of "soldiering" by artisans in South Africa and then proceeds

to explain how the tool room can be made more efficient by removing the tools from the artisan and placing them in the tool room.[57] In 1928 the Department of Labour held a conference on mass production. In 1929 an article on mass production from an overseas journal is summarised, the author concluding that "the proportion of skill is not in fact being very seriously upset. I believe that as fast as the one type of skill is eliminated other types of skills are called into being".[58] In June, Hotz, chairman of the Wage Board, writes an article calling for the establishment of an organisation to promote the Rationalisation Movement in South Africa. He writes "the discussion which has been carried on in the engineering industry in connection with the question of work, specialisation and mass production are evidence of the fact that South African industry has not been altogether oblivious of scientific management".[59] One of the striking features of the debate as conducted through these journals is its derivative nature on developments elsewhere in the world. In August an article is reproduced which summarises the Rationalisation Movement as it has manifested itself in the United States of America, Germany, France, Great Britain, Spain, Italy, Australia and Japan.[60]

While clearly concerned to present capital's perspective on scientific management, the Department of Labour's commitment to implement the Pact government's "civilised labour" policies, led them into the contradictory role of having to continually reassure their leaders that (white) skilled labour will not be displaced by this restructuring of the labour process.[61] However, the clearest statement in favour of scientific management was made in 1929 when Bosman, a Pretoria engineer, presented the Board of Trade and Industries report on the engineering industry. Bosman argued that the engineering industry at present was designed for jobbing and if South Africa was to become less dependent on imports then a transition to mass production was required. "A local industry, which has reached a high point of development along the lines of general engineering, is at present seeking wider markets and new fields of manufacture. It is quite capable of entering such fields if the conditions are made favourable...several plants in fact are in a partial transition stage towards this type of work. Such firms find conditions extremely severe and find it difficult to compete with foreign competition."[62] Three obstacles to mass production are identified. Firstly, *lack of standardisation.* "In industry high labour costs are to a very large extent due to lack of standardisation. Each particular job has its own value, some more lucrative than others".[63] Secondly, *no scientific management exists.* "the system is dangerous and depends to a large extent for its success on the human element. In large scale organisation a system of this nature becomes impossible. A proper costing system, time sheets, accurate statistics is required.[64] Foundry practice, except in one case, is carried on along 'rule of

thumb' lines. No scientific control is in evidence."[65] Above all, to prevent restriction of output a scientific study of timing based on each operation must be done. Thirdly, *the power of the artisan blocks the use of semi-skilled operators.* Bosman then isolates five examples of restrictions imposed on the use of operative labour by the craft unions. The locus of power, Bosman identifies, is the Apprenticeship Committee set up in terms of the Apprenticeship Act of 1922 which controls entry into the trade. This contributes to the massive disparity between the wage levels of skilled workers and labourers in South African Industry. (See Table 3).

TABLE 3

AVERAGE WEEKLY WAGE IN ENGINEERING INDUSTRY (1925-26)

	U.S.A.		S.A.		U.K.		AMSTERDAM		PARIS	
	s	d	s	d	s	d	s	d	s	d
SKILLED	155	0	144	2	64	0	53	6	38	1
LABOURERS	69	3	21	3	43	8	42	9	24	1
PERCENT	45		15		70		80		70	

His solution to these obstacles is a transition to mass production. "The basic function of mass production methods is the saving of time. All forms of management centre around this factor. A saving of time in any direction and under any conditions involves an increased turnover per workman for any particular period and accordingly reduced costs."[66]

In each stage of capitalist development, Wright argues, there is a characteristic pattern of impediments to the accumulation process. "Through a combination of class strategies by the capitalist state, and individual strategies by individual capitalists attempting to maximise their profits, these impediments are overcome and the accumulation process continues in new forms."[67] We have identified the impediments to accumulation and the strategies devised by the state and capital to overcome these impediments to capital accumulation in the 1920s. The progressive introduction of machines into the production process identifies the transition from manufacture to what Marx called machinofacture; a profound change in the relations of production defines this transition. Following Marx, we define this as a transition from formal to real subordination of labour to capital.[68]

THE TRANSITION FROM MANUFACTURE TO MACHINOFACTURE

Between 1932 and 1950 there is an enormous investment in machinery (the value of machinery rises by over 1 500 percent). Employment only increased at half the rate to that of machinery between 1932 and 1950 - 700 percent.

TABLE 4

BASIC METAL INDUSTRIES

YEAR	ESTAB-LISH-MENTS	£000 MACHI-ERY	EMPLOYMENT TOTAL	EMPLOYMENT WHITES	£000 SALARIES TOTAL	£000 SALARIES WHITES	£000 NET OUTPUT
1932/33	322	1 465	11 900	5 153	1 620	1 305	2 737
1933/34	359	3 162	15 886	6 865	2 346	1 906	3 797
1934/35	373	3 825	20 086	8 644	3 100	2 514	5 490
1935/36	410	4 087	24 925	10 151	3 807	3 047	7 112
1936/37	433	4 360	27 895	11 435	4 245	3 367	8 222
1937/38	445	4 306	29 958	12 088	4 690	3 672	9 748
1938/39	448	4 692	29 340	11 744	4 621	3 604	9 285
1939/40	453	5 418	33 878	13 185	5 471	4 251	11 313
1940/41	484	6 078	41 068	15 687	7 111	5 386	15 091
1941/42	514	7 711	46 898	17 930	9 197	6 905	17 441
1942/43	515	9 182	52 158	19 662	11 150	8 156	19 873
1943/44	567	12 443	55 744	20 824	12 308	8 775	21 689
1944/45	579	13 552	59 075	21 767	14 286	9 856	25 557
1945/46	623	14 756	61 835	22 642	14 904	10 272	26 308
1946/47	667	15 858	63 884	23 841	16 153	11 319	29 406
1947/48	812	17 386	70 861	26 231	19 344	13 782	35 030
1948/49	926	20 703	77 200	28 641	22 360	16 207	40 130
1949/50	990	22 611	83 603	30 846	24 714	18 054	45 162

Reference: Union Statistics for 50 years: 1910-1960.

Technological innovation in the foundry industry in the 1920s in Europe and America laid the basis for this drive to mechanisation in the 1930s. In January 1932 a member reported to the Executive Committee that a new operation , 'hollow drill steel', had been introduced in the United Steel Company foundry in Vereeniging.[69] A member reassured the meeting that the cores for this job were made and handled by moulders. The EXCO's anxieties remained - delegates expressed the opinion that United Steel Co. were employing Africans

in these various operations. Possibly more significantly the secretary was instructed to place on the agenda for the next quarterly meeting a resolution urging the government to impose a tariff on all machinery imported into the country. Nine months later their fears were confirmed when the secretary reported that the Industrial Council representative for the United Steel Co. stated that unskilled youth were employed at this operation as it was not considered core making. The society delegates had challenged the employers' representatives at the Industrial Council meeting stating that this work was skilled and could only be made by moulders and apprentices.[70]

Again in December the issue of the 'hollow drill steel' operation was raised and United Steel Co.'s statement that the making of numerous runner cores and the assembling of the permanent moulds was outside the provinces of the moulding trade. The meeting decided, after discussion, to adhere to its previous decision that the making of runner cores for 'hollow drill steel' is part of the moulding trade.[71] A year later the secretary reported that the 'hollow drill steel' operation had been discussed at the Industrial Council. The EXCO had instructed the delegate that under no circumstances were they to agree to this operation being classed as semi-skilled. The Council could not agree on the question and had appointed a sub-committee to reach a decision and they recommended that the operation be removed from the foundry into the steel manufacturing section. Various members expressed the opinion that the United Steel Co. were using this operation as the thin end of the wedge for the dilution of the moulders' trade. Naysmith, the President of IMS, stated that he believed that the company would be prepared to spend a large amount of money to force that point.[72]

The struggle against capital's mechanisation strategy is best illustrated through an analysis of the debate about machine moulders and core makers in the Pretoria railways foundries. During the period 1928-1934 the railway administration introduced a new moulding machine in the foundries, resulting in a considerable increase of work being given to machine moulders.[73] In 1928 IMS formed a branch in Pretoria, submitting a memo shortly afterwards seeking to obtain a guarantee from the administration that in future moulding machines would be worked by moulders.[74] Arising out of this memo a meeting was held between the chief mechanical engineer and delegates from the Pretoria branch. At this meeting they had gained support for their memo to the extent that the latest Peacock moulding machine was guaranteed to the moulders. It was also agreed that a conference be held between the officials of the administration and one representative from each of the foundries in Pretoria.[75]

The following year a meeting was held to discuss encroachment in the railways. The Minutes read as follows:

> The men had decided that things had gone much too

> far and the time had arrived for them to stop any further action on the part of the railway administration to introduce unskilled labour into the moulding trade. Mention was also made of core makers and machine moulders in the railway services and it was thought that the time had come when the Society should seriously consider accepting machine moulders and core makers into the Society. Brother Sutten spoke on the question and said that the railway administration had for some time been putting forward their 'poor white' policy and introducing the men to the different trades. At a conference some two years ago the Minister of Railways had told delegates that the artisans were highly paid and would have to allow some of the poor white element to come into their trade to increase the output and that comparisons between their wages were so great that the artisan would have to accept a reduction to allow the unskilled man to be raised to a higher standard. He hoped that the members of our society working on the railways would stick together and show a united spirit in any negotiations which might arise. Many members spoke and all seemed in agreement that the time was ripe to accept machine moulders and core makers in the society so that we could control them.[76]

However, meetings with the administration seemed to be having very little affect. At the quarterly general meeting in December 1930, Pretoria officials complained that the SAR was inclined to ignore the trade union. In fact, they reported that at their last meeting with the chief mechanical engineer he had left the meeting and the discussions had taken place with the piece work engineer. A number of meetings had been held since then and it had now been decided to approach the Minister of Railways to appoint a Conciliation Board to go into railway moulders' grievances.[77] In June the report of the conference with the Minister of Railways was tabled at the quarterly general meeting. The Pretoria delegates informed the meeting that in their opinion the Minister was attempting to bring a further reduction of pay and also to shorten the hours.[78]

In 1932 the Pretoria branch reported that new machines were being introduced which were so simple that practically anybody could work them.[79] The question of the degree of skill involved in these new operations had been raised on a previous occasion when a discussion had taken place over whether 'chilled moulds' could be defined as moulders' work.[80] The Industrial Council inspector however declared that chilled moulding required no skill and was very strenuous work.[81] With regard to the new machines in the Pretoria foundry, members seemed to see the degree of organisation as crucial. "Various members were of the opinion

that the railway men were not as well organised as they should be and that the administration were taking advantage of this. It was also pointed out that the moulders in SAR had refused to work the machines when they were introduced in 1914."[82]

The theme of organisation was taken up again at a joint meeting between Pretoria and Johannesburg in 1932 to discuss encroachments on the trade in the Pretoria foundries. The discussion is worth recording in detail.

> Brother wallace stated that if the Pretoria men had been fully organised at this time, they would have been able to withstand any encroachment of unskilled labour, but, unfortunately for themselves not being organised, the full weight of any protest could not be brought to bear on the administration. "You must know and have seen employers from the Rand visiting railway shops, and noting conditions of labour as they existed in the railways. They used this as an argument on the Rand in an endeavour to introduce similar methods there, and thereby break the strength of society. We have fought for the railwaymen tooth and nail, and have spent far more money fighting for the railway men than ever we have received from them." Plunkett said employers visit Great Britain and see the change in the foundries there owing to the introduction of unskilled labour into the trade, and if it were not that the moulders on the Rand were strongly organised, they would not hesitate to introduce similar methods here. In the railway shops in Pretoria some of moulders were members, and were contributing to the Society, but owing to the state that existed there they were unable to withstand the attacks that were being made. The worst features were that the men were cutting away the feet from one another, one man tried to earn a larger bonus than his fellow shop mate, thus destroying the brotherhood that should exist with moulders. Brother Boyder referred to the inauguration of the Pretoria branch in 1928, when the moulders were enthusiastic to organise and withstand the encroachment, and now another meeting was being held for a similar purpose. He viewed with alarm the future in industry because of the changed conditions that existed world-wide. Opinions expressed by several prominent people in South Africa is, there is too large a difference between the wages of skilled and unskilled workers. Because of the expression of opinions such as these, and the decision of the Minister of Labour that the Wage Board should hold an enquiry into the wages and conditions existing in the engineering industry in South Africa, there was a definite need for the workers to organ-

> ise. The working conditions of the moulders in the railways were being attacked and as long as a difference between the workers continued, the administration would be successful in having their own way. Wiltshire stated that organisation was a wonderful thing. Every institution has its own rules, and the constitution of the Society should be altered to enable the railway members to join at a cheaper rate of contributions. He was speaking for the men who were not able to express views on this matter as he considered that organisation of the railways was necessary.[83]

In September 1933 Plunkett reported that the SAR's policy of encroaching on skilled work was increasing and that the moulders were not receiving any support from the other craft unions (for example AEU). In order to dispel the attitude, a meeting of all railway artisans had been arranged for the near future.[84] In September a second-class core maker was employed in the Brass foundry to make cores on the machine.[85] This occasioned a one-day strike of all the Pretoria moulders as a protest against the employment of a labourer on core making. The union advised a return to work.[86]

On 15th January 1934 the secretary reported to the EXCO that further encroachment had taken place in the steel foundry and the men were determined to resist it. The men from Pretoria at the meeting reported further that unskilled labour was being introduced and that they anticipated more, particularly men from the special service battalion who would be placed as core makers and machine moulders.[87] At a special executive meeting called on 18th February, the men decided to go on strike.[88] On 22nd February, it is reported by the EXCO that all members in the railway shop were out on strike.[89] The following demands were submitted to the Department of Labour.

1. The abolition of encroachment;
2. the apprenticeship system be reinstated;
3. machine moulders and core makers be paid the artisan rate of wage;
4. all previous agreements be cancelled.

The dilemma facing the union, of resisting encroachment when the task has been deskilled, re-emerges in the joint discussions between the Johannesburg and Pretoria executive on 28th February 1934.[90] Again the logic of the situation leads them to argue for opening the union's rules to allow these new workers in as members. Core makers and machine moulders were working in the trade and were serving an indentured apprenticeship. It was suggested at the meeting that they should be organised in order to be controlled, otherwise the administration would swamp the trade with underpaid men. This was the only way to stop unskilled men from working under the standard rate. Eventually the

meeting endorsed a proposal first made by the Executive Committee in 1921 "that the policy laid down some years ago whereby machine moulders and core makers could join our Society, be put into operation and that we strongly oppose any further encroachments".[91]

On 2nd March the Department of Labour official attended the meeting with an offer from the General Manager of the Railways to meet the IMS and open negotiations for a settlement.[92] However, on 5th March the Pretoria branch decided that there would be no return to work until negotiations had been completed. On 15th March the terms of settlement were submitted to the Pretoria strikers and a Commission of Inquiry set up.

In trying to draw a line between skilled and semi-skilled work, the Commission of Inquiry was faced by the complex question of trying to establish objective measurements of skill. Not surprisingly they had great difficulty - from the evidence of foremen, works managers and arguments of the commissioners themselves, eight possible criteria can be identified.

1. THE QUALITY OF CASTING REQUIRED

"Plunkett said he judged work by the responsible purpose for which it was required. Perfect castings were required in the case of cylinder liner cores - the fact that there can be wastage showed the job to be a skilled one."

2. PAST PRACTICE

"Mr. Skillocorn remarked that Plunkett's idea appeared to be that in defining the work, past practice should be taken into consideration as there would be work which had been done by moulders all along...Plunkett contended that everything that is moulded is moulders' work, and where the ramming up only had been eliminated, this did not take away the skill required. The ingenuity of the moulder was still there. He suggested that the machine moulder should not be allowed to use the moulder's tools; especially the trowel which is the moulder's main tool. Mr. Banbury did not agree and pointed out that in the machine shops there were men using a large number of artisans' tools. Mr. Plunkett said this was encroachment and it was only his opinion that the work was semi-skilled."

3. BEING ABLE TO CONCEIVE OF THE JOB AS A WHOLE AND MAKE A DECISION ON WHAT HAS TO BE DONE

"In regard to greasing blocks, foreman Herne stated he had been on foundry work for many years and he thought there was skill in this work in knowing

just what was required...He stated that machine moulders were supplied with the size of a runner and sprays in the patterns and therefore no skill was required by the operator in determining what size of runner or spray would be required for a particular job, whereas the hand moulder had to make his own decision in this regard."

4. THE EXTENT TO WHICH THE PROCESS IS CONTROLLED BY THE WORKERS' HANDS

"Mr.Skillocorn asked if he were correct in stating that Plunkett's insistence at the removal of the pattern by hand instead of mechanically, changed the process of machine moulding to artisan moulding was based not so much on the question of skill as that of protecting the craft, bearing in mind that it was not economical to use the complete machine for small lots of work. Plunkett said this was so. Skillocorn then stated he understood from Plunkett provided the machine moulder separates the pattern from the sand it is machine moulding, but if the pattern is lifted from sand by hand then it is plate moulding. Mr. Plunkett agreed."

5. THE DEGREE OF RESPONSIBILITY

"The question of imported cores was discussed and Skillocorn suggested that where difficulties could arise in the matter of location of *responsibility*, one man should be responsible even though in the work there may be some simple core which was lower grade work. This should be artisan's work."

6. POSSESSION OF AN ALL-ROUND SKILL ON THE JOB

"Crighton said that a first-class core maker was one who could make any core in the shop."

7. A PERIOD OF TRAINING

"Core making was considered to be skilled because on average foremen believed it took two and a half years to be trained from second-class to a first-class core maker."

8. IF THE JOB ON THE MACHINE INVOLVES CARE AND MAINTENANCE WORK

"Mr. Plunkett asked some foremen if the stripping plate would determine whether it was semi-skilled or skilled work. Mr. Sun stated that if there was after care work it would be artisans' work."[93]

However, ultimately the Commission realised the abstract and arbitrary nature of trying to identify in isolation from the concrete labour process how skill is to be defined. They abandoned the attempt at trying to establish broad principles and formula and examined each job in each foundry. This led them to recommend re-designating some of the work done previously as semi-skilled, as artisans' work. But perhaps the key variable shaping the allocation of work was the strength of shop floor organisation in a particular foundry. After noting the extent to which jobs in Pretoria were defined as artisan, whereas elsewhere they were semi-skilled, Mr. Skillocorn said 'this impressed him as an extraordinary state of affairs, and enquired what was the reason for Pretoria's practice in this respect differeing so much from other centres'. Plunkett said that this was due to the men at Pretoria being organised. There was always strong protest where any encroachment took place. The importance of organisation was confirmed by the foundry manager of Pretoria who said that at foundries overseas, where there were strong societies, cores were made by moulders, where there was no union, women made the cores.[94]

It is also of interest that the strike began in the steel foundry, where more jobbing was done than in any other foundry in South Africa. It would have therefore the largest concentration of craft moulders in the country, including those who have not yet been deskilled, who are both more threatened by encroachment and more able to resist it.[95]

The outcome of the 1934 strike was inconclusive - the South African Railways was not able to establish that the artisan moulder had become a semi-skilled moulder because of the introduction of modern moulding machines, nor had the IMS been able to prevent a large number of jobs from being retained by machine moulders. In November 1937 the IMS gave evidence to the SAR Conciliation Board that, should the Board be unable to agree to raise the pay of machine moulders and core makers to that of artisan moulders, the Board consider raising the pay of machine moulders by 20% and that of core makers by 7%, thereby raising them to the level of the semi-skilled employers in the machinist trades.[96] While it had become obvious to all that the labour process was being transformed, what the 1934 strike established was that the transformation would not take place entirely at management's pace. During the Commission of Inquiry, the IMS delegates agreed to accept the proposal that changes in the status of the artisan would be brought in gradually. "It was thereupon agreed that as there are a number of instances where work, now designated by this Committee as semi-skilled, being done by artisans, and it is undesirable that any sudden change in past practice should be made, the Committee's findings are subject to the administration agreeing not to displace artisans by semi-skilled men until such time as the artisans can be suitably provided for as a result of increased work or wastage in their ranks due to retirement in age limits, or

the creation of a profitable market which had to be met by local production. With South Africa's involvement in the war, demands for munition production followed almost immediately, most orders being placed by the Director General of War Supplies. The quantities demanded by war necessitated the introduction of mass production rather than jobbing. Most foundries were converted to manufacturing heavy armaments supplies, materials and shell cases. Between 1938-39 and 1944-45 the net output in basic metals rose from £9 285 000 to £25 557 000. (See Table 4).

However, it was on the question of dilution that the war strengthened employers. A chronic shortage of skilled labour for strategic industries prompted the government to move swiftly to secure dilution. In August 1940 the *Engineer and Foundryman* ran an editorial in support of dilution arguing that "in an emergency people can be taught to carry out a limited number of skilled operations...(and that)...it speaks volumes for the patriotism and realism of trade unions that they should be willing to accept the principle of dilution during such emergency periods as this". Their enthusiasm for this mechanism for overcoming labour shortage was thinly disguised. "It would be calamitous," the editorial continues, "for the unions if shortage of labour were allowed to hamper a period of internal industrial development likely to result in permanent expansion with the creation of more jobs for the rising generation and a consequent increase in the prosperity of the country."[103]

The emergency agreement of 1939 was passed since the unions realised that the alternative to a voluntary agreement was state regulation.[104] At a special general meeting a delegate expressed the magnitude of the defeat which the iron moulders had suffered. "The Society was faced with the biggest crisis in its history. The employers had always desired dilution and at this stage if backed by the Director General of War Supplies the Society must be broken up".[105] This was certainly the feeling of a delegate to the annual conference in 1941, when he said

> ...the IMS had made great sacrifices in sacrificing the principles of the craft to open the trade to others to assist in the war effort. This had been done in good faith, but they would have to fight hard to keep what they had got. Conditions had been forced upon the workers, meaning the end of individual liberty, and when objecting, were told they were not helping the war effort, wages were frozen at the lowest level instead of the highest level when commodities were frozen at the highest price. If the workers' wages were limited, profits too must be limited, or 100% of profits taken in tax by the state. The war demanded sacrifice by the employers as well as employees. The time had arrived for unions to take part in political action.[106]

Profits in the base metal industries increased by 400.4% between 1939 and 1943.[107]

In fact, the Society did not break up - they chose strategically to accept mechanisation and an increasing dilution on condition that they retain their craft privileges. Thus an emphasis at the special general meeting of the Society in 1939 was on the need to ensure 'absolute control' over the introduction of emergency labour.[108] The means they envisaged to maintain control were threefold. Firstly, the unions would retain some say in the granting of emergency workers through their membership of the Industrial Council.[109] Secondly, the unions sought to ensure that emergency labour would not become a cheap labour device, by demanding that the emergency workers should receive journeymen wages.[110] Finally, the executive of IMS attempted to obtain a strict definition of the scope of emergency labour.[111]

It is not my intention in this paper to discuss the struggle over dilution during the war except to mention a subtle shift in the strategy of employers.[112] Initially emergency workers had been employed because of the shortage of skilled labour. However, employers soon took advantage of this breach to link the employment of emergency labour with mechanisation and more fundamental processes of deskilling. This was, as Lewis argues, to lead to a challenge by the rank and file to IMS leadership on the grounds that the officials had lost touch with the membership on the question of emergency labour. By December 1940 the members had deposed the executive of the society, and voted to repudiate the emergency agreement on the grounds that Clause 2 was being abandoned by employers. However, the moulders' stand was not successful and failed to gain the support of other engineering unions. Although relations in the IMS stabilised after this, a tradition of rank and file activism, which at times transcended the limits of the particular trade union survived throughout the war years. In 1942 a 'war workers committee of action' was involved in a strike in a short-lived conflict with the executives of the engineering unions. In 1944 the rank and file movement ran its own newspaper, *The Engineering Worker*, and was blamed for holding up implementation of the piece work provisions of the new national industrial agreement.[113]

By 1940 the capital labour ratio had equalled out, the value of machinery was £5 418 000; the value of wages was £5 471 000. (See Table 4). In 1943 expenditure of capital surpassed labour for the first time, although the ratio was to decline for the rest of the war. During the war the major area of growth was in black employment and new machinery. Both these tendencies are sustained during the war - machinery rises by 150% (substantially faster than any other industry during the war); overall employment by 74% (whites by 65%); wages by 161% overall (whites by 134%) and output by a relatively high 100%. The value of machinery in 1950 was only 1.1 times smaller than the value of wages, indicating

1964	1 329	62	858	222	2 471
1966	1 380	92	1 322	243	3 037
1968	1 241	49	979	262	2 538
1971	1 116	0	1 377	333	2 836

By 1949 25% of the members were production moulders; by 1971 it had nearly doubled. The strategy of the union was to admit operators only when absolutely necessary in order to protect the skilled members.

This had shaped the union's attitude to Coloureds in the 1920s, the Pretoria foundry and Falkirk. What of African workers? Before the war broke out an African Iron and Steel Workers union existed, "to bring all workers engaged in the iron and steel trade in the continent of Africa into one union. Special attention to be paid to all the big concerns, that is Pretoria Steel Works, Dunswart and Vereeniging".[122] In September 1940 this union submitted a well motivated memo to Industrial Council for an increase in Grade 7 operators' wages from sixpence per hour to ninepence per hour (general labour); with board and lodging from fivepence to sixpence, and labourers from fivepence to eightpence per hour.[123]

In 1943 Grade D operatives' positions were opened to Africans under the negotiated Industrial Council agreement but some were excluded by the closed shop. This allowed the diluted craft unions through the closed shop to exclude Africans from 'skilled work'. However, by 1946, 3 643 out of 63 545 Africans employed in the engineering industry held operative jobs.[124] The way in which these labour categories were revised and reclassified in the 1950s and 1960s to allow certain tasks to be performed by African workers at lower wages (job fragmentation) in return for further guarantees of privileges for the white workers and Coloured workers, must be left to a later period. Similarly the growing antagonism of the registered unions to the African Iron and Steel Workers Union cannot be dealt with in this paper.

By 1945 the production foundry had been well established; a spate of Trade and Industry enquiries reported during this period advocating more scientific methods of production. Firstly, there was an investigation into manufacturing, Report 282, recommending standardisation, industrial research, and better utilisation of labour.[125] This was followed a year later by an investigation into the iron and steel engineering industry recommending the rationalisation of industry through standardisation, research, patents and specialisation.[126] Thirdly, in 1948 the de Villiers Report recommended restructuring the apprenticeship system in the light of the rapid technological developments of the industry. The previous method of apprenticeship, involving a close association with an individual artisan performing all the tasks, and under less pressure to work intensively due to the jobbing character of the work, was no longer possible under the new conditions in the foundry. This Commission

The argument is clear. The primary source of energy is now mechanical. As part of the deskilling process, skills are now incorporated into and under the control of the machine. The skill of the individual worker is being broken down and incorporated in a jointly run machine dominated process, making way for the collective worker. We now have the real subordination of the worker and the devaluation of labour power with increased productivity. The *dominant* form of surplus extraction is now relative surplus value, hence the gradual appearance of cost accounting, attention to plant layout and a system of 'payment by results', ratified in the so-called Premium Bonus System in the 1944 agreement.

This attempt to increase surplus value extraction was to come up against resistance by iron moulders. In particular the attempt at a more systematic bonus system at VECOR, which I am unable to explore in this paper, is an example of this change.[131] The post-war period also hails major changes in foundry technology.

TABLE 6

1949	First automatic frequency induction moulding unit.
1954	First automatic shell moulding machine.
1955	First core shooter.
1957	First mass frequency induction furnace.
1960	First hot blast cupola.
1963	First hot box core shooter.
1965	First continuous mixer.
1970	First fully automatic flashless moulding machine.[132]

By the mid '50s it looked as if base metals were about to enter a massive expansion into automatic production. This was certainly the mood of the bi-annual conference in 1955 of the Iron Moulders Society. Wallace, president of the union, made this speech:

> It is strange that troubles do not come simply and you have heard the effort of employers in our own foundries to dilute the trade, *not* by giving the work to the moulder or to the production moulder, *but* to dilute both the moulder and the production moulder's work by giving what operations we have always regarded as moulders' or production moulders' work,to the native at lower rates of pay, furthering the threat to our standards, and closing still further the avenues of potential employment for our sons and daughters...The tempo of this introduction of the native into industry replacing

> the European and the Coloured has increased at an alarming rate over the past three or four years. The progress of mechanisation today and the new processes being introduced are, to a large extent, removing the necessity for the skill of 10 to 15 years ago. I venture to suggest that it will not be a long time before we reach the press button stage. The harnessing of the electric brain to the mechanical muscle is just round the corner. The way things are going on the basis of skill involved, the native will be pressing the button. The employers' argument that no skill is involved is the greatest danger facing the workers who have attained reasonable standards and wages.[133]

While Wallace was correct about the advancement of Africans, he clearly exaggerated the economic potential for automatic production. Almost by way of reply, W.F. Boustred, president of SEIFSA, warned that the size of the internal market restricted this transition to automatic production.

> The economic question relating to automation, including the high costs of the necessary plant, its specialised nature in relation to the end product and its consequent inflexibility are not likely to be overlooked. It is for these reasons that I believe in a country such as ours where only relatively short runs can be undertaken, which call for a good deal of versatility in the moulding, we must emphasise that this is not an immediate problem which we have to face.[134]

The juxtaposition of jobbing and mass production allows one to speak of this stage - the stage of machinofacture - as one of *combined* as well as *uneven* development. The effect these uneven forms of production, and in particular new technology, has on work place organisation in the 1950s and 1960s, must be left to another occasion. What is clear is that the transformation of the capitalist labour process is *uneven* and cannot be understood in a simple chronological form.

NOTES

1. This summary of the literature is drawn from my theoretical introduction to this study, 'Towards a theory of the capitalist labour process', and based on the following: K. Marx, *Capital*, Vol. 1, (U.S.S.R., Lawrence and Wishart, 1977); H. Braverman, *Labour and Monopoly Capital*, Monthly Service Press, (New York, 1974); C. Palloix, 'The Labour Process', in *The Labour Process and Class Strategies*, C.S.E. Pamphlet 1, London, 1976; E. Mandel, *Late Capitalism*, (N.L.B., London, 1975); T. Elger, 'Valorisation and deskilling', in *Capital and Class*, 7, (1979); Elger, 'The Capitalist Labour Process', in *Capital and Class*, 1; E.O. Wright, *Class, Crisis and the State*, (N.L.B., 1978); M. Berg, *Technology and Toil*, (London, C.S.E., 1979).

2. K. Marx, *Capital*, 1, (London, Everyman's Library, 1939), 408.

3. An analysis of piece work is included in the next chapter of this study,'"Science hand in hand with labour" - Changing technology and the division of labour'.

4. E. Katz, *A Trade Union Aristocracy*, (University of the Witwatersrand, African Studies Institute, 1976). This deals with the early history of three craft unions. See also R. Davies, *Capital, the State and White Wage Earners*, (Sussex, Hamilton Press, 1979); Frederick A. Johnstone, *Class, Race and Gold*, (London, Routledge and Paul Kegan, 1976). Both these books deal with aspects of deskilling.

5. Jon Lewis has written three papers on the labour process: J. Lewis, 'The New Unionism', in E. Webster, *Essays in Southern African Labour History*, (Johannesburg, Ravan, 1978); 'Trade Union and the Labour Process (1925-1930)', (mimeo); 'Dilution and the craft union during the Second World War', (mimeo).

6. J. Lewis, 'Trade Unions and the Labour Process', (mimeo), 2.

7. Board of Trade and Industries Report, No. 286, 1946, 206 and 175.

8. Ibid., 1.

9. Industrial Census, U917/1910.

10. Rules of the *Iron Moulders Society of South Africa Rule Book*.

11. Brighton Labour Process Group, 'The Capitalist Labour Process', *Capital and Class*, Vol. 1, (1977), 7.

12. Interview with Bob Thorpe, a retired iron moulder, apprenticed in 1922, now living in Vanderbylpark, on 7 March 1980. Other tools used by the moulder are the square corner, round corner, fillet tools, top edge and boss tool-sleeking.

13. The Iron Moulders Society of South Africa, hereafter simply referred to as the IMS. Housed in the Historical and Literary Papers, University of the Witwatersrand Library, Accession No. A 1008/E, Letterbooks, 18.10.1918 and C 7, 8.10.1918.

14. Ibid., A 1008, C 8, 12.12.1918.

15. Ibid., C 1, 29.1.1898.

16. Ibid., C 1, 31.1.1898.

17. Ibid., C 1, 7.4.1898.

18. Ibid., C 2, 28.4.1905.

19. Ibid., C 3, 23.5.1913.

20. Ibid., C 2, 19.1.1906.

21. Ibid., C 4, special General Meeting, 10.4.1913.

22. Ibid., E 1, 11.9.1919.

23. Ibid., C 3, 5.5.1909. There was a similar case at the Eagle Brass Foundry on 27.8.1909 and again at the Rand Foundry on 29.6.1911.

24. Ibid., B, Rule 13, IMS.

25. Ibid., C 3, 11.2.1909. Similar situations are recorded in the Executive Committee minutes on 11.5.1919, 15.5.19, 25.8.1919.

26. Ibid., C 3, 5.11.1910.

27. Ibid., C 3, 21.7.1914.

28. "I give the name absolute surplus value to surplus value produced by a prolongation of the working day. On the other hand, to the surplus value that is produced by a reduction of the necessary labour time and by a corresponding change in the relative proportion of the two components of the working day, I give the name relative

surplus value", K. Marx, *Capital*, Vol. 1, (U.S.S.R., Lawrence and Wishart, 1977), 299.

29. Ibid., C 2, 11.10.1902.

30. Ibid., C 3, 7.5.1909.

31. Ibid., C 3, 21.5.1909.

32. E. Katz, Ibid., (1976), 332.

33. Ibid., C 3, 16.2.1910.

34. Ibid., C 5, 27.5.1919.

35. SEIFSA, 'The Origins and Structure of the Metal and Engineering Industry in South Africa', 1968, 10.

36. By capital is meant only the value of machinery, not all fixed investments, and is not a substitute for the Marxist concept of capital which includes fixed investment and raw materials. Labour means here simply the cost of the wage bill.

37. Board of Trade and Industries Report, No. 92, 1929, 74.

38. Ibid., 26.

39. Mechanisation of moulding was introduced because it lowered the cost of production by reducing the time involved in the casting of a mould and at the same time improved the quality of the mould.

"A moulding machine properly installed offers the following advantages compared with ordinary hand ramming from a loose pattern:

(a) Output is increased considerably through using the same manpower.

(b) Castings are much more accurate and are regular in weight.

(c) Finish is much improved."

It will be obvious how each of these three advantages contribute to the general reduction in cost.

Engineer and Foundryman, November, 1930. Of course, it has the added advantage of undercutting the craftsmen, although not always successfully in South Africa, as this foundry employer wrote in 1940:

"At the outset I may state that the foundry trade is one of the few trades of a real craftsman nature, with the exception of machine moulding which, although today operated by skilled trades-

men, is a semi-skilled job in any other part of the world outside South Africa."

Engineer and Foundryman, February, 1940.

40. Ibid., C 8, 11.5.1921.

41. Ibid., C 8, 20.5.1921.

42. Ibid., C 9, 11.12.1925.

43. Ibid., C 10, 8.1.1926.

44. Ibid., C 9, 26.3.1926.

45. C.S. Richards records that at ISCOR initially the decision was to "man the works with white labour, with possibly a few exceptions". However, after an important dispute in 1936, between management and 878 of the 2 555 white workers, the way was opened for the replacement of whites by Africans. C.S. Richards, *The Iron and Steel Industry in South Africa*, (W.U.P., 1948), 293. Reference in Minutes from EXCO, 13.9.1931.

46. Ibid., C 10, 1.10.1926.

47. Ibid., C 10, 29.10.1926.

48. Ibid., C 11, 28.9.1928.

49. Ibid., C 11, 20.10.1928.

50. Ibid., C 11, 1.6.1929.

51. Ibid., C 11, 12.9.1930.

52. Ibid., C 12, 13.9.1931.

53. *Social and Industrial Review*, Vol. 2, No. 1, January, 1926.

54. Ibid., Vol. 2, No. 2, December, 1926. Davies writes that by 1933 the Wage Board was able to record that the sweet making industry was 'considerably more mechanised'. He attributes this in part to the fact that the Wage Board was raising wage levels, ignoring the propaganda role of the Department of Labour in encouraging scientific management, Ibid., 222.

55. Ibid., Vol. 3, No. 17, May, 1927.

56. Ibid., Vol. 4, No. 19, July, 1927.

57. Ibid., Vol. 4, No. 20, August, 1927.

78. Ibid., C 10, 19.6.1931.

79. Ibid., C 10, 19.3.1932.

80. Ibid., C 10, 19.12.1930.

81. Ibid., C 10, 3.7.1931.

82. Ibid., C 10, 19.3.1932.

83. Ibid., C 10, 4.8.1933.

84. Ibid., C 10, 29.9.1933.

85. General report of the Moulding Inquiry into the South African Railway foundries in 1934.

86. Ibid., C 10, 9.10.1933.

87. Ibid., C 10, 25.11.1933.

88. Ibid., C 10, 18.2.1934.

89. Ibid., C 10, 22.2.1934.

90. Special General Meeting, C 10, 23.2.1934.

91. Ibid., C 10, 28.2.1934.

92. Ibid., C 10, 2.3.1934.

93. Ibid. General Report of the evidence to the Commission of Inquiry into the moulding trade.

94. Ibid. General Report of the evidence to the Commission of Inquiry into the moulding trade.

95. See J. Hinton, *The First Shop Stewards Movement*, (London, 1973), for a discussion of the tradition of craft control among engineers in England during the First World War. Hinton argues that a condition for the emergence of a successful local Workers' Committee during the First World War was that the status and privileges of the craftsmen in the area concerned should be intact when war broke out. The advanced technology of the Midlands motor car industry, for example, had substantially undermined the craft status before 1914, and Workers' Committees were not successful in the Midlands.

96. Ibid., F. Annual Conference Minutes, 1937.

97. Ibid. General Report of the evidence of the Commission

of Inquiry into the moulding trade.

98. Quoted in Footnote No. 10, T. Elger, 'Valorisation and deskilling', *Capital and Class*, Vol. 7.

99. Ibid., C 14, 1.7.1937. The Durban branch, of which Falkirk was a member, had made union history 16 years earlier when it was the first to open its membership to Coloureds.

100. Ibid., C 14, 1.7.1937.

101. Not entirely! The existence of cheap African labour remained an inhibiting factor in mechanisation. This is stated bluntly in an address to the Institute of British Foundrymen (S.A. branch) in 1941:

> A boy is made to transport castings by hand or barrow, is made to prepare the ground for the hand-moulder, is made to fettle by hammer and chisel, etc. In transportation a lift of some 80 lbs. would, overseas, be considered a reasonable amount for ordinary and more or less continuous handling, but the boy must have an aid and the rythm of the work is as always the speed of the slower. This is an aside, but the point should be brought out that having this native labour at one's disposal, and the fact that it is always available is, in my opinion, one reason why foundry development in the mechanised sense is, generally speaking, somewhat behind the times in this country.
>
> J. Mclane Renwick, 'Foundry mechanisation and equipment' in *Engineer and Foundryman*, April, 1941.

102. A.G. Thomson, *The Years of Crisis*, (Johannesburg, SEIFSA, 1946), 207.

103. *Engineer and Foundryman*, August, 1940, 75.

104. Ibid., C 15, 29.12.1939.

105. Ibid., C 15, 6.12.1939.

106. F. Annual Conference Minutes, 1941.

107. Board of Trade and Industry Report, No. 286, 12.

108. Ibid., C 15, 6.12.1939.

109. Ibid., C 15, 6.12.1939.

110. Ibid., C 15, 5.12.1939.

111. Ibid., C 15, 27.12.1939.

112. Discussed in detail by J. Lewis, 'Dilution and the Craft Unions during the Second World War', Ibid.

113. J. Lewis, Ibid.

114. D. Innes, 'The state, post-war manufacturing and class struggle', (mimeo), 1978.

115. Ibid., C 18, 20.4.1944. The *Engineer and Foundryman* reported in January 1943, that National Engineering (Pty.) Ltd. were producing general purpose machine tools at the same prices as imported machines. In June 1944 the *Engineer and Foundryman* reported that East Rand Engineering Company were manufacturing moulding machines. In both cases the machines were being used effectively in production.

116. The *Engineer and Foundryman*, December, 1940.

117. Ibid., February, 1943.

118. Ibid., March, 1946.

119. Ibid., January, 1951. It is interesting to note that the Factory Act was amended to introduce a chapter entitled 'Machinery and Accidents' for the first time in 1941.

120. D. Budlender, 'Labour Legislation in South Africa, 1924-1945', M.A. Thesis, University of Cape Town, 1979.

121. Ibid., C 15, 20.4.1944.

122. S.A.T.L.C. file, AH 646, 1DA 57.

123. Ibid.

124. D. Hemson, 'Capital restructuring and the war economy', (unpub. mimeo), 1977.

125. Board of Trade and Industries Report, No. 282, 1945.

126. Board of Trade and Industries Report, No. 286, 1946.

127. Report of the Committee on Technical and Vocational Education, UG 45, 1948.

128. Board of Trade and Industries Report, No. 311, para. 35.

129. Ibid.

130. Ibid.

131. VECOR was the first company to set up a specific agreement with the IMS providing for a Price-Fixing Committee with shop steward participation to deal with the bonus system. A lengthy struggle took place on the shop floor over this. See the Seventh Biennial Conference Minutes in 1947 for a lively discussion inside the union over this agreement.

132. J. Steele, 'The foundry industry in South Africa', *Foundry Welding and Production in South Africa*, February, 1979.

133. Ibid., F, Tenth Biennial Conference Minutes of the IMS.

134. SEIFSA Presidential Address, SEIFSA Monthly Bulletin, 1956.