

ANNEKE  
VAN MOSSEVELD

THE  
AUSTRALIAN  
ARMY UNIFORM  
AND THE  
GOVERNMENT  
CLOTHING  
FACTORY

INNOVATION IN  
THE TWENTIETH  
CENTURY



The Australian Army Uniform and the  
Government Clothing Factory

Anneke van Mosseveld

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Government Clothing  
Factory

Innovation in the Twentieth Century

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## PREFACE

Army uniforms have come a long way since tribal warriors started identifying themselves by the colours and design of their dress and pennants. There have been many redesigns, adaptations and improvements as the nature of warfare and levels of technological skills developed over time. Military requirements and technological change are historically intertwined, as many military historians and scholars of the history of technology have shown. Much has been written about technological developments, logistical and other issues including technology transfers from the military to the private sector. The same emphasis on military technology is reflected in the collections and displays of army museums where weaponry large and small, military transport vehicles of all kinds, aircraft on the floor or even suspended from the ceiling attract large numbers of visitors, from the young to the old. There is no doubt that the defence industries as depicted in those spaces occupy a special place in the minds of people of all ages. Yet the emphasis on military hardware has distorted our interpretation of what 'defence industry' entails and its connection to other, non-defence sectors in the economy. The exaggerated emphasis on hardware furthermore neglects many other defence areas with impact on our society.

One area of study is persistently overlooked: the transformation of the combat uniform, and, more particularly, the *reasons* for this transformation and the driving forces behind the changing patterns. And yet it is the uniform that is most prominently displayed in every illustration of servicemen and women and in every family photo depicting a son, husband, brother or father dressed to go to war. The uniform is also the very first item provided to new recruits into the Army. The uniform is intricately

connected to Australia's military history and so is the military clothing industry. It is a history that goes beyond the confines of the Army, involves a clothing factory and design changes shaped by new technologies in fabrics, fit, and manufacturing systems.

This book explores in a cohesive way the dynamics of this industry and the factors that stimulated these dynamics. It takes the economic concepts of innovation and 'creative destruction' as described by economist Joseph Schumpeter as a connecting point and then goes beyond his theory of innovation to explore the driving forces behind innovative change and to identify the reasons for these changes. It is a book where economics meets history.

In researching and writing this book, I spent many months delving through national archive materials in Canberra and Melbourne. I was very fortunate to receive support from many persons within these organisations. I would like to thank all the archive staff at the Australian War Memorial in Canberra as well as those at the National Archives of Australia in Canberra and Melbourne who so diligently and patiently made available the hundreds of files requested by me. I would like to thank, in particular, the Heraldry curators at the Australian War Memorial for selecting and displaying Australian uniforms from their 'behind the scene' collection and to invite me to visit their enormous collection warehouse. In addition, I would like to acknowledge the hospitality of the Curator at the Army Museum Bandiana, Ralph Behrends, who allowed me access to the one volume of *Dress Regulations* until then still missing from my list. Thank you.

I feel greatly supported by the comments made by three eminent scholars: Dr David Meredith of the History Faculty at Oxford University, Dr Sharon Peoples of the ANU College of Arts & Social Sciences, and Emeritus Professor Christopher Lloyd, University of New England. Financial assistance from the Keith & Dorothy McKay Travelling Scholarship and the Alfred D. Chandler Jr. Travel Grant allowed me to present and test some of the arguments presented in the following chapters. Last but certainly not least, my deepest and heartfelt thanks must go to the School of Humanities at the University of New England, and in particular to Dr Nathan Wise, who cheerfully made many useful comments as the drafts progressed into a book.

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## ABBREVIATIONS

ABS	Australian Bureau of Statistics
AWM	Australian War Memorial
NAA	National Australian Archives
NBAC	Noel Butlin Archive Centre, Australian National University
UMA	University of Melbourne Archives

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## CHAPTER 1

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# Introduction

### BACKGROUND

Army uniforms in every part of the world have evolved over time, ranging from the frocked leather skirts worn by Roman soldiers or the long tunics and pants worn by the Chinese warriors as displayed in Xi'an, the iron-plated and mesh vests worn by the Crusaders, the tailored red coats seen in Napoleon's army and in the Union army of the American Civil War, to the brown woollen belted tunics of the British and Australian armies in the First World War, the green jungle outfits worn by United States and Australian troops in the Vietnam War, and, finally, to the loose camouflage gear worn by most present-day armies. The evolution of military uniforms provides rich material for illustrated publications, which seem to always occupy an eye-catching place on the shelves of dedicated bookshops. Displays of uniforms or uniformed soldiers in action during battle also occupy a significant floor area at military or history museums. Today, many families in the Western world will have photographs of ancestors in uniform who participated in recent wars and this has brought them closer to war histories. Clearly, military uniforms attract the interest of many people. The literature contains many descriptions and illustrations of the vast range of military uniforms, covering all ranks and functions within the three Services (Army, Navy and Air Force) and many of the uniforms are on display in the same museums that contain the military hardware.

However, while the book illustrations and the museum displays point implicitly at the importance and changing design of the uniform, the literature from disciplines such as military history or design history neglects to identify the *reasons* for these changes. Symptomatic of the gap in the literature is the fact that in his *Official History of Australia in the War, 1914–1918*, Charles E.W. Bean, the official observer and later historian and author, devotes only four pages to the uniform worn by the men of the Australian Imperial Force. He does not favour the description with further comment or analysis other than to proudly announce that

It was commonly said that no troops ever went to the front more generously equipped than this first Australian contingent. The cloth of their jackets was strong; their clothing was woollen all through... their boots were as pliable as civilian boots, and far stouter. In France countless favours were obtained in exchange for Australian boots.<sup>1</sup>

Illustrated books showing the uniforms worn in Australia are plentiful and it would be presumptuous to claim knowledge of all of them. For those interested in these illustrations, in particular, those of the Australian armed forces, I refer to the works of Monty Wedd, John Perryman, David Miller and especially Alfred N. Festberg. Monty Wedd illustrates the uniforms worn from the Australian colonial era, continuing its journey to the early 1980s.<sup>2</sup> The illustrations are hand-drawn and very colourful. This work is best regarded as a sampling of some of the uniforms and is by no means complete. John Perryman's book of uniforms, badges and categories of the Australian Navy also has an early start date for its contents.<sup>3</sup> It begins with the uniforms of 1865 and, like Monty Wedd's work, is a good sampling; it is, however, far more in-depth in nature and also describes the badges worn. However, it covers only the Navy. Both books provide a good indication of the changes that have occurred over almost two hundred years, although none of the changes are explicitly discussed and no rationale is given for the decisions to alter the uniform designs. An example of a work that describes the uniforms worn during the Second World War is David Miller's book covering the Allied Forces dress, equipment and weapons.<sup>4</sup> It contains only a small section on the Australian uniform, but is indicative of the close collaboration between US and Australian forces in the type of uniforms adopted during the war. One of the most complete illustrated works for uniforms worn during the Second World War in Australia is a publication by the Royal Australian Army Ordnance

Corps Museum, edited by Alfred N. Festberg.<sup>5</sup> It contains a photographic record of all uniforms manufactured in Australia that were worn in 1943. This work is particularly interesting for its vast coverage of women's uniforms. The book includes uniforms for the Royal Australian Navy (including the Women's Royal Australian Naval Service), the Australian Military and Imperial Force, the Australian Women's Army Service, the Australian Army Nursing Service, the Australian Army Medical Women's Service, the Royal Australian Air Force, the Women's Auxiliary Australian Air Force, the Australian Women's Land Army and the Australian Men and Women Munitions Workers.

### ANALYTICAL FRAMEWORK

In this book I shall touch repeatedly upon elements of the uniforms' designs and innovations, but I will do so only in the context of discussing underlying reasons for those innovative changes. While these changes will be of interest in themselves, the analytical framework of this book is based upon an economic theory of innovation, developed by economist Joseph Schumpeter, and draws on economic and business principles. Furthermore, I apply these principles to the activities of the Australian Government Clothing Factory, the producer of the Australian Army uniforms, and to the impact of relevant actions and decisions taken by the Australian Army and the Department of Defence. For my analysis I have chosen to focus on the period 1912 (the establishment date of the Clothing Factory) to 1995 (the year in which the Factory was privatised), thereby creating an economic and business history of the Factory in the process.

The *leitmotif* running throughout this book is the economic concept of *innovation*. Innovation as a concept is nothing new to business historians, scientists and economists; it has been at the core of human development since the invention of the wheel. As an economic concept, it was also in the mind of economists such as Thorstein Veblen and Joseph Schumpeter in the early twentieth century when they devoted their thoughts to business enterprise and the role of the entrepreneur, and since that time it has been described in many ways by a multitude of scholars.<sup>6</sup> In 2008 Baregheh, Rowley and Sambrook collected 60 definitions of 'innovation' and conducted a content analysis, extracting and counting the number of key words found. They then compiled a new definition based on the highest-count words which they hoped would finally end the quest for a succinct and all-encompassing description:

Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace.<sup>7</sup>

In the first decade of the twenty-first century the term ‘innovation’ became a driving force for government industry strategies. The Australian Business Foundation held a brainstorming session in which academics and business leaders participated. The definition arrived at during this session filtered through to the Business Council of Australia:

Innovation is about doing new things and drawing on knowledge or creativity to find new and better ways to add value to products, services and processes.<sup>8</sup>

Both of these definitions capture key elements of innovation. The second definition is not only a simple and clear statement that contains the key elements of a process (‘doing new things’) to transform ideas or knowledge into new and improved products, services or processes, it also captures the possible use of ‘creativity’ and describes the final outcome as ‘adding value’.<sup>9</sup> It does not explicitly mention any ultimate goals for the process (advancement, competitiveness, differentiation) or a marketplace environment, but in leaving this unsaid, creates a much wider world of application, including social and non-profit settings. Unbeknownst to many persons present at the brainstorming session, this working definition was directly derived from the theory of capitalism, economic development and innovation left to us by economist Joseph A. Schumpeter (1883–1950). Schumpeter’s five key characteristics of innovation—(1) the introduction of a new good with which consumers are not yet familiar or which has a new quality; (2) the introduction of a new method of production; (3) the opening of a new market; (4) the introduction of a new source of supply of raw materials or semi-manufactured goods; or (5) the establishment of a new organisation of any industry, such as the creation of a monopoly position—neatly fit the activities of the Australian Government Clothing Factory. It is easy to see how the government-owned Clothing Factory with exclusive control over the production of Army uniforms conformed to Schumpeter’s theories on the creation of a monopoly position. In the following chapters I shall explain that several other elements of his theory, particularly the introduction of new methods of production and of new sources of supply of raw materials, are also in line with Schumpeter’s idea

of innovation. Furthermore, it may be observed that the Clothing Factory managers were entrepreneurs hand-picked from the private sector who drove innovation and made the Clothing Factory into a model performer. While operating a state-owned enterprise and under a constraint as a non-profit operation, they conducted the business as if it were privately-owned and profit-oriented.<sup>10</sup>

Schumpeter presents us with the idea that the process of innovation is dynamic and that it creates wave after wave of economic activity, rising and falling in intensity.<sup>11</sup> His *Theory of Economic Development* describes a disturbance of the existing equilibrium by new creative forces—which he baptised with the term ‘creative destruction’—in consecutive waves, each reaching a higher order from the previous one. The phenomenon of ‘creative destruction’ may be compared to a boiling pot of water, bubbles rising and exploding, each explosion temporarily making room for another bubble to grow and then explode. As the temperature rises, the bubbles will become larger, more furious. We have reached another level in the process, but it will never stay there.<sup>12</sup>

A second important element of Schumpeter’s analysis concerns the activation of change itself. This is the critically important part of Schumpeter’s analysis, which links with the *leitmotif* in the following chapters. As Schumpeter points out, the economy will not change of its own accord, but someone is needed to set the waves into motion. This someone is the entrepreneur. Schumpeter defines development as ‘new combinations of productive means’.<sup>13</sup> The entrepreneur is the person carrying out these new combinations of productive means. Schumpeter regards the concept of the ‘entrepreneur’ in a broad sense and, importantly, includes not only ‘independent’ businessmen, but also ‘dependent’ employees of a company such as managers, members of the Board of Directors or even a controlling shareholder.<sup>14</sup> When we now consider the history of the Australian Army uniform, it can be observed that the Army uniform did not evolve as it did without the action of someone to connect the combinations of the productive means. We are here not dealing with an ‘independent’ businessman, but with certain members of the Department of Defence and the Army’s clothing operations who performed the role of the entrepreneur, in line with Schumpeter’s inclusion of ‘dependent’ employees.

Innovation may be driven by external factors, including comments and complaints by consumers. I have devoted a section to this in order to show the underlying causes for innovation. However, in Schumpeter’s analysis,

the users' input into changes made to the Army's uniform are not a critical element in innovation. In his view, whenever consumers drive changes in the final products it will merely change the *data*, rather than innovation or economic development itself. Schumpeter explains this at some length in the *Theory of Economic Development*,

To be sure, we must always start from the satisfaction of wants, since they are the end of all production, and the given economic situation at any time must be understood from this aspect. Yet innovations in the economic system do not as a rule take place in such a way that first new wants arise spontaneously in consumers and then the productive apparatus swings round through their pressure. [...] It is, however, the producer who as a rule initiates economic change, and consumers are educated by him if necessary; they are, as it were, taught to want new things, or things which differ in some respect or other from those which they have been in the habit of using.<sup>15</sup>

While he presents us with his theory, Schumpeter writes little about the motivations and driving forces of the producers, apart from a desire to be leader in the chosen field, making a profit and accumulating capital. This book goes beyond Schumpeter's analysis and I shall uncover instances where innovation just had to take place for the uniforms (and the persons wearing them) to be functional in the historical and environmental settings of war. It identifies the driving forces *behind* the innovations that took place in an industry dominated by the demands of war.

The main players in this scenario are public institutions (in this case the Australian Department of Defence and the Australian Army), scientists, inventors and a state-owned factory. The Australian Army's combat uniform was produced by a government-owned factory, the Commonwealth (later, Australian) Government Clothing Factory, based in Melbourne, Victoria. It was a state-owned enterprise, but managed by people with previous expertise in the private clothing business. Over a period of some eight decades, this Clothing Factory was at the centre of innovations introduced in the design and the production of the Army's uniforms. The Clothing Factory was a crucial player throughout this period and I had no option but to describe its history where it was relevant to the key economic interpretation of innovative change. As a result, the economic theory I have applied necessarily integrated with the business history of the Clothing Factory. My research therefore shaped a theoretical framework in which the historical and business developments combine to explain the phenomenon of 'innovation' in an economic context.

The military clothing industry in Australia, led by the Australian Government Clothing Factory, reflects many elements of Schumpeter's theory of entrepreneurship and innovation. It is an industry whose products were solely intended for use by a Government Department and did not, therefore, feel the pressures of competition from similar products made elsewhere or from the need to find markets for its products. The Clothing Factory had a monopoly over the military uniform industry and was thus in a unique position to take control over the industry's direction.

However, this book is about much more than the theory of innovation as applied to the design and production of the Australian Army uniform. Over the course of this work I have asked the vitally important *why* question: why did innovation in the Army uniform occur in the first place? What were the drivers of innovation in the Australian Army uniform? This book studies the types of innovative changes that were adopted: it considers why they were adopted, who invented them or who facilitated their introduction and how they were transferred to the production of the uniforms. In other words, this book goes beyond Schumpeter's analysis. It searches for sources underlying Schumpeter's theory and found these in a range of areas, many of which were unrelated to strictly economic factors. They came principally from developments in technology and from the needs pressed upon the Army by the geographic locations of war. Much later did I realise that in pulling together these elements to present an integrated picture of innovation, I was unwittingly following in the footsteps of Nobel Prize winner Douglass C. North, who pleaded for a new institutional/cognitive approach to the understanding of economic performance based on the integration of the 'complex interplay between institutions, technology, and demography in the overall process of economic change'.<sup>16</sup> Mine was a micro version of that approach and it required an understanding of the way the Clothing Factory as an institution operated and collaborated with another institution, the Australian Army. It also required acknowledgement of the historical times in which it operated, from just before the First World War and throughout the Second World War, Malaysian crisis and Indonesian *Konfrontasi*, the Korean War, Vietnam War and, finally, the Middle East crisis. This study could only be conducted by taking a wider look at economic, geographic and scientific factors that formed the ingredients for a comprehensive economic history of the Australian Army uniform.

The analysis relies for much of its source material on archival documents in official Australian archives, including the National Archives of

Australia in Canberra and Melbourne and the archives of the Australian War Memorial in Canberra. These research materials give a voice to the political and industrial thinking during the period between 1912 and 1995 as expressed by the Army, the Defence Department, and by other players within the clothing industry. While some records had already been studied by other authors in other contexts, a fresh look at them from a new angle helps to explain how, where and when innovation came to be introduced. More importantly, this investigation reveals both a business history and a history of innovation to the Australian Army's uniform that is largely overlooked by writers of military history, but deserves to be appreciated, not only for a better understanding of Australian history but also because it raises important questions for the future of uniform manufacturing in Australia.

### THE AUSTRALIAN ARMY UNIFORM—A BRIEF FLY-OVER

Australia's military history and political alliances provide the historical setting for the country's military clothing industry. Following Federation in 1901, when the military forces of the individual states were transferred to the Commonwealth, discussions regarding the need of a standing military force commenced in earnest. Prior to the proclamation of the Defence Act in 1903, the Commonwealth had a military force of 28,886 men at its disposal, but only 1500 of these were permanent soldiers.<sup>17</sup> Field Marshal Lord Kitchener was invited in 1909 to advise the Commonwealth on measures to create an efficient military force and his subsequent report recommended a force comprising 80,000 soldiers. It was not long after this that the first decision to introduce compulsory military training came about, and with this there was an immediate requirement for the large-scale procurement of uniforms. Following the passing in Parliament in 1909 of a bill for conscription, the size of the military forces increased by 50 per cent within three years.<sup>18</sup> It prompted the government to follow the British example of setting up defence factories and with the appointment of George Foster Pearce, himself an import from Britain, as Minister of State for Defence, it did not take long to establish manufacturing operations in New South Wales and Victoria to secure the supply of small arms and munitions, clothing and harness. The Commonwealth Government Clothing Factory was built with the latest available technology in South Melbourne and commenced operations in 1912. It was the start of large-scale military and other government-issue uniform production in Australia.

The *Dress Regulations*, which were drawn up in 1903 by Major-General Edward Hutton to describe a unified design for the Australian military uniform, meant the end of a multitude of colourful outfits worn by the troops in each colony.<sup>19</sup> Since that time the uniform has undergone continuous change, evolving from the original khaki woollen outfit. C.E.W. Bean described the uniform worn during the First World War as a woollen tunic of ‘peasoup shade’, pleated, caught in at the waist with a belt of the same cloth and with a simple oxidised buckle, with black oxidised buttons, an oxidised collar badge with the rising sun and a shoulder badge with the word ‘Australia’ on each shoulder, cord knee-breeches, puttees (or leather leggings for the mounted men), a greatcoat, waterproof cape and a felt hat with the left brim upturned and fastened with a badge of the rising sun.<sup>20</sup> In contrast, the present-day soldier wears a loose outfit consisting of a combat jacket, some with Velcro closures, and trousers made of high-tech fabrics ‘with special features including near infrared reflectance, fire retardant, anti-fungal and anti-bacterial protection, insect repellence, ultra violet protection and camouflage print’.<sup>21</sup>

The wearing of camouflage uniforms heralded a new era in the making of uniforms, not only in Australia, but also in Europe and North America. During the 1930s, worldwide research was taking place to design the best type of camouflage in different types of environments. Leading the research in Australia was Professor W.J. Dakin, Technical Director of Camouflage at the Department of Home Security. In a report entitled ‘The Art of Camouflage’ by the Sydney Camouflage Group, and compiled and edited by Professor Dakin (Chairman of the Group), mention is made of the contribution by zoologists, botanists, chemists, physicists, aerial photographers, artists, paint specialists, architects and engineers (the two last-mentioned groups were employed for camouflage of buildings and equipment) in designing the right type of camouflage.<sup>22</sup> The research into camouflage colours and patterns and their application to the uniforms did not stop after the Second World War and has continued to the present day. Different environments call for different types of camouflage. The colouring and patterns in a jungle situation is quite different from those in a desert situation and is again different from a wood environment in, say, Northern Europe. A good overview of today’s patterns (from the Vietnam War to the present) is shown on the Camopedia website, a site dedicated to camouflage patterns used by troops across the world.<sup>23</sup>

The route travelled by the Australian uniform over time involved many design stages and the introduction of new fabrics and notions (for example,

dropping the use of buttons in favour of Velcro closures). Whilst the features of the uniforms are at the centre of the discussion, they are the result of sometimes lengthy deliberations with the Department of Defence. The uniform is not just a collection of clothing items; it is the face of the Australian military and its design is protected. One is forbidden to manufacture the current version of the uniform without a special licence or agreement from the Department of Defence. In Australia today, a design (an item of clothing or any other product for that matter) can be registered by IP Australia (a government body responsible for approving and registering applications for patents, designs and plant breeder's rights) as the recognised intellectual property of the person or organisation lodging the application. The Australian military uniform designs, on the other hand, do not find their way to IP Australia but are retained within the Department of Defence and remain the property of the Australian Government. It is unsurprising that each change to the uniform follows a process culminating in some form of design protection. The concept of intellectual property protection was never explicitly stated by the Department, but a systematic search through archival documents uncovered the methods used by the Department of Defence, the Army and the Clothing Factory to register and protect the military uniform as the nation's intellectual property. Understanding the process has a bearing not only on the historical significance of defence IP, but also casts a different light on potential conflicts in IP protection when this IP is outsourced overseas or to Australian-based companies with majority foreign stakeholders.

The design changes give rise to the question: what were the stimulants leading to innovation in the uniform? The search for these driving forces and their impact upon the design changes of the uniform constitute a key part of the research for this book. Some of these forces, such as the application of technological advancement originating elsewhere in society, are external to the Defence Department. In addition, driving forces from within the Services also played a role and I have drawn on the literature and other documents for evidence. Some of the design changes originated from soldiers in the field complaining about the fit of their garments or their usefulness in battle.<sup>24</sup> Soldiers in Australia were able to voice their complaints directly to their superiors. From the middle of the twentieth century, the Department of Defence used a system of trialling new uniform design and conducting surveys among the soldiers.<sup>25</sup> Servicemen provided their comments freely in these surveys, which were passed on to the Quartermaster-General's Department or the Ordnance Department

(which was responsible, at times, for military clothing along with supplies of hardware). The fact that their comments were taken seriously and resulted in some design changes is clear from the available evidence.

At other times, changes have come about by initiatives taken by the makers of the garments. Innovation often worked its way ‘from the ground up to the top’, but it also flowed from the ‘top down’ and the extent to which these two forces played a role has been touched upon briefly. It will come as no surprise that technical advancement in the manufacturing process itself (improved cutting, sewing and finishing machines, new fabric materials, the availability of electricity, computerised design methods, etc.) has given rise to innovations in the design of the uniforms or in the methods applied in the process of manufacture. Technical know-how and scientific developments have impacted upon the industry as it still does today. This is of particular relevance in the development of camouflage uniforms and I have devoted a substantial section to establish the nature and extent of linkages with camouflage-related scientific advancement. The phenomenon of interdependence or linkages between industries has been described in detail by Albert Hirschman, who identified two types of linkages: *backward linkages* to suppliers of inputs to an industry and *forward linkages* to users of the outputs of an industry.<sup>26</sup> The backward linkages to suppliers of materials necessary in the production of military uniforms are of particular interest, as will be shown, for example, in Chap. 7. In more recent decades, the link between the defence industries and sciences has not only increased in intensity, but has also become a global phenomenon, certainly among the Western allied world, to the extent that innovation in the military clothing industry in the Antipodes now relies heavily on innovation sourced from the chemical and new materials research funded by US and Northern European agencies. This has resulted in what is often termed as ‘high-tech’, ‘intelligent’, ‘smart’ or ‘interactive’ textiles that incorporate sensory mechanisms for the measuring and controlling of moisture, heat, fungi or bacteria or that respond intelligently to an environmental stimulus, such as changing colour when electrically charged or releasing heat at a given temperature.<sup>27</sup> The advances in these technologies occur increasingly rapidly, sometimes driven by military requirements and sometimes coming from ‘left field’ or unexpected quarters. It cannot be denied that the Australian Army combat uniform a century from the First World War is now made up of materials (textiles and notions) that provide not only greater comfort but offer an increased level of protection to the soldiers in the field.

The military uniform business operates in a unique setting. It is by its very nature tied to the public sector through the Department of Defence; it rides on the waves of war and peace and it also forms part of the wider clothing industry. By 1900, the Australian clothing industry had already seen much change and innovation, including a shift from a wholly cottage-based industry to factory-based operations with the introduction of power (steam, gas and electricity) and power-driven sewing machines. The introduction of faster sewing machines and of specialty machines (such as buttonhole machines) necessitated a reorganisation of the clothing workers and the structure of their wages. The clothing businesses changed from a multitude of individual tailors, each producing an entire suit or outfit, to factories using division of labour in which each worker would produce only one part of the process. Capital investment and division of labour principles allowed some businesses to grow faster than others, changing the structure of the clothing industry.

First and foremost among the factories producing military uniforms was a government-owned enterprise, the Commonwealth (later, Australian) Government Clothing Factory, established in 1912 in South Melbourne.<sup>28</sup> Its creation was the result of economic-political thought processes at the time, when it was considered expedient that production for defence purposes and other production for which the government was the sole customer should be in the hands of the government itself. Along with other government-owned Defence factories established at about the same time, the Clothing Factory would not only fulfil an important role in the supply of uniforms, it was meant to set an example to other businesses in the industry, as was the purpose also of the other government-owned Defence factories.<sup>29</sup> This book describes for the first time key elements of the Australian Government Clothing Factory's operations over almost a century and its role in the dynamics of the uniform industry.

The quantity of work produced by the Government Clothing Factory (and other producers of uniforms or uniform supplies) was, of course, dependent upon demand for military uniforms and this, in turn, was dictated by oscillating government policies that were either introducing, cancelling or reintroducing compulsory military service (military training and conscription) and, of course, to the vagaries of war. With the advent of the First World War the Government Clothing Factory and suppliers of fabric and other materials were kept very busy, but the 1920s saw a slump in demand, followed by an upturn by the mid-1930s as another war loomed. Upon the conclusion of the Second World War, the businesses retracted,

but they flourished again during the Korean War, the Malayan Emergency and especially the Vietnam War. Meanwhile, a gradual change in foreign policy had been taking place in Australia, involving a shift from the historic link to Great Britain to collaboration with the United States and this was also reflected in US-sourced innovation being introduced into the Australian Army uniform. By the end of the century, the Australian Army had become active in peacekeeping operations in the Asian-Pacific region and the Middle East and by then the uniform-making industry had become one with a global outlook based on global research and development.

It is safe to say that much of the Australian clothing industry today has either moved offshore (mainly to China) or has closed down.<sup>30</sup> How did these developments affect the military uniform business? Did the connection with the Department of Defence provide the business with unique advantages which gave it a robustness to resist the tide of decline seen elsewhere in the industry? How has the heavy reliance upon the government's fluctuating defence policy and budget impacted upon this industry segment? And, finally, what happened to the Government Clothing Factory when a new political philosophy of privatisation became the dominant conviction in the 1980s and 1990s? It is important to understand how the military uniform business managed the relationship with the government over the past century and, vice versa, the role played by government initiatives in changing the nature of this business. The military uniform business today appears to be at the crossroads of either being partially maintained in-country for strategic and/or patriotic motives or being dissolved altogether in favour of overseas low-cost sources of production.<sup>31</sup> By uncovering the processes and nature of innovation as it applied to the making of the Australian Army uniforms throughout the twentieth century, this investigation adds valuable insight into this as yet unresearched industry and may even assist in political decision-making regarding the future supply of military uniforms in Australia.

The theme of *innovation in the Australian Army uniform* runs throughout these connections and binds them all together. There were instances where innovative changes were requested by the Army or its personnel or by the Department of Defence itself. Such requests were often made without knowledge of the full technical details required for their implementation, but they provided a *pull* from above to improve the process or the product. In other words, they provided a *demand pull*. It was then up to the producers to find ways to implement the desired changes. At the other end of the scale, there were instances where inventions elsewhere,

for example by manufacturers of sewing machines, resulted in new technology being embedded in the machinery that paved the way for greater efficiency in the manufacturing processes. In other words, in this instance inventions in the machinery provided a *technology push*. Manufacturers would then need to invest in the new technology to achieve a higher level of efficiency. I have explored the extent to which innovation was a result of *demand pull* from the Department of Defence or Army personnel and the extent to which it was the result of a *technology push* to lift the manufacturing process to a higher level and so produce a better Army uniform. In all of these activities the role of the Army and the Departments responsible for clothing procurement (Quartermaster-General and, at other times, Master General of the Ordnance and the Director of Ordnance Services) are critical ingredients and the analysis is drawing a close parallel to the findings of Smith when he points to the ‘important innovative role’ played by the US Ordnance Department in the mid-eighteenth century.<sup>32</sup>

As a final point for those unfamiliar with the system of Army uniforms, it is important to establish that there is a difference between field or service uniforms and dress uniforms. Field or service uniforms are those worn while on active duty, during field exercises or at war or during peacekeeping service. They are functional garments, providing ease of movement and with the strength of material and cut to withstand heavy duty. Dress (or walking-out) uniforms, on the other hand, are reserved for parades or official functions. They are tailored garments, sometimes incorporating items of a decorative nature (ties, braids, for example). Many of these garments are custom made by tailors, paid for by special clothing allowances to military personnel. The range of clothing items used by the Army is extensive and to assist its personnel in selecting the correct items for wear, the Australian Defence Forces provide the *Standing Orders for Dress and Clothing*, the *Dress Regulations* and the *Dress Manual* as a reference manual.<sup>33</sup> These manuals provide detailed information about the type of dress to be worn at any particular occasion. With the exception of one instance in which I describe design changes in the dress uniforms mid-century, I have concentrated exclusively on the Army’s field uniforms as these have undergone the greatest amount of innovation and represent the largest number of military personnel. Also excluded are helmets, footwear and accoutrements such as rucksacks, bandoliers and the like. These are made by other industries, not those involved in the production of military clothing. Moreover, many items of accoutrements were not always produced in

Australia; they were imported from Great Britain.<sup>34</sup> And, finally, I have excluded badges and colour patches even though they were produced by the Clothing Factory and were of great importance as symbols of national pride and of belonging to Army units. As they have changed little, if any, over time, the innovative influences that were so important in other developments of the Army uniform did not extend to badges and patches. For those interested in them, I refer to the *Weekly Times* issue of 5 April, 1919, and works by John Perryman and John Wilkins.<sup>35</sup>

## THE STRATEGY

The book takes us through the production of Army uniforms from the establishment of the Australian Government Clothing Factory to the Clothing Factory's demise as a government-owned enterprise almost a century later. The work addresses innovation driven by the government (principally the Department of Defence), scientific discoveries and experiments, and other forces, described in detail in individual chapters. Chapter 2 takes us briefly back to the colonial years prior to Federation to show us the characteristics of the colonial Army uniforms and to highlight the stark contrast with the developments following Federation in 1901. From this date and through the next decade, important decisions were made that led to Australia's first *Dress Regulations* of 1903 and the various political attempts to nationalise this industry, culminating in the successful establishment of the Australian Government Clothing Factory in South Melbourne in 1912.

With the government fully in control of the business of producing Army (and other) uniforms, we follow the Clothing Factory's operations in Chap. 3 throughout the First World War. The chapter describes the financial arrangements for the provision of cloth, the massive investments in plant and equipment, the employment of labour and the production of Army clothing. All this is set against the fluctuating numbers of enlisted Army personnel as Australian troops were deployed in various wars, and against the activities of the Clothing Factory and the private clothing industry in terms of value of production. The relationship between the Clothing Factory and the private sector is an important element of this chapter. The Clothing Factory provided a leadership role in the introduction of innovation which translated into the transfer of technology from the Clothing Factory to private contractors. The chapter gives us many clues regarding the government's activities in making an example of the

Clothing Factory as a leader in its field and for the introduction of innovative manufacturing and management methods. Some of these new introductions may appear to be minuscule, for example, new ways of attaching buttons, but it must be remembered that innovation does not necessarily involve world-changing discoveries. Many small steps can lead to major turns and can contribute to innovation on a grander scale. Furthermore, this is a setting in which Schumpeter's 'creative destruction' will have its application.

Chapter 4 investigates the question of what happened to defence factories such as the Clothing Factory and the Government Woollen Cloth Factory during peacetime and describes their role in social welfare arrangements.<sup>36</sup> These activities are not generally known and to describe them in some detail adds to the understanding of the two factories' position as government-owned enterprises while at the same time highlighting ways of doing business, not usually associated with government enterprise. This is entrepreneurship steered by the social demands of a society in depression and by the need to maintain employment.

The history of the Australian Government Clothing Factory is continued in Chaps. 5 and 6, covering the four decades to the establishment of a new factory building in Coburg in 1971.

It is important to note that the Australian Government was not the sole agent of innovation in this business. There were many external forces at play, some driven by specific Army requirements and others initiated by advances in the sciences or in the economic and political world surrounding the industry. The key scientific contributions to innovation in the Army uniform are explained in Chap. 7, which traces the developments in camouflage patterns and products, in technological advancement in the equipment used, and in experimentation and development of new Army textile materials. This chapter also touches upon developments in logistical strategies to supply uniforms where and when they were needed and in the quantities and sizes required. Logistics requires the application of mathematical, financial, transport and storage planning mechanisms, which would generally fit within the 'scientific' scope of this chapter. The chapter concludes with a narrative on the introduction of scientific body measurement techniques for better-fitting uniforms which, after all, are closely related to logistical issues.

The analysis of external forces of innovation then turns to non-scientific factors of innovation in Chap. 8. Among these non-scientific factors are the climates in which the wars of the twentieth century were fought. A

better understanding and appreciation of the impact of differences in temperature and humidity upon the human body resulted in the development of improved uniforms which were more suitable to the environments and more comfortable to wear. A second factor is contained in the application of new combat methods using more accurate equipment to destroy and do harm, which put pressure on the makers of the uniforms to increase the soldiers' body protection. The examples of the application of poison gas and chemical warfare methods serve to underline this argument. The narrative takes us back to the First World War, during which many combat changes took place which turned the focus of the Army uniform to 'body protection', a focus that has gained strength over the century and is today a major consideration in the design of the combat uniform.

Descriptions of activities involving any of the Services are not complete without acknowledgement of the voices of the men and women within. From early on, these voices have carried comments and complaints about various conditions, among which defects in the uniform have formed a major component. Even though in Schumpeter's view the results will only show in a change of the data and not in the essence of innovation, this should not be dismissed as a possibly unimportant factor in changes in the technology and production of uniforms. In all industries it is important to listen to suggestions made by the consumers of goods or services. It is at that level that the best insight into the machinations of the processes and the quality of output is gained. It will therefore be important to discover just to what extent these comments and complaints have resulted in improvements in the uniform's design over time. An analogy can be drawn with complaints about the poor quality of their outfits made in recent times by Australian Service Personnel serving in the Middle East, and these complaints then provide a link between the final pages of Chap. 8 to the present time.

Chapter 9 turns to another aspect of the Army uniform. Unlike other manufactured products, the Army uniform is the property of the nation and it is illegal to copy the current design. Intellectual property protection is directly linked to innovation, it protects the new method or product, it marks it out as a novelty and it carves out a niche for the inventor of the innovation and for the manufacturer to produce the innovation without direct competition. This is quite important for the production of Army uniforms, because they were not only produced by the Clothing Factory but also, under contract, by many private firms, all of whom had the potential to copy the uniforms if allowed to produce without strict

limitations. In this situation there had to be protection of the designs in the system of production and subcontracting in order to retain integrity of the uniform. A preliminary search did not reveal any such design protection by the Army in the usual intellectual protection channels in Australia, but a subsequent major search effort through many layers of the Defence Department's uniform production hierarchy did reveal substantial amounts of evidence relating to the Army uniform's design protection. The results of this search places the history of the Army uniform in an entirely new context and solidifies its position as an object of innovation in the Schumpeterian sense.

Chapter 10, the final chapter in this book, brings us to the last days of the Clothing Factory as a government-owned enterprise in 1995. Whereas Chap. 2 described the activities leading up to the establishment of the Australian Government Clothing Factory in 1912 and the following chapters revealed the Factory's activities and participation in innovative changes, Chap. 10 is a fitting end point of this investigation as it explores how the Factory finally closed its doors. The political mood changed between 1912 and 1995 from one extreme to the other, from a policy of government ownership and control to a policy to relinquish control, and to corporatise and to privatise government businesses. The chapter takes us through what exactly occurred during those final years. Hanging as a cloud above the last remnants of the Clothing Factory is the question: was privatisation of the production of the Army uniforms a desirable outcome for Australia? Were all the efforts to bring innovation and intellectual property protection into the system in vain? Have we lost an industry we should have kept control of as a nation? Important as these questions are, they are not the focus of my analysis. The important question was: What were the driving forces *behind* innovation in the Australian Army uniform? By going beyond Schumpeter's theory of innovation, I will show *why* the uniform had to change.

## NOTES

1. C.E.W. Bean (ed.), *Official History of Australia in the War of 1914–1918*, 11th edn, 12 vols, 1941, i, p. 63.
2. Monty Wedd, *Australian Military Uniforms*, Kenthurst, 1982.
3. John Perryman, *Kit Muster: Uniforms, Badges and Categories of the Australian Navy 1865–1953*, Canberra, 2011.
4. David M.O. Miller, *Fighting Men of World War II: Allied Forces Uniforms, Equipment and Weapons*, Mechanicsburg, 2008.

5. Alfred N. Festberg (ed.), *Australia in Uniform 1943*, 2nd edn, Bandiana, 1977.
6. T. Veblen, *The Theory of Business Enterprise*, New York, 1904; J. A. Schumpeter, *The Theory of Economic Development*, Cambridge, MA, 1934.
7. Anahita Baregheh, Jennifer Rowley and Sally Sambrook, 'Towards a Multidisciplinary Definition of Innovation', *Management Decision*, 47, 2009, pp. 1323–1339.
8. Statement by Steve Vamos, Chairman of the Business Council of Australia's Education, Skills and Innovation Task Force and Managing Director of Microsoft Australia, on the BCA website: <http://www.bca.com.au> (accessed 14 August 2013).
9. Value does not need to be expressed in monetary terms, it can also deliver a social or utilitarian benefit.
10. Johanna M.S. van Mosseveld, 'Design and Production of the Australian Army Combat Uniform—A Schumpeterian Version of Defence Driven Technological Innovation', Paper delivered at the Conference of the *Association of Academic Historians in Australian and New Zealand Business Schools (AAHANZBS)*, Sydney, 3–4 November 2014. Published on [www.academia.edu](http://www.academia.edu)
11. Joseph A. Schumpeter (1883–1950) is one of the twentieth century's leading economic theorists. His most important works are *Das Wesen und der Hauptinhalt der Theoretischer Nationalökonomie* (1908), *The Theory of Economic Development* (first published in 1911), *Business Cycles* (2 vols, 1939), *Capitalism, Socialism and Democracy* (1942) and the posthumously published *History of Economic Analysis* (1954). The original 1911 German edition of *The Theory of Economic Development* incorporated a seventh chapter on these topics, but this was removed in the second German edition. This chapter was later translated by Ursula Backhaus as Joseph A. Schumpeter, 'The Economy as a Whole: Seventh Chapter of the Theory of Economic Development', in *Industry and Innovation*, 9, no. 1/2, April/August, 2002, and I would refer especially to pp. 107–109. I have used the English edition of *The Theory of Economic Development*, based on the third German edition, without a seventh chapter. Joseph A. Schumpeter, *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle* (translated from the German by Redvers Opie, with a new Introduction by John E. Elliott) (New Brunswick, USA, and London, UK, 2002).
12. The 'boiling pot' analogy is my own and is loosely derived from Joseph Schumpeter's description.
13. Joseph A. Schumpeter, *The Theory of Economic Development*, p. 66.
14. Joseph A. Schumpeter, *The Theory of Economic Development*, pp. 74–75.

15. Joseph A. Schumpeter, *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*, translated from the German by Redvers Opie and with a new introduction by John E. Elliott (New Brunswick and London, 2012), p. 65.
16. Douglass C. North, 'Economic Performance Through Time', *The American Economic Review*, 84, no. 3 (June, 1994), p. 366.
17. Jeffrey Grey, *A Military History of Australia*, revised edn, Melbourne, 1999, p. 64.
18. Jeffrey Grey, *A Military History of Australia*, revised edn, Melbourne, 1999, pp. 74–77.
19. Hutton's role in the formation of Australia's federal army and the delicate position he found himself in, caught between British imperialist motives and colonial self-defence policies, is explained in John Mordike, 'The Origins of Australia's Army: The Imperial and National Priorities', *Australian Defence Force Journal*, 87, March/April 1991, pp. 7–19, as well as in Mordike's book, *An Army for A Nation: A History of Australian Military Developments 1880–1914*, Sydney, 1992, especially chapters 2 and 5.
20. For an early description of the uniform supplied to the Australian Imperial Force sailing for Egypt on 1 November 1914, see C.E.W. Bean (ed.), *Official History of Australia in the War of 1914–1918*, 11th edn, 12 vols, 1941, i, pp. 60–61.
21. See the website of Australian Defence Apparel Pty. Ltd., Australia's key manufacturer of uniforms: <http://www.ada.com.au> (accessed 17 November 2012).
22. Professor W.J. Dakin (ed.), *The Art of Camouflage—By Members of the Sydney Camouflage Group*, Sydney, 1941.
23. <http://www.camopedia.org> (accessed 7 May 2015). This is the website of the International Camouflage Uniform Society (ICUS) and claims to be an encyclopaedia of camouflage pattern. Its contributors include academics, historians, collectors, military personnel as well as published authors. One of the pages depicts the patterns worn by Australian troops since the Vietnam War: <http://camopedia.org/index.php?title=Australia>
24. Complaints just like these have been documented in other places and at other times, with a well-known episode concerning the poor quality of the cloth of the Union soldiers' uniforms during the American Civil War and of the shoe soles of the boots which were glued together from wood chips. Both the cloth and the boots fell apart in the first rain or in the first half hour of marching. The poor quality of the uniforms worn by Union soldiers during the American Civil War even gave rise to a new word in the English language: 'shoddy', which was defined by Harpers Weekly as 'a villainous compound, the refuse stuff and sweepings of the shop, pounded, rolled, glued, and smoothed to the external form and gloss of cloth'. Ron

- Soodalter, 'The Union's 'Shoddy' Aristocracy, *New York Times*, 9 May 2011. Published as an opinion blog online: [http://opinionator.blogs.nytimes.com/2011/05/09/the-unions-shoddy-aristocracy/?\\_r=0](http://opinionator.blogs.nytimes.com/2011/05/09/the-unions-shoddy-aristocracy/?_r=0) (accessed 10 July 2015).
25. See for example a poll on the use of polyester in uniforms: 'Poll Gives Polyester Thumbs Up', *Army*, 1 August 2013, p. 22.
  26. Albert O. Hirschman, *The Strategy of Economic Development*, New Haven and London, 1958. See especially pp. 100–104.
  27. Paul Leitch and Thomas H. Tassinari, 'Interactive Textiles: New Materials in the New Millennium, Part I', *Journal of Industrial Textiles*, 29 (2000), pp. 173–190; Dnyanada S. Satam, 'Design and Material Considerations for High Performance Army Combat Uniforms', M.Sc. Thesis, North Carolina State University, 2009; Lieva Van Langenhove and Carla Hertleer, 'Smart Clothing: A New Life', *International Journal of Clothing Science and Technology*, 16, 2004, pp. 63–72; Eugene Wilusz (ed.), *Military Textiles*, Boca Raton, 2008.
  28. I will refer to this factory as the 'Australian Government Clothing Factory' or simply as the 'Clothing Factory'.
  29. The other government factories included the Small Arms Factory at Lithgow, the Small Arms Ammunition Factory at Footscray, the Cordite Factory at Maribyrnong, the Munitions Supply Research Laboratories in Maribyrnong and the Government Harness Factory at Clifton Hill.
  30. As a comparison, in 1905 there were 2315 clothing and fabric establishments in Australia, employing 59,095 persons; in 1947–1948 this had risen to 6069 establishments in clothing alone with employment of 111,593 persons; but in 2000–2001 only 20,931 persons remained employed in clothing manufacturing (no data for the number of establishments). Even taking into account an increase in mechanisation in the industry over the whole of the period, the reduction in employment is startling.
  31. At the time of writing, the government had made the decision to keep production of the Multicam (camouflage) Army combat uniforms within Australia. They are produced by Australian Defence Apparel Pty. Ltd. at their Bendigo factory. However, contracts for the polyester shirts and other garments have been let to Chinese manufacturers.
  32. Merritt Roe Smith, 'Army Ordnance and the "American System" of Manufacturing, 1815–1861', Merritt Roe Smith (ed.), *Military Enterprise and Technological Change: Perspectives on the American Experience*, Cambridge, MA, and London, 1985, chapter 1, pp. 39–86.
  33. The most recent issue of the *Army Dress Manual* came into effect in February 2013. Older issues published during the twentieth century are *the Standing Orders for Dress and Clothing*, *Dress Regulations* and *Dress*

*Manual* which may be found at the State Library of Victoria in Melbourne (some of these are available online), the Melbourne branch of the National Archives of Australia and the Army Museum Bandiana in Wodonga, Victoria.

34. The design and changes within the design of the accoutrements can be found in the numerous volumes contained under Series A1194, *List of Changes in War Materiel and of Patterns of Military Stores*, held by the National Archives of Australia. These volumes contain the British stores which were also provided to the Australian Imperial Force when the latter participated in conflicts as part of an imperial cohort.
35. 'The Great War 1914–1918: Distinguishing Badges of the Australian Imperial Force' (issued as a supplement to the *Weekly Times*, 5 April 1919; John Perryman, *Kit Muster*; Cmdr John M. Wilkins, *Australian & British Naval Buttons Buckles Banners & Badges, 1748–2006*, limited revised 3rd edn, Doncaster East, 2006).
36. The peacetime activities of the Woollen Cloth Factory and the Clothing Factory were the subject of a conference paper delivered in early 2015. Johanna M.S. van Mosseveld, 'Civvies for the Boys! Government Factories, Social Responsibility and the Bottom Line', *Asia-Pacific Economic & Business History Conference*, Canberra, 12–14 February 2015. Available via [www.academia.edu](http://www.academia.edu)



## CHAPTER 2

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# Military Uniforms and the Making of a National Industry

### MILITARY ORGANISATION AND UNIFORMS TO 1912

The period between 1900 and 1912 was of tremendous importance for Australia as a new nation responsible for its own defence. This requirement implied that Australia should have secure access to military manpower, defence equipment and materials. It heralded the birth of the country's national defence force (as opposed to the previous colonial military structures) and it saw the Federal Government taking an active (some have defined it as an 'interventionist') role by creating government-owned defence industries. This chapter describes the key developments that transformed the colonial military forces into a national defence force and the innovations introduced therein by Major-General Hutton. It then describes how another innovator, Senator Pearce, eventually succeeded, by using the terms of the Defence Act of 1909, to obtain parliamentary approval for the construction of the Commonwealth Government Clothing Factory, which was to supply the military uniforms.

Prior to Federation, Australia's security was rooted in colonial defence systems, at first entirely consisting of Imperial troops based in garrisons in the principal cities and gradually expanding to include units of resident volunteers in each of the colonies. Fuelled by a fear of attack by the French upon the colonies as a result of the threat of war between France and Great Britain, the colony of New South Wales was the first to establish a corps of volunteers in 1801. Upon the cessation of hostilities in Europe,

the fears of invasion quietened down and so did the size of the volunteer corps. In 1854, however, as Britain was embroiled in the Crimean War, once again a volunteer force was called upon in New South Wales. Similar forces were established the same year in the colonies of Victoria and South Australia. The first volunteer forces in Queensland were formed in 1860 (following its separation from New South Wales in 1859), Tasmania in 1859 and Western Australia in 1861.<sup>1</sup> In the same era, military training was taking place in schools in the colonies, giving birth to a comprehensive system of School Cadets. Boys leaving school who had attended the School Cadet training were able to enter the Senior Cadet system which in turn fed into the citizen forces.

The military defence of Australia changed dramatically when the Imperial garrison troops from Victoria were redirected to New Zealand in 1860 and were withdrawn altogether from the remaining colonies in 1870. At this point the colonies became entirely dependent upon their own defence and it was considered necessary to establish permanent armies alongside the partially paid and volunteer regiments. Thus, on 31 December 1900, the total strength of colonial arms amounted to 27,353 men, as outlined in Table 2.1, with the bulk of men, or 25,915, still among the partially paid and volunteer arms.

The volunteers were required to provide their own uniform. To be a volunteer was an expensive affair, as argued by Monty Wedd in describing the Rifle Regiment of the 1860s:

All those who enlisted were to provide their own uniforms but, because of the cost involved, only the most influential citizens were able to volunteer, as the average working man's weekly wage was seven to fourteen shillings, according to skills, and the uniforms ranged in cost from eight pounds to ten pounds. It was beyond the means of the ordinary citizen.<sup>2</sup>

In the early years, when regiments were still relatively small, the uniforms were all made to measure by local tailors, often using cloth imported from Britain. Today these uniforms would have been classified as 'dress uniform', perfectly suitable for parades and pleasing to the eye in design and colour, but far less suitable for combat. The designs were generally based upon those then current in Britain and varied widely both between the colonies and also between regiments in each colony. When Colonel George Arthur French, RA, Commandant of the Queensland forces, reported on the Queensland Volunteer Force to

**Table 2.1** Strength of the various arms, 31 December 1900

Arms	NSW		VIC		QLD		SA		WA		TAS		Total	
	Officers	Other ranks	Officers	Other ranks	Officers	Other ranks	Officers	Other ranks	Officers	Other ranks	Officers	Other ranks	Officers	Other ranks
<i>Permanent:</i>														
Staff	19	98	14	58	15	57	14	5	2	8	3	9	67	235
Field and Garrison Artillery	18	429	12	272	7	214	1	23	2	31	-	15	40	984
Engineers and other units	5	70	1	32	-	-	-	-	2	2	-	-	8	104
<i>Militia and volunteers:</i>														
Cavalry and Mounted Rifles	88	1695	52	1033	53	741	33	621	32	799	5	91	263	4980
Field Artillery	10	121	14	277	13	138	4	101	12	174	-	-	53	811
Garrison Artillery	27	441	37	901	17	212	9	165	2	66	13	197	105	1982
Infantry	242	5382	136	3193	145	2189	58	1786	71	1451	83	1549	735	15,550
Engineers and other units	96	597	35	268	41	186	16	96	12	30	9	50	209	1227
	505	8833	301	6034	291	3737	135	2797	135	2561	113	1911	1480	25,873

Source: Commonwealth Bureau of Census and Statistics, *Official Year Book of the Commonwealth of Australia, 1901-1907*, No. 1, 1908, p. 887

Parliament in March 1884, he noted that the clothing and equipment in Queensland was

... almost as varied as the number of corps, and even in the same corps there are often several different patterns, the result being that they present a very motley appearance on parade.<sup>3</sup>

Once the military forces in the colonies were expanded to also include partially paid militia and small permanent forces, there was an increased urgency to manage and streamline the wide variety of garment designs and to quickly supply the necessary uniforms and it was deemed that local tailors would be unable to supply the required quantities in the desired quality. The Royal Army Clothing Depot in Britain was approached and many colonial corps as well as the Cadets made the decision to adopt uniforms identical to their equivalent corps in Britain. Thus, again taking Queensland as an example,

... by 1885 Queensland's Field and Garrison Artillery wore the uniform of the Royal Artillery; the Brisbane Engineers the uniform of the Royal Engineers; the Moreton Mounted Infantry adopted the uniform of the 1st Kings Dragoon Guards; and the Moreton Regiment that of the Royal West Surrey Regiment... the Queensland Scottish Volunteer Corps adopted the uniform of the 92nd Gordon Highlanders, and the Queensland Irish that of the 1st Bn Royal Irish Rifles.<sup>4</sup>

Most of these uniforms were manufactured in the Royal Army's Clothing Factory in Pimlico or by various contractors appointed by the factory and thus they were made to detailed specifications and subjected to stringent inspection as to quality of materials and workmanship and their compliance with the specifications. In addition, cloth for uniforms was imported from Britain and made up by local tailors using the sealed patterns of the relevant corps as a guide.<sup>5</sup>

Both the importation of complete uniforms and of cloth for the local manufacture of uniforms by tailors or contractors continued after Federation. But locally manufactured cloth also became more widely available as the capacity of the Australian woollen and worsted industry grew. A 1909 Committee of Inquiry report found that the newly established Australian Department of Defence would purchase fabric of Australian manufacture to be sold to contractors to make up clothing with sealed

patterns in use.<sup>6</sup> Cloth for uniforms was stored in the various Ordnance Stores across metropolitan areas.

As late as the 1909 report there was no centralised system enabling the planning, budgeting or purchasing of military uniforms. Instead, officers in command of regiments and corps were authorised to enter into contracts under certain conditions, and payment was made from the Corps Contingent Fund, recouped annually by vote of Parliament on the basis of 40 shillings per head for Militia and 30 shillings per head of Volunteers up to full establishment. Prices for identical uniforms differed from contract to contract and the Committee of Inquiry concluded on the basis of witness accounts that contractors considered the time requirements for completing orders so short that it necessitated employees to work overtime.<sup>7</sup> The Committee found that the cost of annual requirements, for making up the uniforms, amounted to:

Militia and volunteers	£ 26,265
Permanent forces	£ 4,240
Cadets	£ 7,750
<b>Sub-total</b>	<b>£ 38,255</b>
Naval	£ 3,000
<b>Total</b>	<b>£ 41,255<sup>a</sup></b>

<sup>a</sup>NAA: A1194, 05.80/3180, *Report of the Committee Appointed to Enquire into the Question of the Supply of Uniform Clothing for the Commonwealth Services and the Establishment of a Government Clothing Factory*, 18 May 1909, p. 1

The lack of a central organisation also resulted in bottlenecks of supply. Purchasing decisions were often made ad hoc without reference to supply lines and timeline requirements and on occasion this resulted in shortages of materials from the Ordnance Stores, as Messrs Kirkland and Sparks, Directors of the Parramatta Woollen Mills Ltd., and Mr. Coonan, Manager of C. Anderson & Co. Ltd. in Sydney, testified to the Committee of Inquiry.<sup>8</sup>

The first decade of the twentieth century was a time of significant political change for Australia and for the structure of the country's defence. On 1 March 1901, two months after the six colonies were federated into the Commonwealth of Australia, the responsibility for the defence forces was transferred to the Commonwealth which was now faced with the task to somehow unify and streamline a diversity of regiments, wearing a multitude of colourful, mostly British-inspired, uniforms. The importance of the task was reflected in the fact that on the very same day that the forces came

under Commonwealth jurisdiction, the then Minister of State for Defence, John Forrest, mustered the military commandants to a meeting in Sydney to draft a range of defence bills and regulations, including dress regulations. It was a false start: the draft bill was rejected in Parliament and one of the reasons for this failure was the fact that the permanent forces were at that time serving in South Africa and the timing for new regulations was deemed inappropriate. Further deliberations upon strategies for the country's defence against possible invasion, and for the structure and the management of the defence forces, culminated in the appointment of Major-General Edward T.H. Hutton as General Officer Commanding. The new appointment delivered his 'Minute Upon the Defence of Australia' on 7 April 1902.<sup>9</sup>

Among Hutton's targets for change was the issue of regulating the wearing of uniforms by the Commonwealth forces. On 19 December 1903, he presented the Governor-General with the *Dress Regulations for Officers of the Military Forces of the Commonwealth, 1903*.<sup>10</sup> The *Dress Regulations* covered officers of the Headquarters and other General Staff, militia, partially paid and volunteer military forces. Appreciating the fact that it would be an impossible task to have the officers' uniforms instantly changed to the regulation patterns, Hutton wrote in his foreword:

Officers will be permitted to continue to wear the uniforms at present in their possession, which will be, however, gradually replaced by uniform now laid down.<sup>11</sup>

This marked a breakthrough in presenting a much more unified picture of the Commonwealth forces, regardless of the units to which the men belonged. For example, as part of their 'Undress' (day-to-day or working uniform), Officers of Staff, Instructional Staff, Field Artillery, Garrison Artillery, Engineers, Infantry (except Scottish), Army Service Corps, Army Medical Corps, Army Ordnance Corps and Army Veterinary Department were all to wear the same jacket, described in paragraph 18 of the *Dress Regulations*.

With its expanding four pockets with flaps, this jacket was referred to as the 'Service Jacket' and would have been more functional than the variety of jackets worn in the colonial era. It was also worn by the Army's rank and file. Made of a 'drab' serge fabric, later described by Charles E.W. Bean as 'a woollen tunic of peasoup shade', it was worn over Bedford cord

breeches or trousers of the same special drab mixture serge as the jacket.<sup>12</sup> The breeches were described as made of

Bedford cord, same colour as Service Jacket, cut loose at the thigh and tight at the knee, to be laced below knee, pockets to be cut across, waist-strap and buckle.<sup>13</sup>

They were worn by Officers of mounted Staff, mounted Instructional Staff, Light Horse (when mounted), Field Artillery, Army Service Corps and Army Medical Corps.

Trousers came in three patterns: for Mounted Officers, Service Trousers (both made of the same material as the Service Jacket) and Staff Pattern Trousers (made of blue cloth). The Mounted Officers trousers were cut straight and somewhat longer than ordinary trousers so they could be strapped firmly down the boot and fit closely over the spur. The Service Trousers were cut loose in the breech and at the knee, but narrow as they approach the ankle. They had cross pockets. The Staff pattern trousers of blue cloth were not described in the *Dress Regulations*. They were worn by Staff, Instructional Staff, Light Horse, Garrison Artillery, Engineers, Infantry (except Scottish), Army Ordnance Corps and Army Veterinary Department.

Another item worn by all units was the greatcoat. Its purpose was to provide protection to the body and legs during cold weather and, because of its generous width, could also be used as a substitute blanket. Described in the *Dress Regulations* as,

Cloth, drab mixture, milled and waterproofed, double-breasted, to reach within a foot of the ground, stand and fall collar, a 2¼ inch inverted expanding pleat down the centre of the back from the collar to the waist, terminating under the back strap, loose turn-back cuffs of single material 6 inches deep, two slits at side 10 inches long, jettex in with button catch for pocket mouth, two large patch pockets inside of same cloth, one button and hole to each pocket mouth, a pocket in the breast placed vertically between the second and third button, two rows of buttons down the front, four in each row, two tabs and buttons to slit in back seam, a 2 inch cloth back strap fastened with three holes and buttons, skirt to fasten with two tabs and buttons inside, coat lined on shoulder and sleeve only, shoulder straps as for Service Jacket, badges of rank in gilt or gilded metal on shoulder straps. For Mounted Officers the coat is cut below the waist with spring to form a 16 inch lap, the slit at the back should be of suitable length for riding.<sup>14</sup>

The important new feature of the new *Dress Regulations* commenced in 1903 was the unification of a great variety of garments into a number of identical items to be worn by the majority of ranks and units. The 'new look' Full Dress and Undress uniforms of the twentieth century incorporated the drab mixture serge jackets and trousers for almost all ranks and units and so became a standard issue. Only the Submarine Miners had a Working Dress made of blue serge, but even the Scottish regiments, who wore a scarlet doublet and tartan pantaloons or kilt in Full Dress, were prescribed the drab mixture Universal Service Dress jacket as Undress, although 'shorter in the skirt and rounded off in front'.<sup>15</sup>

The reduction in the number of different types of garments presented a significant reduction in costs, as noted by John Forrest, Minister of State for Defence at the time:

The Commonwealth Uniform will consist of a General Service Dress which will, by the addition of aiguillettes, breast-lines and girdles, be convertible into Full Dress. It will be observed, therefore, that by this means a single uniform coat will be provided which shall meet the requirements of Fatigue or Service Jacket, and by the addition of lace attachments, &c., be readily converted into Ceremonial or Full Dress. Great economy in the provision of uniform, both from Government funds and at the hands of Officers, will be insured by this means.<sup>16</sup>

The streamlining of the range and the production of larger volumes of identical garments paved the way for a large-scale production set-up and thus facilitated the establishment of the Government Clothing Factory a decade later. There would be another outcome of this development: by increasing the demand for large-scale production, the services of individual tailors were greatly curtailed and only those firms which had the facilities and capital to keep up with the technology needed for such large-scale production would have a role to play in the military clothing industry, thereby preparing for a structural change in the industry.<sup>17</sup>

With much opposition to his plans generally, another of Hutton's proposals involved the creation of a Military Board of Administration, consisting of the Chief of General Staff, Adjutant-General, Quartermaster General, Chief of Ordnance and a departmental Finance Member, reporting to the minister who had the power to approve or veto the board's recommendations.<sup>18</sup> The board was established on 12 January 1905, and continued to exist as a key decision-making body until its abolition on 9

February, 1976.<sup>19</sup> Until the board came into being, the administration of defence was borne by a General Officer Commanding (GOC) and headquarters staff. Hutton established a direct link between defence administration and the minister himself, thereby preventing the GOC from taking any actions which were not in line with parliamentary decisions or principles. The ultimate responsibility for all defence matters now rested with the minister himself—and this went as far as approving every change in the design and scale of issue of military uniforms. While the system imposed time constraints on all parties involved, it also meant that the minister was fully aware of issues arising within defence operations.

### THE NEED FOR A COMMONWEALTH GOVERNMENT CLOTHING FACTORY

When Senator George Foster Pearce took on the responsibilities as Minister of State for Defence on 13 November 1908, in the newly elected Labor Government under Prime Minister Andrew Fisher, he immediately set to work on further streamlining the manufacture and supply of military uniforms. Pearce acted in an era when the government took an active role in the prospects of industry and trade in the interests of the nation. It was also an era in which the nation began to grow into its new suit as an independent entity, in which the notion of ‘Australian-ness’ started to emerge and in which the nation’s leaders began to take an interest in building capacity for its defence. John Connor, in his biography of Pearce, stated that he (Pearce) believed in the state ownership of monopolies and that the minister argued for the nationalisation of industries if they were natural monopolies. The argument was that any industry which had the government as its sole client and its sole supplier should be government-owned to avoid excess profits.<sup>20</sup> It was a convenient argument to push for government ownership of military clothing supply, but the decision did ignore the existence of a large number of private clothing firms.

Whatever the merits of this argument, in 1909 Pearce did create a committee to investigate the supply of military clothing and the establishment of a Government Clothing Factory. The committee was chaired by the Acting Secretary of the Department of Defence, S. A. Pethebridge, and it duly set out to visit a number of clothing firms and take witness statements on a variety of questions: the output, size and frequency of military contracts; the number of employees; and the wages paid and

prices charged. Among those interviewed was W. J. Fallon, Manager of the New South Wales State Clothing Factory, who estimated that the annual output of coats, vests and trousers ran to 50,000 garments and that all uniforms were made to order with measurements supplied, but that the factory was not making any profits.<sup>21</sup> Recurring themes among the committee's witnesses was the fact that military orders did not come in a steady stream and that when orders did come in, they had to be rushed. The uniforms required a high standard of work and skill and took much longer to make than standard men's garments or even the uniforms of the Postmaster-General's Department for which the minister was also responsible. Witnesses stated that highly skilled workers were difficult to find and that the training of apprentices was a thankless task as they often left to find employment with other firms after their period of training. Most witnesses stated that workers preferred to be paid on the basis of piece-work as opposed to waged work. Under such a scheme skilled workers were able to earn wages above the average by finishing a high number of garments.<sup>22</sup> Despite the fact that much of the information obtained by the committee would have called into question the viability of a government-owned clothing enterprise and that two witnesses had rejected the idea of a Government Clothing Factory, the committee 'is of the opinion that it would be a distinct advantage to the Commonwealth Service if a Government Clothing Factory were established'.<sup>23</sup>

It must be pointed out that the committee had been asked to investigate the *establishment* of a Government Clothing Factory and not the *feasibility* of its establishment and that it was therefore not required to determine whether or not there should be such a building. Pearce had taken for granted that the Commonwealth should build such a Factory. The committee promptly looked at the key elements required for running a clothing factory and collected relevant information from those already in the industry. Unsurprisingly then, the report's recommendations played right into Pearce's hands and he was able to endorse it just ten days after it was presented.<sup>24</sup> However, on 2 June 1909, the Fisher minority government lost office and Pearce had to take a back seat. His plan was put on hold.

It is possible but by no means certain that Pearce looked to Great Britain for inspiration in government enterprise building and his decision to establish a Government Clothing Factory along the same lines as the British Royal Army Clothing Factory may have been the result. This factory, established in 1862 at Grosvenor Gardens, Pimlico, and located on

the River Thames, very likely served as the model for the Australian factory. The latter was a close copy of the British factory: not only did it operate along the same managerial guidelines and factory floor plan, but it also copied the factory's function as a design and inspection centre and the safe keeper of the unique sewing patterns for the military garments.<sup>25</sup>

The existence of the British factory was known of in Australia, certainly as early as 1866 when an article appeared in *The Maitland Mercury & Hunter River General Advertiser*, presenting a description of the building and the division of the female labour between machine workers (wearing scarlet jackets) and hand workers (in blue jackets). The article described how the women were paid by piece work and that they were also allowed to work for themselves during official leisure times. They were provided with tea 'at a penny the half pint' and 'vast slices of bread and butter at a penny a slice'. The article impressed upon the reader the idea that the women were much better off in this factory, where they were earning between 15s. and 25s. a week for eight hours a day, than they had been when working for slop sellers for a wage of a maximum of 6s. a week. Experienced workers could even earn as much as 27s. a week.<sup>26</sup>

The operations of the factory were divided into two distinct sections: (1) design and pattern making, inspection of materials, storage of samples and finished garments; and (2) the cutting, sewing and finishing of garments. The Pimlico factory maintained a separate Pattern Room in which the original sealed patterns for each garment were kept and recorded by number and specification. This was the heart of the factory from which emanated a workflow to the cutting and sewing rooms and to external contractors. It represented a store of government-owned intellectual property and each garment was described in great detail and strictly protected from illegal copying. Pattern making, the laying out of patterns on multiple layers of fabric and cutting, was done upstairs in the three-storey galleries of the factory, sewing and finishing was carried out by some five hundred female workers down in the central aisle which was approximately two hundred feet long and forty feet wide and lit by a large skylight which ran the whole length of the building. The sewing machines were driven by steam power and could be individually turned on and off. These machines represented the latest in available technology at the time and they were evidence of the aspirations by the factory's management to keep its equipment up to date in a factory that by then was almost half a century old. This was not lost on the Australian authorities who repeatedly referred to the Pimlico factory as the example to copy (see Fig. 2.1).<sup>27</sup>



**Fig. 2.1** Royal Army Clothing Factory at Pimlico—Central Aisle c1900. Source: F.G. Engelbach, ‘The Royal Army Clothing Factory—I’, in *The Navy and Army Illustrated*, XI, No. 205, 5 January 1901, p. 385. State Library of New South Wales, Dewey 359.105 (TF00071)

The desire by some members of Parliament to replicate the Pimlico factory also stemmed from other motives, namely the desirability to nationalise certain industries of national importance. The production of Army uniforms belonged to this category, along with the production of other defence supplies such as munitions, and on 24 July 1901 William Wilks observed in the House of Representatives that all of these had been nationalised in Britain.<sup>28</sup> Aside from nationalistic motives, however, the Pimlico factory was held up as the ideal and the details of its operations became an object of study. In 1903, Sir John Forrest obtained a report on the Pimlico factory from the War Office in Britain. *The Advertiser* reported that by that year the number of employees had risen to some two thousand in the sewing room alone. The wages of the lowest hand worker was 6s.1d. a week and the highest wage for skilled buttonhole machinists was 31s.6d. a week. However, federal ministers rejected the proposal and considered that the time was not yet ripe for such an undertaking.<sup>29</sup>

Pearce's successor as Minister for Defence, Joseph Cook, tabled amendments to a Defence Bill resulting in the Defence Act of 1909 which introduced, for the first time in Australia, a system of universal military training, commencing on 1 July 1911, that was to have a large impact on the number of men in uniform and in the cadet system. By the end of 1913, there were 34,537 men permanently in the military forces, a figure which rose to 45,645 men a year later. This is a significant increase from the numbers of men permanently in the forces at the end of 1900: 1323 men (see Table 2.1). In addition, there were large numbers of boys in the cadet system: 87,653 senior cadets at the end of 1913 and 87,354 by the end of 1914, as shown in Tables 2.2A and 2.2B. Moreover, the new Act provided authority for the establishment and maintenance of factories for the manufacture of naval and military equipment and uniforms.<sup>30</sup>

Labor lost power to a Protectionist/Free Trade Government on 2 June 1909, but the next change in government on 29 April 1910 brought Labor back into power and when Pearce once again became Minister for Defence he wasted no time in implementing his plans. Now officially

**Table 2.2A** Permanent forces, men in training, cadets—year to 31 December 1913

	<i>Permanent</i>	<i>In training</i>	<i>Qualified</i>
Permanent military forces	34,537		
Men in training		33,969	
Senior cadets		87,653	
Junior cadets qualified for training			49,291
Total	34,537	121,622	49,291

Source: Compiled from ABS, Catalogue 1301.0, *Year Book Australia*, No. 7, 1914

**Table 2.2B** Permanent forces, men in training, cadets—year to 31 December 1914

	<i>Permanent</i>	<i>In training</i>	<i>Qualified</i>
Permanent military forces	45,645		
Men in training		51,195	
Senior cadets		87,354	
Junior cadets qualified for training			47,236
Total	45,645	138,549	47,236

Source: Compiled from ABS, Catalogue 1301.0, *Year Book Australia*, No. 8, 1915

supported by the Defence Act of 1909, preparations for the selection of a site and construction of the factory could commence henceforth. As the number of men was growing in the citizen forces and the cadet system, and, even more so, in training camps, there was a sense of urgency in having the military clothing factory up and running. The report on the Pimlico factory, obtained in 1903 by Forrest, was dusted off and used as a guide in the preparations for the construction of its Australian counterpart.<sup>31</sup>

The Commonwealth Government Clothing Factory was built in 1912 on a site of approximately three acres in South Melbourne, Victoria, bounded by Coventry, Miles, Dodds and Wells Streets. There were a number of buildings in the complex, connected by covered walkways, simply constructed of wooden frames covered in galvanised iron walls and roofs.<sup>32</sup> The factory formally commenced operations on 3 January 1913, but was already in business in July 1912, with three hundred employees (43 males, 257 females). It was intended primarily for the manufacture of all military uniforms, but also produced uniforms for other government departments, including the uniforms for the Postmaster-General's Department, and the Victorian Railways and Tramways. The key operations of the Clothing Factory were divided into several departments, each requiring of the workers a set of skills peculiar to the output of their department: the Cutting Room, the Breeches Room, the Tunic Room, the Cap Room, the Pressing Room and the Brushing and Folding Room. Table 2.3 shows the

**Table 2.3** Commonwealth Clothing Factory—value of production by customer—year ending 30 June 1918

	£	s.	d.
Department of Defence	317,989	7	1
Department of the Navy	14,661	4	7
Postmaster General's Dept	8936	19	8
Small Arms Factory	836	15	4
Commonwealth Railways	417	1	5
Department of Trade and Customs	382	10	9
Commonwealth Govt Line of Steamers	49	14	0
Cordite Factory	48	12	0
Factory Samples	20	5	1
Governor General's Dept	19	14	6
Sundries	90	14	7
Total	343,452	19	0

Source: NAA: A1952, 474/9/71, *Commonwealth Government Factories reports for year ended 30th June 1918*

value produced for each department for the year ending 30 June 1918. Unsurprisingly for a period of war, the production of military uniforms was paramount at this time.

Whereas the Pimlico factory in Britain was driven by steam power in the mid-nineteenth century (at the time the most modern technology), the Commonwealth Clothing Factory commenced its operations using electric power, which was by then the most advanced technology. A report for the year ending 30 June 1920, by the factory manager, H.A. Slade, to the Munitions Supply Board (which at that time oversaw the operations of the factory), stated that power was provided by a power plant consisting of eleven motors ranging from two horsepower to ten horsepower and two stationary petrol engines were installed enabling the factory to carry on during the power restrictions.<sup>33</sup> Three years later, Slade reported that three stationary petrol engines were in operation.<sup>34</sup>

From the start, the Clothing Factory was equipped with the latest technology in machines, most of them imported from Britain. Much of the sewing equipment came from the Singer Company. In line with the expansion in the demand for uniforms in the following years, more machines were imported. In the financial year to 30 June 1918 alone, 85 sewing machines were purchased to bring the total number to 586.<sup>35</sup> The total original value of the machines then installed was £8317.17s.9d. Among them were electric cloth cutters, basting machines, buttonhole machines for a range of buttonhole sizes, button sewers, pressing machines, eyelet machines, 472 plain sewing machines of varying capacities and twin needle machines.<sup>36</sup>

This was a factory unrivalled in the Australian clothing industry at that time. Just prior to the establishment of the Clothing Factory in 1912, there were 3115 clothing and textile factories in Australia, with 1398 located in Victoria.<sup>37</sup> The combined Australian clothing and textile factories had a value of plant and machinery of £1,620,437, or an average of just over £520 each. The investment in machinery alone of the Clothing Factory of over £8317 outshone by far the average capital invested in the entire Australian clothing and textile industry.

The relative size of the Clothing Factory's operations is also evident in the number of workers employed. Whereas the average clothing and textile factory in Australia employed approximately 27 employees (not counting outworkers) in 1912, the Clothing Factory began its operation with some 300 workers.<sup>38</sup> This number increased over the next few years as the war in Europe loomed and Australia enlisted men to be sent to fight in the Middle East and France. This put enormous pressure to bear on the production and supply of uniforms (see Table 2.4).

**Table 2.4** Male and female employees—Commonwealth Government Clothing Factory

	<i>Males</i>	<i>Females</i>	<i>Total</i>
1912	43	257	300
1913	98	489	587
1914	84	355	439
1915	102	612	714
1916	110	591	701
1917	69	436	505
1918	87	581	668
1919	78	420	498
1920	52	202	254

Source: NAA: 1952, 474/10/26, *Clothing Factory Statement of Accounts 1919–1920*

This was an industry dominated by female workers, with women typically outnumbering men by ratios of between 5:1 and 6:1. Across the industry one finds a distinct division of skills between male and female workers, with most men employed in the highly regarded cutting and pressing rooms, and the women employed in the sewing and finishing rooms. A good cutter was able to plan a garment, grade a pattern to a range of sizes, lay the pattern pieces in such a way onto fabric that minimum wastage would be incurred, and cut through multiple layers at once. This job required both skill and physical strength. Equally, the job of the presser required not only physical strength in handling heavy seam presses, his work was also essential in shaping a garment as it was in the process of being made up by machinists. Unsurprisingly perhaps, the wages of cutters and pressers were much higher than those of the women in the machine rooms.

Figure 2.2 depicts the Cutting Room. In the foreground are bundles of multiple layers of cut pieces. With fabric as heavy as the worsted cloth used for military tunics at that time, the cutting multiple layers—and keeping them aligned while cutting—required both skill and strength, even with the use of electric cutters. The room is furnished with large cutting tables, offering plenty of space for each cutter, of whom approximately a dozen can be seen. This contrasts sharply with the Machine Room (see Fig. 2.3), which accommodated hundreds of machinists, each working from a small table and sewing machine.

The Machine Room was typically crowded, with over four hundred women, but this would have been even more congested at the peak of



**Fig. 2.2** Commonwealth Government Clothing Factory—Cutting Room c1919. Source: Australian War Memorial, DAX2293. Reproduced with permission from the Australian War Memorial

uniform manufacture in 1915 when there were over six hundred female workers. In contrast, the Cutting Room in 1919 looked almost empty, probably employing no more than thirty or forty cutters (the majority of the remaining forty or so men would have been engaged as pressers and some as overseers in the Machine Room). Of course, it is also in the nature of cloth cutting that more individual space is required to lay out the fabric for cutting.

From the start, the Clothing Factory's workers were paid on the basis of a minimum log (a minimum wage) plus excess piece work rates. This provided an opportunity for fast workers to earn a higher wage.<sup>39</sup> In the Clothing Factory's first year, the average weekly wage of men amounted to £2 19s.2d. and for women £1 4s.6d. The men's average wage was approximately 2.4 times that of the women's average wage. Over the next few years the gap narrowed and during 1920 the men's average wage was



**Fig. 2.3** Commonwealth Government Clothing Factory—Machine Room *c.*1919. Source: Australian War Memorial, DAX2294. Reproduced with permission from the Australian War Memorial

1.8 times that of the women's wage. It is not clear whether this may have been a result of women being able to work faster as their individual tasks became more specialised, but it is almost certain that new technology introduced into the factory over the next decades also assisted in increasing their output (see Table 2.5).

Considering that the vast majority of workers in the Clothing Factory were women and that their average weekly wage in 1912 amounted to £1 4s.6d., their wage would then compare quite favourably with the average wage of £1 0s.7d. in the clothing and textile industry in general during the same year (and that would have applied to some of the men as well), as is shown in Table 2.6. This apparent advantage continued to be the case throughout the period under consideration here. However, we must be cautious in drawing too much from direct comparisons as the official figures produced by the Australian Bureau of Statistics cover not only the clothing

**Table 2.5** Commonwealth Clothing Factory—average weekly wages as at 30 June—excluding foremen and forewomen

	Men			Boys			Women			Girls		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1912	2	19	2	1	3	3	1	4	6	0	13	4
1913	2	17	1	1	0	9	1	8	7	0	13	7
1914	2	17	9	1	0	1	1	7	9	0	14	1
1915	2	18	4	1	3	6	1	8	4	0	13	11
1916	3	5	2	0	18	7	1	12	9	0	17	0
1917	3	8	7	1	3	6	1	15	5	0	16	7
1918	3	12	3	1	3	2	1	16	1	0	17	7
1919	3	15	0	1	9	6	2	1	0	0	19	11
1920	3	18	10	1	13	11	2	1	11	1	6	7

Source: NAA: MP392/10, 589/502/56, *Munitions Supply Board Annual Reports, 1923*

**Table 2.6** Average wages—Australian clothing and textile industry

	Number of factories	Average no. of persons employed	Salaries and wages paid		Average weekly wage per person
			£		£
1912	3115	84,661	5,149,207		1-0-7
1913	3266	84,237	5,295,702		1-1-0
1914	3254	81,076	5,233,175		1-1-0
1915	3117	78,952	5,218,123		1-1-3
1916	3085	80,292	5,373,010		1-1-4
1917	3176	83,201	5,996,900		1-1-8
1918	3177	82,002	6,236,953		1-2-3
1919	3155	81,441	6,689,340		1-2-8
1920	3311	89,424	9,522,730		2-0-2

Source: ABS—Catalogue 1301.1, *Year Book Australia*, Issues 1914–1920

industry but also the textile industry, furriers, dressmakers, boots and shoes, etc. as is mentioned earlier in a footnote, which may (or may not) have reduced the average calculated wage.

The clothing industry in general presented a division of labour not only between the genders, but also among the machinists themselves. Prior to the introduction of mechanisation in the clothing industry, up to about the 1880s, in Britain and elsewhere, a sewer would make up an entire garment, working in small workshops and using treadle machines or sewing

by hand. But the introduction of steam-powered machines, as well as an increase in the female workforce and the advent of larger workshops and clothing factories during the 1880s and 1890s, allowed for the various parts of this process to be divided between several workers, each of them 'specialising' in a specific task and each of them therefore able to become more accomplished in their task and so to build up speed. Frances provides an example where tasks such as machining, tacking and buttonholing were carried out by separate workers by the 1890s and that some manufacturers had separated the entire manufacturing production into seven processes.<sup>40</sup> The idea to divide the factory floor into fundamental processing sections came from Frederick Taylor, an American industrial innovator, who had conducted a systematic examination of late nineteenth-century workshops. Taylor based his philosophy on the elimination of wasteful practices and the increase of workplace efficiency. His time and motion studies using a stopwatch were fundamental in developing workflow efficiencies which simultaneously allowed the specialisation of skills. His philosophy became known as 'scientific management' and was often referred to as 'Taylorism' or 'Taylorisation'. The same principles were also adopted by the Clothing Factory.<sup>41</sup>

The *Dress Regulations* of 1903 were the start of an unprecedented level of standardisation in the Australian Army uniforms. With so many units and ranks requiring the same pattern of jacket, breeches, trousers, great-coats and other items, the scene was set for military uniform manufacture on a large scale. The establishment of the Commonwealth Clothing Factory in 1912, in which ever-increasingly efficient processes for mass production were applied, was a logical outcome of the need for large volumes of product. Whereas the *Dress Regulations* of 1903 were an innovative turning point for the industry and the Army, the Clothing Factory itself introduced further elements of innovation. It acquired the latest technology in equipment (and continued doing so for most of its working life), established wages based on a minimum log plus excess piece work rates which were envied by those female machinists working for slop sellers.

The 12 years between 1900 and 1912 saw a number of innovative changes that laid the basis for Australia's defence structure and for the development of its defence industries. The key figures driving this innovation were Hutton, who structured the defence forces and standardised the uniforms with the publication of the *Dress Regulations* of 1903, and Pearce, who had the foresight to push for the establishment of locally produced military uniforms. Even though the main ideas for the

Government Clothing Factory were borrowed from a British example, the Australian Government was henceforth able to put its own stamp on the operations of the Factory and on future innovations in the design of the Army uniform. The Clothing Factory was to play a pivotal role in the development of the Army uniform; it was the centre of pattern making and experimentation with new designs. The Clothing Factory not only had close working relationships with the Department of Defence, specifically with Army departments, but also worked closely with scientists in laboratories owned by government as well as private businesses.

## NOTES

1. The Volunteer Regulation Act, passed in 1867, served as an inducement for enlisting as a volunteer, who, after five years of continuous efficient service, would be granted up to 50 acres of land. However, the act was revoked in 1874 and was replaced by a system of partial payment, usually including the cost of uniforms, accoutrements and arms.
2. Monty Wedd, *Australian Military Uniforms, 1800–1982*, Kenthurst, 1982, p. 16.
3. Colonial Forces Study Group (Qld), ‘Clothing the Military’, <http://www.qldcolonialforces.org> (accessed 10 February, 2014).
4. Colonial Forces Study Group (Qld), ‘Clothing the Military’, <http://www.qldcolonialforces.org> (accessed 10 February 2014).
5. A sealed pattern is the protected, registered and numbered design of a military garment. The producers of the uniforms were required to adhere strictly to the design when making up the garments. The process of sealing patterns is explained in more detail in Chap. 9—Military Control over Intellectual Property.
6. NAA: A1194, 05.80/3180, *Report of the Committee Appointed to Enquire into the Question of the Supply of Uniform Clothing for the Commonwealth Services and the Establishment of a Government Clothing Factory*, 18 May 1909, p. 1.
7. NAA: A1194, 05.80/3180, *Report of the Committee Appointed to Enquire into the Question of the Supply of Uniform Clothing for the Commonwealth Services and the Establishment of a Government Clothing Factory*, 18 May 1909, p. 2.
8. NAA: A1194, 05.80/3180, *Report of the Committee Appointed to Enquire into the Question of the Supply of Uniform Clothing for the Commonwealth Services and the Establishment of a Government Clothing Factory*, 18 May 1909, Appendix B, pp. 6–7.
9. Jeffrey Grey, *The Australian Army: A History*, South Melbourne, 2001, pp. 9–13. For an interpretation of the role Hutton played in the organisation

- of an Australian Federal defence system, see Craig Stockings, 'A "Trojan Horse" in the Colony? Federal & Imperial Defence in the Australian Colonies, 1893–1896', *Journal of Australian Colonial History*, 17, July 2015, pp. 159–184.
10. NAA: B168/0 1905/10010, *Clothing and Dress Regulations*—Item 4 of 5. This is one of several copies of the document scattered in archival records.
  11. NAA: B168/0 1905/10010, *Clothing and Dress Regulations*—Item 4 of 5.
  12. C.E.W. Bean (ed.), *Official History of Australia in the War of 1914–1918*, 11th edn, 12 vols, 1941, i, pp. 60–61.
  13. *Dress Regulations for Officers of the Military Forces of the Commonwealth, 1903*, Melbourne, 1903, paragraph 3, p. 6.
  14. *Dress Regulations for Officers of the Military Forces of the Commonwealth, 1903*, Melbourne, 1903, paragraph 14, p. 10.
  15. *Dress Regulations for Officers of the Military Forces of the Commonwealth, 1903*, Melbourne, 1903, pp. 28–29.
  16. NAA: B168, 1905/10010, Item 2 of 5, John Forrest, Minister of State for Defence, *General Instructions*, 16 May 1903, p. 1.
  17. Tailors would still make special Ceremonial or Full Dress Uniforms where the drab mixture khaki jacket was not prescribed. This is still the case today and an allowance is paid to Officers and above for these types of uniforms.
  18. The Minister for Defence would make his decisions following the presentation of a summary of the subjects discussed and the recommendations made by the Board at each meeting. Refer NAA: MP153/9, *Decisions of the Military Board* (13 items in this series).
  19. Peter Dennis, Jeffrey Grey, Ewan Morris, Robin Prior and Jean Bou, *The Oxford Companion to Australian Military History*, 2nd edn, electronic version, 2009 (accessed 13 February, 2014).
  20. John Connor, *Anzac and Empire: George Foster Pearce and the Foundation of Australian Defence*, Cambridge, 2011, p. 11.
  21. NAA: A1194, 05.80/3180, *Report of the Committee*, 1909, Appendix B: Statements of Witnesses Examined, p. 6.
  22. NAA: A1194, 05.80/3180, *Report of the Committee*, 1909, Appendix B: Statements of Witnesses Examined, pp. 5–11.
  23. NAA: A1194, 05.80/3180, *Report of the Committee*, 1909, Appendix B: Statements of Witnesses Examined, p. 2.
  24. NAA: A2023, 1872/3/244, *Memorandum from Minister G.F. Pearce Endorsing the Report on Establishing a Government Clothing Factory*, 28 May 1909.
  25. For a brief online description of the history of the Royal Army Clothing Factory, see <http://davidshistoryblog.blogspot.com.au/2012/06/development-of-army-clothing-factory.html> A more in-depth description

- of the Factory as it was in 1901 is provided by F.G. Engelbach, 'The Royal Army Clothing Factory (in 2 parts)', *The Navy and Army Illustrated*, XI, 205, 5 January 1901, pp. 385–387 and XII, 206, 19 January 1901, pp. 433–435. The Factory was closed down in 1933 and is currently a serviced apartment block with the name 'Dolphin Square' for long and short stays. The original central hall has been demolished and turned into a large courtyard.
26. 'The Army Clothing Factory at Pimlico', *The Maitland Mercury & Hunter River General Advertiser*, Saturday, 15 December 1866, p. 3. Electronic version viewed via the National Library of Australia's Trove site (accessed 24 February 2014).
  27. See, for example, the question asked by James Page to the Minister for Defence in the House of Representatives: 'Whether it is the intention of the Government to initiate a clothing factory on similar lines to those on which the institution at Pimlico, England, is conducted?', Commonwealth of Australia, *Parliamentary Debates—House of Representatives*, 25 September 1901.
  28. Commonwealth of Australia, *Parliamentary Debates—House of Representatives, Defence Bill, Second Reading*, 24 July 1901.
  29. 'Proposed Federal Clothing Factory', *The Advertiser (Adelaide)*, Monday, 29 June 1903, p. 5. Electronic version viewed via the National Library of Australia's Trove site (accessed 24 February 2014).
  30. Australian Bureau of Statistics (hereinafter referred to as ABS), Catalogue No. 1301.0, *Year Book Australia*, No. 3, 1910, p. 1059.
  31. According to Pearce, a committee consisting of the Secretary to the Department of Defence, the Quartermaster-General and Scott of the Postal Department investigated the question of the factory's establishment, 'having before them a report on the Pimlico Clothing Factory in England' and visiting the State Clothing Factory in Sydney as well as several private clothing factories. Commonwealth of Australia, *Parliamentary Debates—Senate, Budget*, 25 August 1909.
  32. As described in NAA: A5799, 247/1951: C.K. Davies (Chair), *Interim Report of the Working Party Set Up by the Defence Supply Committee to Investigate Commonwealth Government Clothing Factory Operations*, 10 May 1951, p. 4.
  33. NAA: A1952, 474/10/26, *Clothing Factory Statement of Accounts 1919–1920*. One horsepower equates to about 745 Watts.
  34. NAA: MP392/10, 589/502/56, *Munitions Supply Board Annual Reports*, 9 August 1923.
  35. NAA: A1952, 474/9/71, *Commonwealth Government Factories Reports for Year Ended 30th June 1918*.

36. NAA: A1952, 474/9/57, *Department of Defence Clothing Factory Annual Report and Certified Statements*, 30 June 1918.
37. ABS, Catalogue 1301.0, *Year Book Australia, 1914*, p. 454. The ABS industry classification include woollen and tweed mills, boots and shoes, slop clothing, tailoring, dressmakers and milliners, dye works and cleaning, furriers, hat and caps, waterproof and oilskins, shirts, ties and scarfs, rope and cordage, tents and tarpaulins. Therefore, the figures given above must be seen as a general indication of differences between the Clothing Factory and the Australian clothing and textile industry.
38. Calculation of average Australian clothing and textile workers per factory is derived from ABS, Catalogue 1301.0, *Year Book Australia, 1914*, p. 457.
39. See, for example, the statement by H.A. Slade in his covering letter to the Secretary of the Department of Defence, dated 18 November 1918. NAA: A1952, 474/9/71, *Commonwealth Government Factories Reports for Year Ended 30th June 1918*.
40. Raelene Frances, *The Policy of Work: Gender and Labour in Victoria, 1880–1939*, p. 29.
41. For an overview and analysis of Taylorism, see Anne M. Blake and James L. Moseley, 'Frederick Winslow Taylor: One Hundred Years of Managerial Insight', *International Journal of Management*, 28, No. 4, Part 2, December 2011, pp. 346–353. For a comparative analysis of the impact of scientific management on developments in vocational training, see Lucy Taksa, 'The Cultural Diffusion of Scientific Management: the United States and New South Wales', *The Journal of Industrial Relations*, 37, September 1995, pp. 427–461.



## CHAPTER 3

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# The Government Takes Control

When Pearce established the Commonwealth Government Clothing Factory in 1912, in his second period as Defence Minister (this time under the second Fisher Government, in office from 29 April 1910), this marked the beginning of an era of entrepreneurial activity in the clothing sector, driven by the Clothing Factory.<sup>1</sup> One of the most far-reaching and clearly observable actions taken by the government was the absorption of elements of the existing clothing industry. The Clothing Factory drew workers from small Victorian workshops and clothing firms into its own establishment and the materials for the uniforms that originally had been purchased by these smaller enterprises were now purchased by the Clothing Factory. There was thus a redirection of some of the labour force and raw materials away from private enterprise to government enterprise. Not only that, but the establishment of the Clothing Factory effectively created a monopoly that replaced the combat uniform-making activities of a multitude of small clothing and tailoring firms.<sup>2</sup> It produced an entirely new player in the industry with powers well beyond those of individual private firms and with the capital resources to enable the introduction of the latest technologies and to make bulk purchases of the materials required for the manufacturing process. The government had in fact produced a mechanism that controlled the supply lines, demand and delivery of product, and pushed previous firms to the sideline or turned them into subcontractors

whenever the need arose. In other words, the government had created a new organisation in the form of a monopoly for the manufacture of uniforms, and was in full command of the production chain. One could draw parallels between the government's creation of a new production system and Schumpeter's description of the manner in which entrepreneurs introduce innovation and eventually cause the creation of a new level of economic activity.<sup>3</sup> By combining a series of production functions, the government had created a monopolistic facility for which it had control of demand and in which it allowed managers to assume an entrepreneurial role as they managed and innovated production and output. A few years later, another link in the chain was added when the government's Woollen Cloth Factory was established in 1915 in North Geelong, Victoria.<sup>4</sup> Both factories operated with minimum cost, paid no tax and—in theory at least—their costs should be equivalent to their income.

In this context it is interesting to reflect for a moment and to note that this was not the first time that public authorities in Australia went beyond the established boundaries of governing and administering. Indeed, over a hundred years prior to this the colonial authorities had—by the need to commence a convict settlement—laid the foundations for agricultural pursuits to feed the colony, established housing and other buildings, delivered all necessary goods by ship, supplied (convict) labour for the original colonies and oversaw all daily activities for the settlement's survival. Government involvement in these sectors was forced upon it by necessity, but as soon as private settlers entered the colonies and convicts obtained their tickets of leave and wanted to engage in pastoral activities or in manufacturing, trade and other services, the government encouraged the transfer from public to private interests by issuing various land grants and other settler support. A century later, during the early twentieth century, the political circumstances in Europe, and the need for Australia to be more self-sufficient in its defence, brought about the need to develop an Australian defence industry.<sup>5</sup>

The Clothing and other defence factories were built with the intention to supply the government's own needs. They were not intended to produce consumer or trade goods.<sup>6</sup> The government was both business owner and its own exclusive customer. This was completely in line with the goals of Senator Pearce, who, as Sir John Klunder Jensen would write, 'favoured public ownership when the Government was the sole customer'.<sup>7</sup> It was also in accordance with Schumpeter's thoughts on public monopolies in the context of innovation.

On the subject of comparing Pearce's actions with Schumpeter's theory of innovation, it is worth noting that Senator Pearce and Joseph Schumpeter were true contemporaries: they were both born in 1883 and both died in 1950. They also each served as government ministers: Schumpeter was Finance Minister in Austria in 1919 and Pearce occupied the position of Defence Minister on several occasions. Both of them observed and felt the influence of economic, social and cultural developments that were taking place around the world. They may even have experienced somewhat similar political directions as their respective countries took a new turn: Schumpeter was in Austria when the loss of the Austro-Hungarian monarchy completely changed the political circumstances of the country, while Pearce was driving the defence mechanism of a newly created Australian Commonwealth that proved itself as a nation in its own right soon after in the First World War.<sup>8</sup> It would be stretching things to say that Schumpeter had a direct influence on Pearce. He would not have read Schumpeter's 1911 *Theory of Economic Development* as it was written in German and not translated into English until 1934. But they were both products of their time and adhered to identical philosophies with regard to the capacity of the government to lead innovation. One wrote the book, the other practised the idea.

Having selected the site for the new Clothing Factory in South Melbourne, it was necessary to obtain the services of someone knowledgeable in the operations of clothing factories, someone who could assist in the design and management of the new factory. Advertisements were placed early in 1911 and soon afterwards, on 22 February of the same year, the *Commonwealth of Australia Gazette* announced the appointment of Henry Alfred Slade as Manager of the Clothing Factory and the signing of an agreement between him and the Minister of State for Defence.<sup>9</sup> According to Jensen, the 45-year-old Slade had substantial experience in England as the manager of a factory of five hundred hands and this fact was an important consideration in the decision to select him as manager of the Clothing Factory.<sup>10</sup> Slade set about working with the Works Branch of the Department of Home Affairs in designing the buildings, which were constructed of a timber frame clad with corrugated iron. For the operations of the Factory, it was essential to have excellent cutters and Slade wasted no time in seeking them out. To ensure their commitment, he allowed some to take up their duties towards the end of November 1911, before the Factory had even opened its doors.<sup>11</sup> We can only assume that they would have assisted Slade in designing the cutting room's layout. On 3 January 1912, the

Factory commenced operations, but it was immediately clear that its establishment caused friction in the clothing industry: a number of workers who had been selected had been lured back by private firms with offers of better conditions. This was a typical example of the type of friction that Schumpeter had described as ‘creative destruction’ in his theory of economic development, written only a few months before: it was the result of introducing innovation into an industry which would disturb the status quo, the equilibrium that had thus far been in evidence, and it would be the cause of adjustments throughout the industry.<sup>12</sup> The adjustments might see the light in the form of the counter-movements made by firms (as happened when the Clothing Factory opened its doors). Other firms copied the innovation and managed to capture a slice of the market with these copies. But the innovation could also result in the disappearance of those firms that did not adjust to the new situation. After the adjustments had been made, the industry would settle down to a new equilibrium and accept the superior position of the new leader, in this case the Government Clothing Factory. Many firms were still able to participate in the manufacture of military uniforms by obtaining subcontracts from the Clothing Factory whenever the quantities of military orders were beyond its capacity. They were able to backfill some of the gaps in their own production volumes after the Clothing Factory began operations and retained key production employees. As the leading player in the military clothing industry, the Clothing Factory was able to set high standards of production and impose up-to-date technical requirements on the making of the garments. It was the keeper of the intellectual property inherent in the designs of the uniforms.

### FINANCING THE UNIFORM BUSINESS

To finance the cost of purchasing cloth for the uniforms, the government established a Trust Fund account under Section 62A of the Audit Act. The Trust Fund Account was independent from the annual budget estimates and the reason for its establishment was that there was often a long delay between the placing of an order for cloth from overseas, its arrival and the due date for payment. The long period often stretched well beyond the government’s normal budget year. The Trust Fund Account was a perpetual holding account, which was topped up as required following a request to the minister. The minister would approach the Treasurer who, in turn, required the approval of the Governor General in accordance with Section 5 of the Surplus Revenue Act 1908.<sup>13</sup> The Clothing Factory was

charged interest of 4 per cent on the balance in the account. During the financial year 1911–1912, Treasury appropriated a total of £146,000 0s.0d. to be paid into the Trust Fund to cover the cost of military clothing and necessaries.<sup>14</sup> Of this amount, £70,842 18s.2d. was utilised and the balance of £75,157 1s.10d. was returned to revenue at the end of June 1912. The Clothing Factory's first Annual Report, for the year ending 30 June 1912, showed interest on Treasury balances at £495 9s.8d.<sup>15</sup> Six months later, at the end of December 1912, expenditure against the Clothing Factory itself had risen to £48,125 17s.8d., possibly as a result of additional staff recruitments and the purchase of additional machinery, but the cost of military uniform provisions was down to £25,556 10s.4d.

A significant cost item against the Trust Fund was the supply of clothing material for military uniforms. Naval uniforms were accounted for separately and are not included in the figures quoted here.<sup>16</sup> The material cost of tailor-made Army dress uniforms and other uniform items supplied from external sources to the Clothing Factory (such as buttons) were also covered by the Trust Fund.<sup>17</sup> Woollen cloth for tunics, greatcoats and woollen shirts, as well as cord material for breeches, were imported at first, but after the Woollen Cloth Factory commenced operations in North Geelong on 23 September 1915 (the factory was officially opened on 22 December 1915) and was in full production by the end of April 1916, all woollen fabric for the Department of Defence, for the Navy (still a separate entity at that time) and for other public departments was produced locally.<sup>18</sup> The Woollen Cloth Factory supplied the fabric for government departments at net cost of production. The sole buyer of cloth for military uniforms was the Government Clothing Factory. The Clothing Factory's contractors (Appendix B at the end of the book contains a sample list of firms contracted by the government immediately prior to the establishment of the Clothing Factory) were required to purchase the materials on commencement of their contracts directly from the Clothing Factory. The Clothing Factory would transfer the amounts back into the Trust Fund together with payments for fabric used by its own production lines.<sup>19</sup> This flow of funds from the Trust Fund account is shown in Fig. 3.1, where the Woollen Cloth Factory would receive funds from the Trust Fund to manufacture cloth, which would be purchased by the Clothing Factory. The Clothing Factory, in turn, would subcontract some of the work and require its subcontractors to pay for cloth upfront. Once received, the Clothing Factory would reimburse the Trust Fund for these costs, thereby completing the circle. In this way the Trust Fund was a floating account

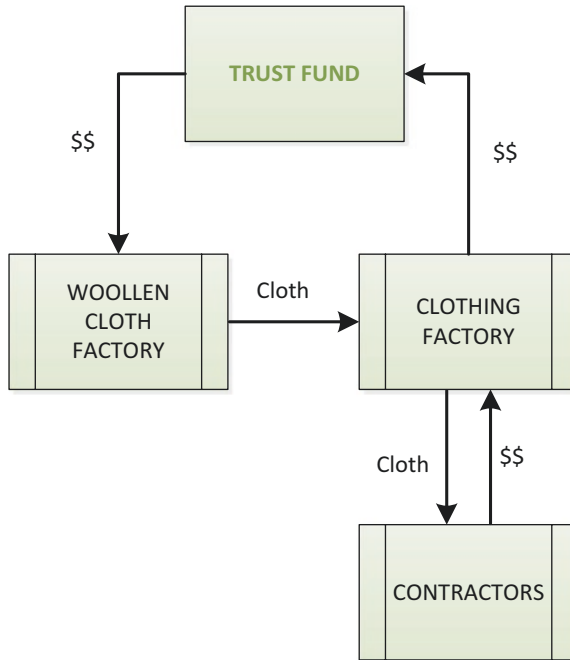


Fig. 3.1 Movement of funds for payment of cloth

providing the funds for material and the operations of the Clothing Factory and obtaining reimbursements for the material as well as interest on the balance outstanding. During the year ended 30 June 1912, a total amount of £16,000 0s.0d. was appropriated to operate the Clothing Factory, of which £14,789 16s.6d. was utilised and the remainder returned to revenue. During the same period, the Factory received £18,119 10s.2d. from external sources for work done and payment for material supplied to subcontractors.<sup>20</sup>

### INVESTMENT IN PLANT AND EQUIPMENT IN THE CLOTHING FACTORY

The machinery and plant of the Clothing Factory in its first year of operations had a value of £1708 2s.1d.<sup>21</sup> By the end of 30 June 1913, however, the investment had more than doubled to £3807 5s.11d.<sup>22</sup> Henry Slade's

report as published in the Commonwealth Parliamentary Paper did not elaborate on the nature of the machinery installed at the factory, but he had indicated that the Factory had been enlarged to cope with the additional production of naval and postal uniforms. There is some indication of the type of machinery purchased in a *Commonwealth of Australia Gazette* published early in the year. On 6 February 1913, Pearce approved one (or more) contracts to the value of £1129 5s.0d. with the Singer Sewing Machine Coy., located at 328 William Street, Melbourne, for the supply of sewing equipment for the Clothing Factory. The details of the machines purchased from the Singer Sewing Machine Coy. are shown in Table 3.1. The order for 140 power-driven sewing machines in this contract added significantly to the Clothing Factory's manufacturing capacity and also indicates there would have been a concurrent increase in machinists to operate them. Quite possibly, these machines accounted for the bulk of the increase in value of machinery at the Clothing Factory as reported by Slade.

Even though there was significant investment in the Clothing Factory, and the establishment was the largest of this industry in Australia, one should not overlook the fact that in 1912 in Victoria alone, sewing machines to the value of £93,518 had been imported, and only some of these were destined for the Clothing Factory with the bulk being purchased by smaller firms.<sup>23</sup>

As Australia started to prepare for its participation in the First World War, the demand for military uniforms had an impact upon the operations of the Clothing Factory and there was increased investment in its plant

**Table 3.1** Contracts for the supply of Singer sewing machinery, 1913

<i>Quantity</i>	<i>Machine</i>	<i>Cost ea.</i>			<i>Total</i>		
		<i>£</i>	<i>s.</i>	<i>d.</i>	<i>£</i>	<i>s.</i>	<i>d.</i>
140	Machines, sewing, power driven	5	0	0	700	0	0
3	Machines, lap-seam filler	20	5	0	60	15	0
2	Machines, buttonhole, ordinary	16	5	0	32	10	0
1	Machine, buttonhole, taper bar	20	0	0	20	0	0
2	Machines, buttonhole, shirt	45	0	0	91	0	0
5	Machines, bar-tack	43	10	0	217	10	0
1	Machine, hemming	7	10	0	7	10	0
154	Machines				1129	5	0

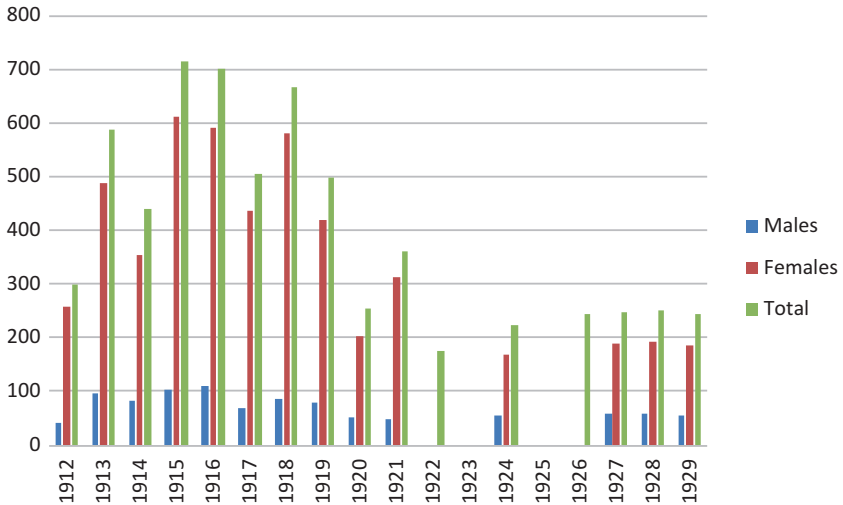
Source: Calculated from *Commonwealth of Australia Gazette*, No. 7 (6 February 1913)

and equipment. From the start, the Factory had been fitted out to cope with the production of large numbers of military garments, but an unprecedented demand was placed upon the Factory during 1915. By the end of the 1914 financial year, the investment in machines stood at £3943 13s.8d., but a year later this had risen to £4841 1s.7d., a modest increase given the circumstances.<sup>24</sup> Jensen explained that the Clothing Factory was extended ‘only to a moderate degree’.<sup>25</sup> In 1916 major extensions were built, however, involving the enlargement of the Cutting Room and the purchase of several hundred power-driven sewing machines. There were now more than six hundred items of plant in the Factory, including twin-needle machines, button-hole making and button-sewing machines as well as steam pressing machines.<sup>26</sup>

### EMPLOYMENT AND MILITARY ENLISTMENTS

Whereas the rise in investment in plant and equipment is a good indicator of the capacity of the Factory in its first years of operation, the statistics showing the labour employed in the premises is an even better measure. The number of workers employed during the first decade of operations was at a high during 1915 (714 workers), when the Australian Imperial Force (AIF) was deployed in the Middle East. The following year, when the troops were moved to the Western Front, demand for warm uniforms kept the Factory busy and employment remained stable (701 workers). By 1917, replacement uniforms for the Australian Army were also manufactured in the United Kingdom, at the British government-owned Pimlico Clothing Factory, and shipped from there directly to France. Uncertainty about how the war was developing in Europe and the insistence of the Australian Government that only Australian suppliers should clothe the troops in order to keep employment at acceptable levels, may have accounted for an upsurge in activity and employment at the Clothing Factory during 1918.<sup>27</sup> However, all this was soon to come to an end when hostilities ceased and the production of military uniforms came to an abrupt stop. Clothing Factory workers, especially female machinists, were either moved to work on other Factory production lines or let go. Within one year, 161 of the Factory’s female employees were made redundant, but only nine of the men (who mostly occupied skilled cutting or pressing roles and were less replaceable) left the Factory.

Data on the movement of Clothing Factory labour, shown in Fig. 3.2, are significant in several ways. Firstly, the graph clearly shows that the num-



**Fig. 3.2** Australian Government Clothing Factory Employees, 1912–1929. Sources: Selected Government Clothing Factory Annual Reports; NAA: MP392/10, 589/502/69, *Munitions Supply Board Reports, 1927–1928–1929*

ber of workers employed in the period 1912 to 1929 reached its highest level in 1915 and remained very high the following year. When uniforms were also produced by the Pimlico factory in the United Kingdom (1917), the number of employees at the Melbourne factory dropped from 701 to 505, but with the (in hindsight, false) expectation that the war would continue in Europe beyond 1918, production increased during 1918 as did the level of employment. From 1919 onwards the Factory was no longer producing military uniforms; it was now taking orders for the Postmaster-General's Department, the Victorian Railways and other public clients, which kept the numbers of employees at a reasonable level (498).

Secondly, Fig. 3.2 also shows the relatively low number of males employed compared to the number of female workers. This is characteristic of the clothing industry, which, as we have explained earlier, typically employed males in the critical production processes of cutting many layers of fabric at once and pressing semi-finished garments. Cutters required special skills in laying out the patterns on the fabric in such a way as to minimise wastage. Their work required precision and the ability to calculate measurements on a flat pattern to produce a three-dimensional final

product. They also needed to be strong to be able to cut twenty or more layers of heavy woollen fabric at once. Their work was critical to the entire flow in the factory. If a mistake was made at this stage, it would have a knock-on effect for the entire production line. Similarly, pressers played an important role in steam-shrinking pieces of garments to fit to, for example, a rolled collar or a sleeve top. The presses were heavy pieces of equipment and required skill and strength to operate. Cutters and pressers obtained higher wages than machinists, but a clothing factory only required a small number of these employees, whereas much larger numbers of machinists were required to complete the garments.

As is to be expected of a defence industry, workloads and numbers of workers employed at the Clothing Factory fluctuated with demand for military uniforms at times of war. In the foregoing section, these fluctuations during and just after the First World War were described. But also of interest are the employment movements over almost the entire period in which the Government Clothing Factory was in existence as a state-run enterprise. Table 3.2 clearly indicates peaks in employment during the First and Second World Wars, the Korean War and the Vietnam War and shows that the highest employment levels were reached in 1915 (714 workers) and surpassed at various stages in the future, such as in 1942 (883 workers), 1955 (930 workers) and 1969 (900 workers).

The Clothing Factory was producing uniforms for all men and women in the Services as well as for the cadets who had been part of the system from the beginning of the century. Apart from the Army uniforms, the Factory also produced naval and air force uniforms. The range included garments for the medical staff, nurses and even garments for patients in military hospitals. Uniforms for volunteers and ancillary services were furthermore added to the range, as were some made-to-measure uniforms. The Factory's employment levels must therefore be seen against the full range of production. However, as we are concerned with developments in the Army uniforms and because the demand for Army outfits follow a similar trend with the demand for clothing by the other Services during war and peace times, a comparison with enlistments in the Army and employment at the Clothing Factory will be made.

During the First World War there were between 45,645 (in 1914) to 122,186 (in 1918) enlistments in the Army. During the period of the Second World War (1939–1945), however, there were almost a million men and women enlisted in the three Services and almost three-quarters of these were Army personnel (see Table 3.3).<sup>28</sup>

**Table 3.2** Government Clothing Factory employees, 1912–1982

	<i>Males</i>	<i>Females</i>	<i>Total</i>
1912	43	257	300
1913	98	489	587
1914	84	355	439
1915	102	612	714
1916	110	591	701
1917	69	436	505
1918	87	581	668
1919	78	420	498
1920	52	202	254
1921	48	313	361
1922			174
1923			
1924	54	168	222
1925			
1926			243
1927	60	189	249
1928	60	192	252
1929	56	187	243
1930	56	189	245
1933	67	218	285
1934			
1935			482
1936	86	272	358
1937			397
1938			
1939	97	387	484
1942	137	746	883
1943	134	673	807
1944	131	585	716
1945	124	480	604
1955			930
1964			750
1969			900
1977			692
1980			662
1981			712
1982			720

Sources: Selected Australian Government Clothing Factory Annual Reports, Davies Report (1951), Allison-Brewster Report (1964), Parliamentary Standing Committee on Public Works, *Minutes of Evidence* (1968), Senate Select Committee on the Government Clothing and Ordnance Factories, 1982, Australian Government Clothing Factory brochure (ca. 1983)

**Table 3.3** Gross enlistments in the military services, 1939–1945 (thousands)

<i>Service</i>	<i>Males</i>	<i>Females</i>	<i>Persons</i>
Royal Australian Navy	45.8	3.1	48.9
Australian Military Forces	691.4	35.8	727.2
Royal Australian Air Force	189.7	27.2	216.9
Total	926.9	66.1	993.0

Source: ABS, Catalogue 1301.0, *Year Book Australia, 1944–1945*, p. 1034

**Table 3.4** Army personnel, 1900–2000, selected years

<i>Year</i>		<i>Total</i>
1900		27,353
1914–1918	First World War	391,292
1920		102,665
1930		27,454
1939–1945	Second World War	103,886
1952	Mid-Korean War 1950–1953	79,800
1960		46,467
1962–1975	Vietnam War	837,845
1980		32,321
2000		45,527

Source: ABS, Catalogue 1301.0, *Year Book Australia*, issues published over this period. No annual data for the period 1939–1945 were published, but the total enlistments for this period are shown, as are total data for all wars in which Australians participated. No data were published for 1950, 1951 and 1953

A second upsurge in Army personnel occurred during the 1950s, partly because of the Australian involvement in the Korean War and also as a result of the introduction of the National Service Act (1951) in which military training was made compulsory for all Australian males over 18 years of age. When the Act was withdrawn in 1959, numbers in the Army fell to a low, as can be seen in Table 3.4. With the exception of a small upsurge during the Vietnam War in the late 1960s when conscription once more was brought in under the National Service Act (1964), the size of the Army was again on a downward trend.

Employment levels at the Clothing Factory roughly mirrors movements in Army enlistments, as is demonstrated in Table 3.5. Just prior and in the early stages of the First and Second World Wars, the Korean War and the Vietnam War, work at the Factory increased and so did levels of employment. But

**Table 3.5** Comparison between Clothing Factory employment and Army enlistments, 1912–1982

	<i>Number of employees/enlistments</i>	
	<i>Clothing factory</i>	<i>Armed forces</i>
1912	300	23,696
1913	587	34,537
1914	439	45,645
1915	714	60,972
1916	701	74,127
1917	505	88,362
1918	668	122,186
1919	498	109,881
1920	254	102,665
1921	361	127,960
1922	174	37,156
1924	222	
1926	243	44,634
1927	249	44,635
1928	252	
1929	243	47,931
1930	245	27,454
1933	285	27,963
1935	482	28,080
1936	358	36,063
1937	397	36,943
1939	484	
1942	883	103,886
1943	807	103,886
1944	716	103,886
1945	604	
1955	930	152,198
1964	750	50,788
1969	900	79,799
1977	692	
1980	662	32,321
1981	712	32,898
1982	720	32,876

Sources: For Clothing Factory employment: Selected Australian Government Clothing Factory Annual Reports, Davies Report (1951), Allison–Brewster Report (1964), Parliamentary Standing Committee on Public Works, *Minutes of Evidence* (1968), Senate Select Committee on the Government Clothing and Ordnance Factories, 1982, Australian Government Clothing Factory brochure (ca. 1983)

For Army personnel: Catalogue 1301.0, *Year Book Australia*, issues published over this period

Note: Army enlistments during the Second World War are not available in the ABS Catalogues on a year-by-year basis, but were an average of 103,886

unlike the sharp drops in Army enlistments after the Second World War, employment at the Factory was generally retained and was even higher than during the First World War. This is a clear indication that the Factory did not rely solely on military requirements for uniforms, but could resort to mainstay lines of production. It had been a commercially sound decision, taken just after the First World War, to diversify Factory production over different lines for different clients, including the Postmaster General's Department, the Railways and other departments. Without these, work in the Factory would have ground to a halt after the last war.

### PRODUCTION

At the onset of the First World War, production increased significantly as preparations were underway to send troops overseas. In his report to the Secretary, Department of Defence, dated 30 September 1915, Slade commented,

During the period under review, the outbreak of war has of necessity increased the activities of the Factory, and, particularly during the first few weeks, it proved to be of great assistance to the Department in connexion with the clothing of troops urgently required for active service... Large consignments of clothing were manufactured at short notice and despatched to various destinations for issue to the Tropical Forces and to the Expeditionary Forces which embarked for Egypt.<sup>29</sup>

From the time the Clothing Factory had been established until the end of the First World War, clothing to the value of £1,416,409 14s.1d. had been produced, almost all of which was delivered to the Army. The Factory also manufactured uniforms for the Navy (a department separate from the Defence Department at that time), railways, Postmaster General's Department and Trade and Customs plus some miscellaneous items for the Governor General's Department. During the final war year, the total value of the Factory's output amounted to £343,452 19s.0d., of which £317,989 7s.1d., or approximately 93 per cent, consisted of military garments for the Department of Defence. The Clothing Factory's production since the commencement of business is shown in Table 3.6.

**Table 3.6** Government Clothing Factory—value of production, 1911–1918

<i>Year</i>	£	<i>s.</i>	<i>d.</i>
1911/12	26,794	9	9
1912/13	137,815	4	6
1913/14	164,024	1	1
1914/15	235,722	15	4
1915/16	267,136	5	5
1916/17	241,463	19	0
1917/18	343,452	19	0
Total	1,416,409	14	1

Source: NAA: A1952/2, 474/9/71, *Commonwealth Government Factories Reports for Year Ended 30th June 1918*, Report by H.A. Slade to Secretary, Department of Defence, 18 November 1918, p. 4

The full range of items was quite astonishing and covered a wide range of garments and components such as collars and hat bands.<sup>30</sup> Some garments were produced in large quantities as is shown in a list, prepared by Slade for the Minister of State for Defence, for 1917–1918:

128,764	Breeches, Khaki Cord, 12 oz. Dismounted Pattern
64,314	Breeches, Khaki Cord, 12 oz., Mounted Pattern
90,801	Jackets, Khaki Cloth, Service Dress (including jackets for Staff Clerks and Senior Cadets)
37,000	Greatcoats, Khaki Cloth, 25 oz., New Dismounted Pattern
22,278	Greatcoats, Khaki Cloth, 25 oz., Mounted Pattern
1387	Trousers, Khaki Cloth, Commonwealth Pattern
1686	Trousers, Khaki Drill (of various types, including working trousers) <sup>31</sup>

But there were also many items that were produced in very small quantities (often referred to as ‘short runs’). For example, the list included garments of special sizes to fit particular men, such as 5 only cotton cord breeches for mounted men and several short runs of specials in khaki cord breeches (176, 6, 18 and 77 pairs respectively) as well as special runs of 3 and 15 khaki cloth caps with black peaks and of 4 special size blue jackets. Many of the standard size ranges were also produced in small runs through the year. Such small runs took time to set up for layout, cutting, designating staff to sew, setting up sewing machines with the required threads and other notions; in addition, when the run was finished, the process needed to be changed over for another type of garment. Short runs do not have the makings for efficient, streamlined operations and this was often an argument used by private contractors in refusing small clothing contracts. In this context it is not surprising that no subcontractors had been used

for the manufacture of military uniforms during 1917–1918 and that all these garments had been made at the Clothing Factory.<sup>32</sup> Only a relatively small number of postal uniforms and an even smaller number of railways uniforms had been produced outside the Clothing Factory.<sup>33</sup> Importantly, the lack of operational efficiency or the inability to achieve economies of scale because of short production runs strengthened the arguments in favour of retaining government control of the Clothing Factory over the following decades. As the private sector showed little interest in producing short production lines, it was felt that the government should remain in the role of owner/manufacturer and produce the nation's uniforms.<sup>34</sup>

### INTERACTIONS WITH THE PRIVATE CLOTHING INDUSTRY

Throughout its existence as a government industry, the Clothing Factory maintained strong links with the private clothing industry, which would often supplement the Factory's output of military uniforms to achieve production targets and satisfy military demand. It pays to consider the structure of the Australian clothing industry from the beginning of the twentieth century for an appreciation of the impact of the Clothing Factory and the way it operated in the industry.

The Australian clothing industry was a splintered industry, consisting mostly of very small firms, many of which specialised in tailoring men's suits and who had taken pre-Federation military made-to-measure orders as an additional source of income. Pearce's determination to establish a government-owned enterprise which would take away this source of income created a ripple in the industry, but it also provided new opportunities for further development.<sup>35</sup> The introduction of the first 'all-ranks' *Dress Regulations* in 1903 created a brand-new platform for the manufacture of military uniforms. The new designs were streamlined across all ranks, providing an opportunity for mass production. Prior to this, the colonial military uniforms were individually tailor-made by approved firms all over the colonies. Table 3.7 serves to provide an idea of the size of the entire textile and clothing industry prior to 1912.

To put the figures into perspective, of the entire clothing and textile industry 58 per cent (or 30,691) persons were employed in slop clothing, tailoring, dressmaking or millinery in 1903.<sup>36</sup> By 1911, this figure had risen to 59,606 persons or 71 per cent.<sup>37</sup>

The Victorian Year Book for 1912–1913 contains a detailed list of clothing industry wages paid in Melbourne during 1912 (see Table 3.8).

**Table 3.7** Size of the clothing and textile industry in Australia, 1903–1911

	<i>Number of factories</i>	<i>Average no. of persons employed</i>
1903	2176	53,041
1904	2236	56,269
1905	2315	59,095
1906	2335	62,594
1907	2661	68,390
1908	2681	70,075
1909	2774	73,567
1910	2982	78,983
1911	3093	83,845

Source: ABS, *Year Book Australia, 1909–1913*

Note: The industry includes the production of textile fabrics such as woollen cloth, spinning yarn and a wide range of clothing, including hats, underwear and other items

**Table 3.8** Weekly wages in the private clothing industry, Melbourne

<i>1912 ready-made clothing occupations</i>	<i>Wages per week</i>
	<i>Shillings</i>
Cutters, stock—male and female	60
Machinists—examiners—male	45
Folders	40
Seam pressers—male and female	30
Brushers	25
Tailoresses, machinists, buttonhole makers	21

Source: ABS, Catalogue 1301.2, *Victorian Year-Book, 1912–1913*, p. 766

The list shows separate wages for the made-to-order and the ready-made clothing occupations, with the latter slightly below the former. Clothing produced at the Government Clothing Factory was mostly ready-made, in bulk and in a pre-set range of sizes, and can be compared with those in the private sector for ready-made occupations.

The establishment of the Government Clothing Factory in 1912 was a rude awakening for the existing clothing industry: the Clothing Factory set slightly higher wages and had better conditions for the workers, including a tea room. The Factory was paying cutters and pressers an average of £2 19s.2d. per week (equivalent to 59s.2d.).<sup>38</sup> Women (mostly machinists) received £1 4s.6d. (or 24s.6d.) per week.<sup>39</sup>

This contrasts with the private sector which offered 60s. for cutters, 30s. for pressers and 21s. for female machinists. The Clothing Factory had no difficulty attracting workers, but the departure of skilled staff from private clothing firms left gaps to be filled. Some private tailoring business owners started to offer higher wages and managed to draw some of the workers back to their own premises. But the initial dismay about the establishment of a government-owned Clothing Factory quickly vanished when it became clear that the Factory was unable to produce the full demand for military uniforms and that surplus work was handed to the private sector. In fact, with the exception of the First World War years when all military uniforms were produced by the Clothing Factory, production came to rely on external contractors to fulfil the bulk of military requirements for most of the Factory's life. In this context it is also of interest to note that by establishing the Clothing Factory, Pearce had stopped the import of uniforms made in the United Kingdom. All uniforms were henceforth produced locally and this created a larger workload and more work opportunities in Australia.<sup>40</sup> The government contracts printed in the *Commonwealth of Australia Gazette* provide a useful insight into the private sector's involvement in the making of Army uniforms—see Appendix B. A scrutiny of contracts accepted by the government during the period 1911–1913 and subsequently printed in the *Commonwealth of Australia Gazette* provides an interesting view of the industry just prior to the establishment of the Government Clothing Factory in 1912 and during the year following its establishment.<sup>41</sup> The list of contracts accepted indicates that the clothing firms were spread over several states, but that a small number of firms were repeatedly successful in obtaining contracts and dominated the production of a variety of garments: the Adelaide Clothing Manufacturing Co. Ltd., C. Anderson in Sydney, O'Brien and Down in Melbourne, S. Bartlett in Brisbane and Steedman Bros. in Melbourne immediately stand out for the production of jackets and tunics, trousers, pantaloons or breeches, shirts and greatcoats. Several contractors produced hats, but the Denton Hat Mills in Melbourne was the obvious favoured contractor in this area with six contracts totalling at least 30,750 items during the period. The Dunkerley Hat Mills Ltd. in Sydney, in one contract, managed to secure the production of 27,000 hats, while the Stockport Hat Co. Ltd. in Melbourne, with two contracts, produced 19,750 hats. The contracts also showed up a number of specialists: buttons were supplied by A.J. Parkes in Brisbane, puttees

came from John Vickars and Co. in Sydney and shirts were produced in large numbers (94,913 shirts) by V. Kaufman and Co. in Melbourne.

The Clothing Factory's reliance on the private sector for part of the production of military garments was firmly established from the start and increased over the course of the following decades. By 1951 the Clothing Factory was producing only 15 per cent of garments required by the Services. In contrast, it then delivered 100 per cent of the requirements for postal uniforms.<sup>42</sup> It appears, then, that the Factory's management had at some point made a strategic decision to concentrate production on what is in the world of commerce sometimes referred to as 'bread-and-butter' lines, the production of goods that provided a more constant source of income and employment and which were not subject to the fluctuations of war requirements. The constant stream of postal and railway uniforms orders seems to have provided the Factory with sufficient work to keep the machines running, albeit with less employees than during the height of the First World War. But this decision meant that there was little capacity left within the Clothing Factory to produce military garments when war broke out in 1939 and again in later years. It had now become absolutely vital for the Clothing Factory to collaborate with producers in the private sector in order to keep the Servicemen in uniform. Contracts had to be drawn up in such quantities as to be attractive to private producers. And this required a good deal of forward planning, not only by the Factory but especially by Unit Commanders in the military and by the Departments of Defence and Treasury.

From the start, the Australian Government's ownership of the Clothing Factory set it on a path of leadership. A liberal amount of Treasury funding, replenished as needed from time to time, ensured its elevation above the private sector in terms of investment in new equipment and wages to its workers. The close relationship between the Clothing Factory and the Australian Army is evident from the rise and fall in the Factory's employment figures and similar movements in Army enlistments. This was a relationship in which the Department of Defence supported both the Factory and the Army, with funds supplied to the Factory through a Trust Fund so that it could purchase the necessary cloth. It was also a government enterprise that was to set an example to other firms. From the start, the Clothing Factory was equipped with the latest machinery and it continued to invest in sewing machines to enable faster and more specialised operations. It made the Factory an industry leader and these investments set it up for successful operations in the decades to come.

## NOTES

1. The Clothing Factory was one of five government-owned defence factories. The other four were: the Cordite Factory in Maribyrnong (Victoria), the Small Arms Factory in Lithgow (New South Wales), the Harness Factory in Clifton Hill (Victoria) and the Woollen Cloth Factory in North Geelong (Victoria).
2. Dress and ceremonial uniforms continued to be tailor-made, but even this activity was to some extent taken over by the Clothing Factory.
3. Joseph A. Schumpeter, *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle* (translated from the German by Redvers Opie), with a New Introduction by John E. Elliott, New Brunswick, USA and London, UK, Transaction Publishers, 2002, in particular Chapter II.
4. The Woollen Cloth Factory commenced operations on 23 September 1915, but was not officially opened until 22 December of that year. D.J. Amos, *The Story of the Commonwealth Woollen Mills*, 2nd edn, Adelaide, 1945, p. 6.
5. The economic role played by governments in Australia has been well documented. See, for example, Noel G. Butlin, *Investment in Australian Economic Development, 1861–1900*, Cambridge, 1964. An excellent historical overview of the fluctuating involvement by governments in Australia is provided by Stephen Bell, *Ungoverning the Economy*, Melbourne, 1997, pp. 65–69. It should also be noted that the Commonwealth Government also established other enterprises at that time, such as the Commonwealth Bank which commenced operations in 1912.
6. It must be pointed out here that in later years the Small Arms Factory, with technical support from the Commonwealth Scientific and Industry Organisation, also produced some lines of goods sold to private industry.
7. NAA: MP956/2/0, 14, ‘Jensen Papers’, *Defence Production in Australia*, p. 156. Jensen had for many years managed the accounts of the government-owned Small Arms Factory in Lithgow. After the First World War, he became Secretary and Controller of the Munitions Supply Board. Until 1939 he was Chairman of the Defence Contract Board.
8. Many of the Schumpeter biographies leave a disturbing gap for the period 1914–1918. He is said to have taught at the University of Graz until the First World War and he became Austrian Minister of Finance in 1919. Robert Allen in his *Opening Doors: The Life and Work of Joseph Schumpeter—Volume 1: Europe* writes on p. 162: ‘in the fall of 1918 Schumpeter worked and waited in Graz’ and that he had been a supporter of the Austrian monarchy and deplored its disappearance. This would imply that Schumpeter stayed on in Graz and either continued lecturing at the University or worked privately.

9. *Commonwealth of Australia Gazette*, January–March, 1911, Index 1911, p. 738. Jensen, incorrectly, records that Henry Slade was selected only in March 1911 to attend an interview. This would mean his appointment would be some time later. The error also seems incongruous with his further statement that applications were invited, also in March 1911, for foremen and factory and clerical staff. These appointments should be the responsibility of the new Manager who would therefore have had to be in situ earlier than March. See NAA: MP956/2/0, 14, ‘Jensen Papers’, *Defence Production in Australia*, p. 157.
10. NAA: MP956/2/0, 14, ‘Jensen Papers’, *Defence Production in Australia*, p. 157.
11. Commonwealth Government Clothing Factory, *Report for the Period Ended 30th June, 1912*, Commonwealth Parliamentary Paper No. 16/1913, p. 4.
12. Joseph A. Schumpeter, *Capitalism, Socialism & Democracy* (with a new introduction by Richard Swedberg), London and New York, 1976, Chapter VII, pp. 81–86.
13. NAA: A1831, 1953/369, *Letter from Secretary and Chief Inspector to The Secretary, Department of the Treasury*, 17 August 1953.
14. *Commonwealth of Australia Gazette*, No. 55 (29 August 1912), Statement (K), p. 1519.
15. Commonwealth Government Clothing Factory, *Report for Period Ended 30th June, 1912*, Commonwealth Parliamentary Paper No. 16/1913, p. 6.
16. Production of Navy and Postal Department uniforms was commenced following an enlargement of the Clothing Factory the following year. Commonwealth Government Clothing Factory, *Report for Year Ended 30th June, 1913*, Commonwealth Parliamentary Paper No. 16/1914-17, p. 4.
17. *Commonwealth of Australia Gazette*, No. 55 (29 August 1912), p. 1512.
18. Royal Commission on Navy and Defence Administration, *Fourth Progress Report*, (Melbourne, 13 March, 1918), p. 4.
19. Department of Defence and Supply records show that on occasion there were problems with contractors who were issued with cloth for uniforms but who failed to pre-pay as required. NAA: 705/1, 17/7/408, *D and S 40/504—Ordnance Stores—Issues of Cloth*.
20. *Commonwealth of Australia Gazette*, No. 55 (29 August 1912), Statement (K), p. 1519.
21. Commonwealth Government Clothing Factory, *Report for Period Ended 30th June, 1912*, Commonwealth Parliamentary Paper No. 16/1913, p. 6.
22. Commonwealth Government Clothing Factory, *Report for Year Ended 30th June, 1913*, Commonwealth Parliamentary Paper No. 16/1914-17, p. 6.
23. ABS, Catalogue 1301.2, *Victorian Year-Book, 1912–1913: Value of Principal Articles Imported Oversea into Victoria, 1912*, p. 469.

24. Commonwealth Government Clothing Factory, *Report for Year Ended 30th June, 1914*, Commonwealth Parliamentary Paper No. 312/1914-17, p. 5. Commonwealth Government Clothing Factory, *Report for Year Ended 30th June, 1915*, Commonwealth Parliamentary Paper No. 313/1914-17, p. 5.
25. NAA: MP956/2/0, 14, 'Jensen Papers', *Defence Production in Australia, The War of 1914-1918*, Ch. 5—The Government Factories and Establishments, p. 162.
26. NAA: MP956/2/0, 14, 'Jensen Papers', *The War of 1914-1918*, Ch. 5—The Government Factories and Establishments, p. 162.
27. Prior to the Australian Government sending its troops to assist in the First World War there had been an undertaking that the United Kingdom would provide for all their equipment and war materiel, whilst Australia would send the AIF fully dressed in combat clothing. As supplies of goods, including fresh clothing, were delayed, mislaid or hindered in transit as the war in Europe was in progress, reserve clothing was also commissioned from the Pimlico Clothing Factory. The Australian Government was never happy about this development as it would dislocate local trade and cause loss of employment. AWM13, 6508/40/6, Despatches from Defence, Melbourne [concerning ordnance], *Cable from Melbourne No. 10459*, reproduced in *Letter from John Stanley, Quartermaster-General, to Secretary, Department of Defence*, 15 November 1916, p. 10.
28. The statistics for 1914 and 1918 are taken from ABS, Catalogue 1301.0, *Year Book Australia, No. 13*, 1920, p. 1001.
29. Commonwealth Government Clothing Factory, *Report for Year Ended 30th June, 1915*, Commonwealth Parliamentary Paper No. 313/1914-17, p. 3.
30. Gorget patches are insignia fastened onto the collar of the uniforms of senior military personnel. The patches are made of cloth and are adorned with silk gimp (cord) or embroidered with leaf trails.
31. NAA: A1952/2, 474/9/71, *Commonwealth Government Factories Reports for the Year Ended 30th June 1918*, section headed *Summary of Finished Product Manufactured in the Factory for the Year Ending 30th June, 1918*.
32. NAA: A1952/2, 474/9/71, *Commonwealth Government Factories Reports for Year Ended 30th June, 1918*, Report by H.A. Slade to Secretary, Department of Defence, 18 November 1918, p. 4; *Statement of Accounts for Period Ended 30th June, 1918*, p. 9.
33. Out of £8936 19s. 8d. worth of postal uniforms only £253 17s. 9d. was produced elsewhere. Similarly, of £417 1s. 5d. worth of railway uniforms, £52 6s. 8d. came from non-Clothing Factory sources. It is not clear whether perhaps the New South Wales State clothing factory was still in production and had manufactured these items.

34. For example, Sir John Allison, Chairman of the Defence Business Board in the early 1960s and L. Brewster, Federal President of the Australian Clothing Manufacturers' Council and Clothing Adviser to the Minister of Supply, authors of the Allison-Brewster Report of 1964, were strongly in favour not only of retaining the Government Clothing Factory, but also of building a new factory to replace the outdated one in South Melbourne. NAA: A4940/1, C3567, *Report from Sir John Alison and Mr. L. Brewster on Commonwealth Government Clothing Factory Requested in Letter from Minister for Supply Dated 13th January, 1964*, p. 9.
35. The Commonwealth Government Clothing Factory was to manufacture the uniforms for the Department of Defence, Navy (at the time a separate Department), the Postmaster-General, Railways and miscellaneous garments for some other departments such as protective garments worn in the Munitions Factory and the Small Arms Factory.
36. 'Slop clothing' refers to ready-to-wear or 'off the rack' clothing. It is not individually tailor-made, is of lower quality and does not involve time consuming hand sewing techniques.
37. ABS, Catalogue 1301.0, *Year Book Australia*, issues 1909 and 1913 respectively.
38. Cutters' wages were much higher than those of pressers, but unfortunately are not itemised in the Clothing Factory's Annual Report. NAA: MP392/10, 589/502/56, *Munitions Supply Board Annual Report, 1923*.
39. NAA: MP392/10, 589/502/56, *Munitions Supply Board Annual Report, 1923*.
40. In addition, the tariff system with its import restrictions and high rates of duties upon textile and clothing imports provided extra protection for the local industry and was gradually removed only in the last decades of the twentieth century.
41. The contracts published in the Commonwealth of Australia Gazette can be viewed in microfilm format at the National Library of Australia in Canberra and selected other libraries.
42. NAA: A816, 14/301/496, C.K. Davies (Chairman), *Interim Report of the Working Party Set Up by the Defence Supply Committee to Investigate Commonwealth Government Clothing Factory Operations* (10 May 1951), p. 8.



## CHAPTER 4

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# The Clothing and Woollen Cloth Factories Following the First World War

### PRODUCTION OF CLOTH AT THE WOOLLEN CLOTH FACTORY

The Woollen Cloth Factory supplied the fabric for the uniforms as well as woollen blankets for the military until approximately the mid-1920s, when it was sold. This factory formed part of the government-owned supply chain. But it was more than that: it also produced and sold woollen products to the private sector and did therefore not entirely fit the Schumpeterian idea of a state-run monopoly with only government clients. The Factory was, however, a crucial player in the military uniform industry and is therefore worth some investigation. The Woollen Cloth Factory had been built in North Geelong on 13 acres transferred free of charge to the Commonwealth. The Factory boasted plant and equipment imported from the United Kingdom and commenced operations on 23 September 1915. It consisted of a wool scouring, carding and dyeing plant as well as yarn spinning and weaving operations. The Factory produced good-quality yarn and knitting wool as well as woollen cloth of a variety of types required by the Clothing Factory for the making of uniforms. Fine suiting material was also supplied to the private sector, such as bespoke tailors. Included in the range needed by the Clothing Factory were khaki woollen cloth, drab mixture serge, woollen waterproof coating material, Bedford cord and whipcord, blankets and rugs. During the war

**Table 4.1** Production at the Woollen Cloth Factory, Geelong, in £

<i>Year</i>	<i>Cloth</i>	<i>Yarn &amp; knitting wool</i>	<i>Dyeing, milling, shrinking</i>	<i>By-products</i>	<i>Total</i>
1915–1916	41,279	3528	106	140	45,053
1916–1917	149,000	77	274	429	149,780
1917–1918	141,932	567	2147	628	145,275
1918–1919	168,258	4594	212	955	174,019
Total	500,469	8766	2739	2152	514,127

Source: NAA: MP956/2/0, 14, ‘Jensen Papers’, *Defence Production in Australia, Chapter5—The War of 1914–1918, The Government Factories and Establishments*, p. 175

the Woollen Cloth Factory also supplied ‘scribbling’ wool to Red Cross volunteers.<sup>1</sup> The value of total product manufactured at the Woollen Cloth Factory from its beginnings in 1915–1917/18 reached £340,108 as is shown in Table 4.1, rising from £45,053 to £145,275 per annum. But production was boosted still further to £168,258 in 1918 as there was an increased demand for civilian suiting material.

The Cloth Factory was able to produce fabrics cheaper than the private mills. For example, khaki cloth, 18 oz., was produced at 5s.2d. at the Factory, but cost an average of 6s.0d. at commercial mills. Similarly, khaki waterproof cloth, 25 oz., was produced at 6s.5d. at the Factory, but cost 7s.2d. at commercial mills.<sup>2</sup> Not only was the cloth cheaper, but it was also of the best quality and, according to a statement from one of Melbourne’s tailors, its quality could easily compete with the best imported cloth:

... no mills to our knowledge have as yet produced a cloth that could in any way approach the quality and finish of the khaki material which has been manufactured by the Commonwealth mills at Geelong... We have closely watched this fabric both in regard to shrinking, and also manipulation during the various phases of manufacture, and we believe it quite equal to the best imported article...<sup>3</sup>

The Royal Commission on Navy and Defence Administration also confirmed the high quality of cloth produced by the Woollen Cloth Factory when it stated in March 1918 that

... we consider that the product of the factory is superior in many respects to the goods supplied to the Defence Department by outside contractors.<sup>4</sup>

These comments indicate that the Woollen Cloth Factory was not only competing with the best imported cloth, it also competed against smaller local woollen mills—and in both cases its cloth was considered superior. This is understandable, given that the Geelong factory was new and that it therefore incorporated the latest available technology. What is of significance in this context is the fact that it was a government-owned operation in direct competition with the private sector and this may have been one factor in the government's decision to reverse its earlier policy of owning a defence-related business. The government sold the Cloth Factory into private hands for £155,000 on 14 June 1923, despite (or perhaps because of) its successes.<sup>5</sup> However, prior to this, Jensen took it upon himself to advertise the quality of the Factory's cloth during his July 1918 trip to Britain:

... I developed an idea of advertising Australian-made woollen piece-goods and requested the Manager of the Woollen Mills to provide me with a suit length of the blue cloth being manufactured for the Australian Engineer Corps clothing. This I had made up into a suit of clothes for myself by a Collins Street tailor at cost of £4.4.0, for the time a high charge for making only. In London later I had occasion for some more tailoring—in a shop opposite Australia House—and the cutter was astounded when I told him that my own suiting, which he had been admiring, cost only seven shillings a yard made in Australia; he thought it would be about 25/- a yard retail...<sup>6</sup>

And so, by the end of the First World War, when the troops were expected to come home, the Government Clothing Factory in South Melbourne and the military depots were overstocked with military garments, the Clothing Factory was facing overcapacity of production and having to reduce its workforce, while the Woollen Cloth Factory in Geelong was already reducing the volume of production for cloth that had no equal in the world.

### SURPLUS CLOTH AND BLANKETS

When the remnants of the Australian Imperial Force (AIF) returned to Australian shores from the end of 1918, they faced the practicalities of a civilian life. As they had been volunteers, they had no further career in the Services and for the first time in a long while, they were required to wear civilian clothes. For some, finding a job was easy as their previous employers

had kept their positions open—and this was also the case in the Clothing Factory, where a number of men returned to their old positions. Others, however, found there was no employment for them or that they were unable to work due to physical and/or emotional stresses. As a result, many soon found themselves destitute. These developments led to a rise in voluntary social and welfare activities across the nation. The government established a Demobilisation and Repatriation Department at its Headquarters in London to coordinate several initiatives to help the men get back on their feet in civilian life. Many of the men remained in the United Kingdom for some time after the war, one reason being that ships were not immediately available to transport them all back to Australia. Along with other industries, the Australian textile industry had suffered from a lack of manpower during the war and the outlook remained grim in the years thereafter due to the loss or injury of men and a subsequent shortage of technical skills in the factories. It was therefore decided to utilise the ‘waiting time’ of the AIF in the United Kingdom and provide technical training for those interested in wool textile and wool manufacture, skills that could be applied, or so it was argued, when they returned home. Time was not wasted and in January 1919, Major W.L. Marfell at IDS Textiles & Wool reported:

Technical Colleges and Factories have been approached in the Wool Manufacturing areas, (Bradford, Leeds, Halifax) and we now have arrangements made for placing a considerable number of men in these localities. The Technical Colleges at both Halifax and Bradford have made liberal concessions for training of men in the A.I.F.<sup>7</sup>

Attached to the Major’s report was a list showing the names of 25 men from across a range of military units and various ranks to attend the Wool and Scouring course at Halifax Textile Technical College.<sup>8</sup> Whether or not the scheme was successful is a matter of some debate. It appears that some of the skills acquired in English colleges and factories were not always applicable or useful to situations in Australian factories and that the scheme had been a waste of time for some of its participants. In Australia, similar training was conducted. Jensen, for example, mentions the Returned Soldiers’ Hand Loom Weaving School, using yarn to the value of £1381 supplied by the Woollen Cloth Factory.<sup>9</sup> The Factory also supplied knitting wool worth £3212 to the Central Red Cross Society.<sup>10</sup>

Meanwhile, at the Woollen Cloth Factory the oversupply of cloth needed to be resolved, but it was also important to keep production lines

operating so as to retain as many employees as possible. It was at this time that the Factory started to distribute surplus khaki cloth to various state government departments at a low cost to be used for the benefit of those in necessitous circumstances. No further detail has emerged at this point, but this trade was very successful and of benefit not only to those in need, but also to the Cloth Factory which found that ‘this trade increases continually in volume every year’.<sup>11</sup> The Factory also set about producing quantities of high-quality wool tweed required by the Defence Department to have civilian suits made up for returned servicemen. As one of the reports of the Royal Commission on Navy and Defence Administration had commented, the Woollen Cloth Factory

... produces a pure wool cloth at a cost which enables the Defence Department to provide returned soldiers with a ready-to-wear civilian suit at the same price as was previously paid for a similar suit made from cotton and shoddy imported cloth.<sup>12</sup>

Whereas the Woollen Cloth Factory’s total value of production over the period 1915–1919 had amounted to £514,127, in the following four-year period of 1919–1923 the value of production rose to £650,186.<sup>13</sup> Once again, everyone was a winner: the Factory’s mills continued to operate, albeit not at full capacity; the Defence Department was able to fulfil its commitments to the ex-servicemen; and the returning soldiers, in turn, were now in possession of a high-quality suit, some of them for the very first time in their lives.

The civilian suits were made up by the Clothing Factory as well as the private trade and the demand for skilled workers in this latter sector rose accordingly. As many of the tailors had been in the war themselves and some had not returned, the shortage of workers, coupled with the sudden high demand for suits, created a bottleneck. A similar situation arose at the end of the Second World War and resulted in the Department of Supply and Shipping sending out calls to skilled women workers to join the men’s clothing trade to make civilian suits for returned soldiers, as is shown in Fig. 4.1.

Once the orders from the Defence Department for civilian suits to ex-servicemen were filled, the Returned Soldiers & Sailors Imperial League of Australia (R.S. & S.I. League), which had incorporated a trading arm named the Returned Soldiers Trading Co-operative Company, took it upon itself to continue to provide wool tweed to those in need. In 1921 the League entered into a contract with the Woollen Cloth Factory for

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**Fig. 4.1** Civvies for the boys! Source: NAA: B1552, 952, supply and shipping campaigns (including Clothing Factory labour)—correspondence. Reproduced with permission from the National Archives of Australia

480,000 yards of defence tweed, which was sold to the R.S. & S.I. League wholesale at 50 per cent of the current market value (but still at a profitable level for the Factory) and distributed to ex-servicemen at a higher rate, thereby leading to a substantial profit to the R.S. & S.I. League in every state.<sup>14</sup> The quantities sold to the R.S. & S.I. League were not inconsiderable. A schedule of debtors, produced by the Woollen Cloth Factory as at 4 June 1923, shows that the R.S. & S. I. League had purchased cloth to the value of £16,693 11s.6d., which represented almost half of the total amount sold by the Factory.<sup>15</sup>

### SOLVING THE PROBLEM OF SURPLUS MILITARY CLOTHING

Following the end of the First World War, surplus military clothing had lain in the Clothing Factory and in Ordnance stores across Australia for some time while very little activity was taking place in the production of new military clothing. On top of this, part-worn and unserviceable military clothing that had been returned during and shortly after the war had added to the stockpiles. It was not long before retail outlets were established at the Factory and the depots for the sale of surplus clothing. In the period from the end of the war until 30 June 1922 total sales had realised £932,838, with the greatest amount contributed by the Retail Depot of the Clothing Factory in Melbourne. From August 1921, the newly established Munitions Supply Board (constituted on 13 August 1921 following the recommendations of the Royal Commission on Navy and Defence Administration) took matters in hand to further reduce the stockpiles. Control of the sales was given to the Contract and Supply Board and it was reported that between 1 August 1921 and 30 June 1922 alone, sales from retail depots and by private treaty reached £206,778. Aside from selling its own stockpiles, the Clothing Factory obtained goods from depots in other states where there would have been low demand for some items and sold everything at profitable rates. Sales during the period between 1 August 1921 and 30 June 1922 reached £114,370 (or 55 per cent of the total surplus sales).<sup>16</sup> And during the financial year of 1921/22 the Factory made a profit of £8059.<sup>17</sup>

It was an opportune time to bring surplus stores to the market. Following the end of the First World War, the Australian economy was sluggish, but when the stock market crashed in 1929, resulting in a serious economic stagnation highlighted by high levels of unemployment, many Australian families found themselves in desperate need of clothing, bedding, blankets

and other items. As with the supply of civilian suits to returned servicemen, this need did not go unnoticed to the Returned Soldiers & Sailors Imperial League. Its trading arm, the Returned Soldiers Trading Co-operative Company, secured the entire stocks of some lines of goods from the surplus stores. In the closing months of 1921/22 alone, this included 416 greatcoats and approximately 1200 blankets.<sup>18</sup>

The Department for Home Affairs (later the Department of the Interior), in collaboration with the state governments, was charged to provide relief to the unemployed, many of whom were in urgent need of warm clothing. Greatcoats, jackets, breeches as well as hats, leggings, puttees and boots were in great demand. The stockpiles of part-worn and unserviceable clothing were the first to be used. Orders for particular items of clothing in the quantities required were addressed to the Minister for Home Affairs, who would pass the request on to the Minister for Defence and it would then travel down the hierarchy to the Chief Ordnance Officers of the various military districts. The clothing was then packed in boxes from the various military stores and freighted to where they were needed. It was decided that greatcoats should be re-dyed at a cost to the Department for Home Affairs, which also paid for freight costs.<sup>19</sup> One of the first clothing orders came from Ben Chifley, Minister for Defence, barely six weeks into his term, in a letter to Arthur Blakeley, Minister for Home Affairs. The letter contained a request for 30 jackets, 50 breeches, 50 greatcoats and 70 additional greatcoats unfit for dyeing.<sup>20</sup> In the 30 months between 1 January 1932 and 30 June 1934, state governments received 17,437 boots, 13,295 breeches, 8747 greatcoats, 13,013 hats, 17,685 jackets, 3208 trousers and other items. In addition, charitable institutions were provided with 2022 boots, 1728 breeches, 2064 hats, 2931 jackets and other items.<sup>21</sup> Other items from the stores, such as woollen blankets, beds, mattresses and a wide range of other items, were made available. The activities continued to at least 1935 and cleaned up the ordnance stores of unwanted items.<sup>22</sup> By then, developments in Europe and East Asia had begun to cause political unease in Australia and elsewhere and it was felt that it would be advisable to rebuild Australia's military supplies, including military clothing. It would spell another period of high activity for the Government Clothing Factory, but by 1923 the Woollen Cloth Factory had already been privatised and cloth for military uniforms, including cotton for use in tropical areas, was purchased from the private trade.<sup>23</sup>

By establishing the Commonwealth (later Australian) Clothing Factory in 1912 and the Woollen Cloth Factory in 1915, Senator Pearce, the then Minister of State for Defence, added two enterprises to a small collection of Australian defence industries. Both were intended to supply the Australian Army. After the First World War, however, the Woollen Cloth Factory saw very little demand for cloth from the Department of Defence and instead began to compete with private enterprise. It produced very high-quality materials, as Jensen, Secretary of the Munitions Supply Board, was quick to point out during his trip to Britain in July 1918. As there was a need to provide warm clothing, blankets and other goods to needy civilians, both the Woollen Cloth Factory and the Clothing Factory sold their surplus goods and so were able not only to make a profit but also to improve their balance sheets. With the decrease in the military demand for woollen cloth, however, the fulfilment of social welfare needs as well as the presence of privately owned woollen mills able to adequately supply the woollen fabrics placed the Nationalist/Country Party Coalition (elected on 9 February 1923) in a difficult philosophical position. Australia was self-sufficient in the provision of woollen cloth for military purposes without the operations of the government-owned mill and its operations were no longer in line with the principles of public enterprise adhered to previously. In 1923 the government sold the Factory to a private consortium. The Clothing Factory, on the other hand, continued to exclusively fulfill the needs of government and after the First World War, when the demand for military uniforms had fallen, its business was largely redirected to other areas, such as the supply of postal and other uniforms. Instead of competing with the private sector, the Clothing Factory sub-contracted some of its business to private clothing firms during periods of high demand and thereby passed on a portion of the increase in business to benefit private industry.

## NOTES

1. "Scribbling" wool is raw wool that has undergone the first carding process. It consists of shorter wool fibres lying in different directions, making them suitable for soft wool knits. This contrasts with the worsted yarns made of fine, long wool fibres lying parallel to each other, drawn out into tops which form the basis for spinning high quality suiting material.

2. NAA: MP956/2/0, 14, 'Jensen Papers', *Defence Production in Australia, Chapter 5—The War of 1914–1918, The Government Factories and Establishments*, p. 175.
3. NAA: MP956/2/0, 14, 'Jensen Papers', *Defence Production in Australia, Chapter 5—The War of 1914–1918, The Government Factories and Establishments*, p. 176.
4. Royal Commission on Navy and Defence Administration, *Fourth Progress Report*, Melbourne, 13 March 1918, p. 5.
5. NAA: MP392/10, 473/509/24, *Correspondence Relating to the Sale of the Woollen Cloth Factory, Geelong, Gazette No. 40*, 14 June 1924.
6. NAA: MP956/2/0, 14, 'Jensen Papers', *Defence Production in Australia, Chapter 5—The War of 1914–1918, The Government Factories and Establishments*, p. 176.
7. AWM25, 303/31, [Education and non-military Employment] Reports with Regard to the Posting of Men at Technical Colleges and Factories in Instruction in Wool Textile Manufacture, also Report on a Trip to Bradford together with Recommendations (January–May 1919), *Letter from Major W.L. Marfell, IDS Textiles & Wool, to Lt. R.J. Bunchell, Industrial Development Sub-Branch, Repatriation and Demobilisation Department A.I.F.*, 8 January 1919.
8. AWM25, 303/31, [Education and non-military Employment] Reports with Regard to the Posting of Men at Technical Colleges and Factories in Instruction in Wool Textile Manufacture, also Report on a Trip to Bradford together with Recommendations (January–May 1919), *Letter from Major W.L. Marfell, IDS Textiles & Wool, to Lt. R.J. Bunchell, Industrial Development Sub-Branch, Repatriation and Demobilisation Department A.I.F.*, 8 January 1919.
9. NAA: MP956/2/0, 14, 'Jensen Papers', *Defence Production in Australia, Chapter 5—The War of 1914–1918, The Government Factories and Establishments*, p. 175. Jensen does not elaborate on the Hand Loom Weaving School; it appears to have been established either by the Department of Repatriation or the Returned Soldiers Welfare League.
10. NAA: MP956/2/0, 14, 'Jensen Papers', *Defence Production in Australia, Chapter 5—The War of 1914–1918, The Government Factories and Establishments*, p. 175.
11. NAA: A1952/2, 474/14/68, Woollen Cloth Factory North Geelong Accounts, *Letter from James Robertson, Manager of the Woollen Cloth Factory, to the Secretary, Board of Factory Administration*, 3 February 1921.
12. Royal Commission on Navy and Defence Administration, *Fourth Progress Report*, Melbourne, 13 March 1918, p. 5.

13. NAA: MP392/10, 589/502/56, Munitions Supply Board Annual Reports, *First Report of the Munitions Supply Board*, 9 August 1923, p. 12.
14. NAA: A1952/2, 474/14/68, Woollen Cloth Factory North Geelong Accounts, *Letter from James Robertson, Manager of the Woollen Cloth Factory, to the Secretary, Board of Factory Administration*, 3 February 1921.
15. NAA: MP392/10. 473/509/6, 'Australcrag'—Commonwealth Woollen Factory Transactions, *Woollen Cloth Factory, Schedule of Creditors and Debtors as at 4 June, 1923*.
16. NAA: MP392/10, 589/502/56, Munitions Supply Board Annual Reports, *First Report of the Munitions Supply Board*, 9 August 1923, p. 10.
17. NAA: MP392/11, 764/501/40, Activities of Establishments from Inauguration of Munitions Supply Board 1920/21, *Appendix—Commonwealth Government Clothing Factory—Activities During Munitions Supply Board Control*, p. 1.
18. NAA: MP392/10, 589/502/56, Munitions Supply Board Annual Reports, *First Report of the Munitions Supply Board*, 9 August 1923, p. 10.
19. The cost of dyeing was approximately 1/- for a greatcoat and 6½d. for a jacket, depending on the quantities, as is shown in NAA: A1, 1937/2660, *Supply of Military Clothing from Defence Department for those in Necessitous Circumstances*, Letter from L.H. Story, Chief Ordnance Officer, 2nd District Base, to the Secretary, Department of the Interior, 8 February 1935.
20. NAA: A1, 1937/2660, *Supply of Military Clothing from Defence Department for those in Necessitous Circumstances*, Letter from J.B. Chifley to Arthur Blakeley, 21 April 1931.
21. NAA: A1, 1937/2660, *Supply of Military Clothing from Defence Department for those in Necessitous Circumstances*, Response by the Minister for Defence to a Question Upon Notice by the Hon. Jennings, Member for South Sydney, in Parliament (no date given).
22. The departmental correspondence in this file reaches well into 1935. NAA: A1, 1937/2660, *Supply of Military Clothing from Defence Department for those in Necessitous Circumstances*.
23. The Woollen Cloth Factory was sold for £155,000 to Federal Woollen Mills Pty. Ltd., a syndicate consisting of James Dyer, James Robertson, Duncan MacLellan, Julius Solomon, William Stawell, Sidney Evan Price and Robert Vincent. NAA: MP392/10, 473/509/24, *Sale of Geelong [Government] Woollen Cloth Factory—File 1, Correspondence Relating to the Sale of the Woollen Cloth Factory, Geelong, Gazette No. 40, 14 June, 1923*.



## The Clothing Factory During the 1930s and the Second World War

Whereas the Clothing Factory had been in full swing turning out military uniforms during the First World War, the end of the war signalled a turn-about. As the need for military uniforms had come to a virtual standstill, there was now an oversupply of uniforms, Ordnance Stores were overstocked and the production of non-Service uniforms came to be the dominant activity of the Factory. In reality, these non-Service items underpinned the very survival of the Clothing Factory during the next two decades. A return of orders for the year 1931/32, prepared by D. McDonald, at that time Manager of the Factory, shows orders to the value of £24,898 by Commonwealth Departments other than Defence (these would include the Postmaster-General's Department, one of the Factory's major customers) and orders by several State bodies such as the Victorian Railways (£6136), the Melbourne and Metropolitan Tramways Board (£5392) and the 'Hospital for Insane' (£1340). The range of Victorian State customers was quite varied and also included the Boy Scouts Association, Ballarat & Bendigo Tramway Board, St John's Ambulance, Children's Welfare Department, Aborigines Department, penal establishments, the Royal Automobile Club of Victoria, Commonwealth Oil Refineries, the Metropolitan Fire Brigade, Lost Dogs Home, Melbourne Aquarium, the Dental Centre, the Agriculture Department and the Zoological Gardens.<sup>1</sup> The fact that the Factory carried out much work for non-Defence departments was also confirmed in a 1937 statement by F.E. Corbett, who had

succeeded McDonald as Manager of the Clothing Factory on 16 January of the previous year:

The activities of the Factory have primarily been directed to the supply of the requirements of Defence Services and of other Commonwealth Departments (principally the Postmaster-General's Department) but to maintain the Factory on a basis of production to cope with its required output [*sic*] as a Defence unit in national emergency orders from State Government Departments, principally from the Victorian Railways and Melb. & Metro. Tramways Board, have been accepted from time to time. Such contracts are on a profitable basis and tend to reduce costs to the Defence Department.<sup>2</sup>

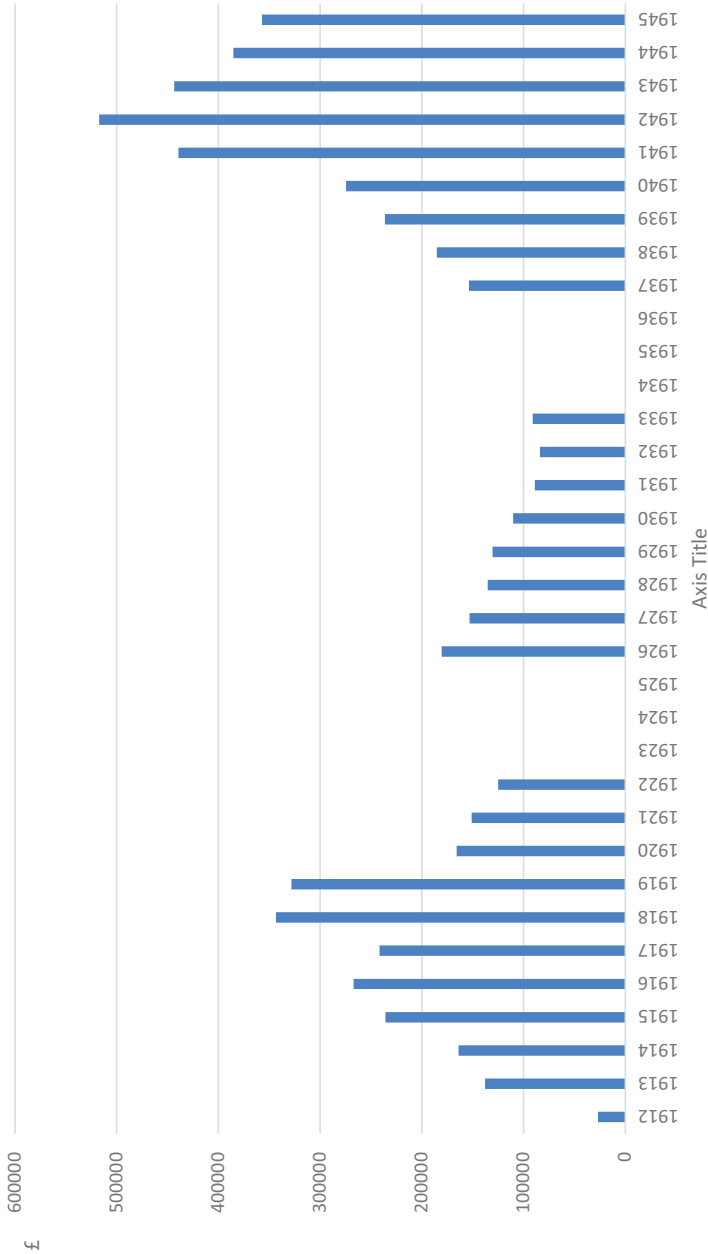
The ink on this statement was hardly dry when it became clear that another war was looming on the horizon. In the following years, preparations were underway to mobilise the Australian forces and an increased demand for Army uniforms was directed at the Clothing Factory. Documents uncovered to date, however, have not provided any information concerning changes in methods of manufacturing or the introduction of new technology as a result of the increased volume of uniform clothing within the Factory, but it is clear that employment increased significantly in the first three years of the Second World War, from 484 in 1939 to a peak of 883 in 1942.<sup>3</sup> The value of Factory production increased from a low of £185,196 in 1937/38 to a peak of £517,230 in 1941/42.<sup>4</sup> This year also reached a peak in the amount of profits, namely £106,898, which could indicate that there was still a large amount of non-Service turnover from contracts based on profits, mentioned by Corbett above. The Factory was retaining the profitable commissions as well as adding large volumes of military uniforms to its production, which by now had undergone further design changes and also had the addition of new lines of cotton uniforms for use in tropical areas. New wartime demands were putting enormous pressures upon the Factory, necessitating increases in employment. In addition, during the 1930s new technologies in science resulted in a closer collaboration between the Clothing Factory and scientific and commercial organisations. New developments in camouflage, dyes and textiles led to new designs and the Australian Army, Navy and Air Force were to be fitted out in brand-new uniforms from the late 1930s. The demand had risen dramatically, and the delivery of the garments was marked 'urgent', providing increased opportunities for employment.

By the early 1930s the equipment that had been installed at the Clothing Factory at establishment was twenty years old, some of it was

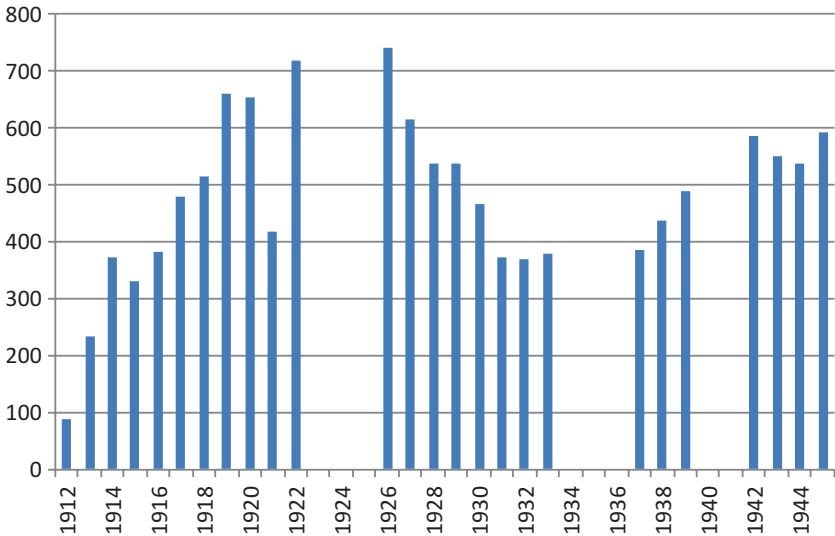
worn and some of the technology was outdated. It was time for a major capital investment. This was especially pressing when in 1931 a new design for uniforms for the volunteer Militia Forces was introduced, resulting in a large military order for clothing.<sup>5</sup> During 1932–1933 the machine rooms were rearranged to improve efficiency and a policy for the replacement of machines that had been installed during the First World War was put in place. The electricity supply was changed from a single-phase to a three-phase, which necessitated the rewiring of the machine rooms and the opportunity was taken to install modern lighting systems.<sup>6</sup> McDonald reported an increase in output, improved methods of production which resulted both in a higher quality and in lower prices of the garments.<sup>7</sup> The total capital investment that year amounted to £37,825.<sup>8</sup> This was, for the period, a substantial amount of money and it is to be expected that such an investment was aimed at increasing the productivity of the Factory's employees. Figure 5.1 shows the Factory's value of production between 1912 and 1945. The data are based on the sales prices shown in the Factory's Annual Reports, with some gaps where documents were missing from among the archive material. It will not be surprising to note that the value of production during periods of high demand (the First and Second World Wars) show significant peaks in the graph.

In Fig. 5.2, the production values are divided by the number of employees working in the Factory at that time. This is a rather crude measurement of production per employee. For one thing, we do not know the number of hours worked to achieve output and, for another, some employees (notably administrative staff) were non-productive in a manufacturing sense and should be taken out of the equation. We do know that the number of administrative staff in the Factory's office was very small and it would therefore be safe to assume that their impact on the figures is negligible. Significantly, the trend lines of the Factory's total value of production (Fig. 5.1) and the value of production per employee (Fig. 5.2) are quite different. Figure 5.2 shows a peak in value of production during the 1920s (allowing for missing data) when employee numbers were down, as was shown in Table 3.2. One could surmise that the Factory's management was driving the employees to work faster, but it is more likely that the price of the goods produced was much higher. During this post-war period the Factory was switching back to produce civil uniforms, which may have been sold at higher prices. It was also the precise period when the Factory was selling surplus Army uniforms and producing civilian suits for returned Army personnel, at a profit.

Figure 5.2 is remarkable in more than one respect. Firstly, the investment of 1932–1933 had little or no impact on productivity during the



**Fig. 5.1** Australian Government Clothing Factory—Value of production, 1912–1945. Sources: NAA documents: MP392/11,764/501/40; MP891/17, 1; MP392/10, 589/502/69; MP392/10,589/502/76A; MP392/10,589/502/123; MP392/10, 589/502/56; A12930, 1210; Davies Report 1951; Allison-Brewster Report 1964; Statement by Mr. Bott, Minutes of Evidence, 1969; Senate Select Committee, 1982, AGCF brochure, ABS, various issues of *Year Book Australia*, Cat. 1301.0

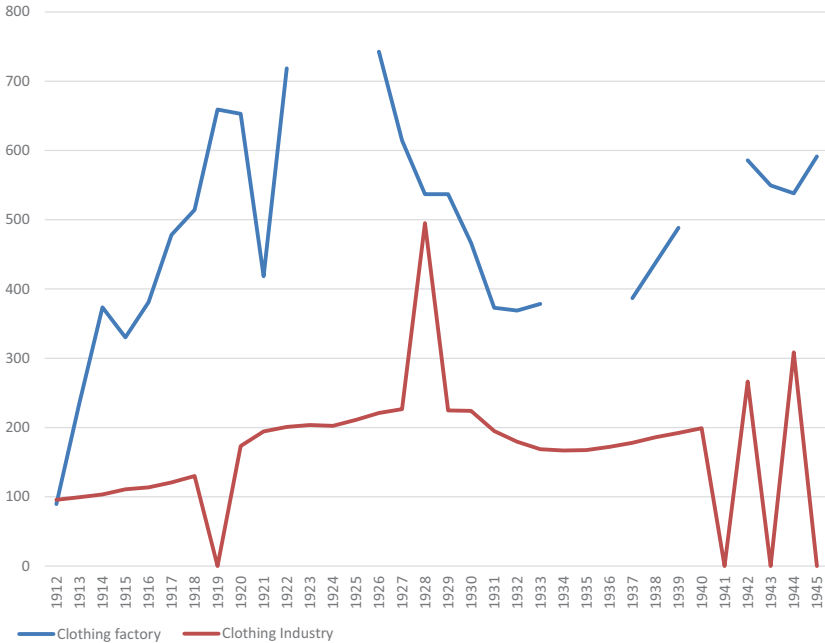


**Fig. 5.2** Australian Government Clothing Factory—Value of production per employee, 1912–1945. Sources: NAA documents: MP392/11,764/501/40; MP891/17, 1; MP392/10, 589/502/69; MP392/10,589/502/76A; MP392/10,589/502/123; MP392/10, 589/502/56; A12930, 1210; Davies Report 1951; Allison-Brewster Report 1964; Statement by Mr. Bott, Minutes of Evidence, 1969; Senate Select Committee, 1982, AGCF brochure, ABS, various issues of *Year Book Australia*, Cat. 1301.0

next two years and probably until 1937, when the trend only moves marginally upwards. Productivity leapt up only after 1937 when preparations for another war were made. Secondly, productivity had been much higher before this investment and reorganisation were put into place, with peaks in 1922 and 1926—during peacetime years, rather than war years. These were also years in which the Clothing Factory concentrated on non-Service uniforms, produced, in particular, for the Postmaster-General's Department. One possible explanation for the lack of productivity increase immediately after 1932–1933 may be the introduction of a new military uniform design. This would have necessitated the application of different cutting and sewing techniques, using different materials and trimmings. Such a change would involve a period of learning and experimenting with the new techniques and of streamlining the processes for optimum efficiency and this takes time to come to fruition. Even so, productivity never

again reached the levels of the early 1920s. Another possible explanation may be found in the hours worked. As mentioned earlier, the effect of hours worked in the Clothing Factory is not incorporated in the tabulation and it is quite possible that formal regulations of conditions in the industry have contributed to a reduction in working hours and in productivity. This is an area for further investigation. A third possible explanation may be an increased use of subcontractors for the production of military uniforms, leaving the Clothing Factory to the production of non-Service lines only. The value of uniform production by private firms is not included in the Annual Reports of the Clothing Factory. However, the Australian Bureau of Statistics segments on the activities of the Clothing Factory between 1934 and 1939 repeatedly state that the Clothing Factory 'has been able to supply the whole of the uniform clothing [and head gear] required for the Defence forces and the Postmaster-General's Department'.<sup>9</sup> This being the case (and assuming that the official statements are correct), the stagnant productivity level at the Clothing Factory cannot be blamed on subcontractors taking away part of the Factory's manufacturing activity. The situation changed, however, in the early years of the Second World War. On 15 April 1941, the Department of Defence produced a six-page list of clothing contracts for the Departments of the Army and Air, held with private firms in Melbourne alone.<sup>10</sup> By then, however, productivity levels at the Factory were also increasing as production of military clothing was in full swing.

The Clothing Factory's performance in employee production can only be fully appreciated when it is compared with the performance of the clothing industry as a whole. This will show whether the Factory was a model citizen in the industry or whether it operated in much the same way as the private clothing industry or lagged behind. A comparison with the private sector on value produced per employee is shown in Fig. 5.3.<sup>11</sup> The value is expressed as the wholesale selling value at the factory. Here a very interesting result is shown: the value of production per employee in the Clothing Factory far exceeds that of the workers in the Australian clothing industry as a whole. This outcome may have several explanations. The private firms operated within a competitive market which would temper prices, whereas the Clothing Factory operated as a monopoly in a specialised field and was able to set its own prices. The private firms produced different clothing lines, such as men's suits, ladies' wear, sleepwear and children's clothing, which are made of a variety of materials with a range of costs. The uniforms produced by the Clothing Factory, on the



**Fig. 5.3** Comparison of the Clothing Factory and the Private Clothing Industry—value of production per employee. Sources: Clothing Factory data: NAA documents: MP392/11,764/501/40; MP891/17, 1; MP392/10, 589/502/69; MP392/10,589/502/76A; MP392/10,589/502/123; MP392/10, 589/502/56; A12930, 1210; Davies Report 1951; Allison-Brewster Report 1964; Statement by Mr. Bott, Minutes of Evidence, 1969; Senate Select Committee, 1982, AGCF brochure, ABS, various issues of *Year Book Australia*, Cat. 1301.0. Clothing industry data: ABS, Cat. 1301.0, *Year Book, Australia*, Issues No. 4, 1914 to No. 39, 1953. Some data are missing in the Year Books (indicated by blanks in the graph)

other hand, were all made of the highest-quality materials, resulting in high value production. However, the argument that the Clothing Factory benefited from economies of scale due to the production of a single line can only be partially maintained, as the production runs for each type of uniform item tended to be short. Furthermore, the Clothing Factory had invested heavily in equipment with the latest technology and less downtime due to breakdowns, which would have contributed to the higher value of production per employee evident in the chart.

The Clothing Factory commenced only in July 1912 with three hundred employees, but even then the value of production per employee over the next six months was almost equal to that of the private sector in the entire year. In 1914 the Clothing Factory's performance was almost four times that of the clothing industry. The standard Service uniforms and other garments are fairly basic items, well-made but not incorporating any intricate design features or expensive materials, yet the total production values were much higher than those achieved in the manufacture of the much more expensive gentlemen's suits and ladies' dresses and other outfits for private consumption. The outlay for a military uniform consisting of a Service Dress Jacket of 14oz., a Working Dress Jumper, flannel shirt, Service Dress Trousers of 14oz., a Field Service khaki Cap, a pair of woolen socks and a pair of A.B. universal boots would cost a soldier £3 1s.8d. if he had to replace these items between times of free issue, as shown on a price list of 24 May 1940.<sup>12</sup> In contrast to these rates, discharged soldiers who were 'in necessitous circumstances' were given a grant of £6 6s. for a suit and £1 for a hat, making a total of £7 6s.—more than twice the cost of a military uniform and the men still had to find a shirt, socks and shoes for their civilian suits.<sup>13</sup>

The graph shows other intriguing contrasts in the performances of both players: in 1921 the Clothing Factory's workers took a dip in production value whereas the clothing industry as a whole continued on its path and in 1928—just prior to the Depression—the clothing industry showed a sudden unexplained increase while the Clothing Factory continued to slide down.<sup>14</sup> The graph indicates that the Clothing Factory's performance increased as demand for uniforms went up prior to and during the First and Second World Wars, but the highest level of performance was in fact reached during the 1920s when the Factory concentrated on non-Service uniforms. Quite possibly, then, the latter are a more profitable undertaking for the Clothing Factory. This would, at least partly, explain the decision to outsource the military uniforms to private firms, a practice which became even more prominent during the Second World War.

The outsourcing of military uniforms was furthermore driven by the urgent need to clothe the Army, Navy and Air Force as quickly as possible at the outbreak of war. That this required a major intensification of the effort to manufacture uniforms may be illustrated by the Assistant Director of Ordnance Services' (ADOS) estimate for the number of garments required to cover the 17 months to 30 June 1941, as shown in Table 5.1.

**Table 5.1** Estimated number of military garments required for the period 9 February 1940–1930 June 1941

<i>Item</i>	<i>Total required</i>	<i>In reserve stock</i>	<i>To be ordered</i>
Caps, F.S.	600,455	190,000	410,455
Hats, working	263,094	90,000	173,094
Breeches	85,442	20,000	65,442
Greatcoats	353,010	90,000	263,010
Jackets, 13/4 and 18oz.	631,358	190,000	441,358
Jumpers, K.W.D.	646,753	190,000	456,753
Trousers, 13/14 and 18oz.	604,343	170,000	434,343
Trousers, K.W.D.	645,221	190,000	455,221
Gaiters	463,597	190,000	273,597
Shirts, flannel	595,851	220,000	375,851
Shirts, khaki	579,829	190,000	389,829
Shorts, khaki	557,462	190,000	367,462

Source: NAA: B6681, 106/1940, *Military Board Agendum—Supply of Clothing Materials and Trimmings for the Manufacture of Military Uniforms, Appendix “A”*

K.W.D. = Khaki Working Dress

These are not insignificant quantities and would require the full-scale deployment of the clothing industry and the Government Clothing Factory. The demand for uniforms also impacted on the wider textile industry (woollen cloth manufacturers, cotton fabric suppliers and suppliers of accessories and trimmings). To produce the items shown in the estimate, the military needed to purchase vast amounts of fabric, as shown in Table 5.2. The production of these fabrics was to be completed by 31 December 1940, prior to the commencement of production of the garments.

Local woollen and cotton mills produced the bulk of these fabrics and it will be appreciated that those mills contracted by the Contracts Board were operating at full capacity to fulfil orders and had to postpone (or were ordered to postpone by the government’s wartime powers) the production of goods for private consumption. In turn, this depleted the stocks of fabrics available for the civil population. At the same time as the military requirements were estimated by DADOS, *The Herald* reported that Sir Frederick Stewart, then Minister for Supply and Development, had made a statement to the effect that ‘virtually the complete capacity of Australian woollen and cotton textile mills... has been employed for months on production of materials for clothing for the defence services’.<sup>15</sup> The Melbourne

**Table 5.2** Fabric requirements for military garments to 30 June 1941

<i>Fabric</i>	<i>Total required</i>	<i>In stock</i>	<i>To be ordered</i>
Cloth, drab mixture, 13/14oz.	1,702,000	231,600	1,470,400
Cloth drab mixture 18oz.	438,300	58,000	380,300
Jean or shirting fabric	2,835,320	52,300	2,783,020
Drill No. 2	5,125,080	382,300	4,742,780
Drill No. 3 or Calico for pockets	1,209,200	90,500	1,118,700
Cord, 18oz.	21,000	12,000	9000
Cord 20oz.	25,700	22,000	3700
Cord 24oz.	53,200	35,000	18,200
Cloth, W.P. 25oz.	1,087,710	100,800	986,910
Flannel	819,300	130,000	689,300

Source: NAA: B6681, 106/1940, *Military Board Agendum—Supply of Clothing Materials and Trimmings for the Manufacture of Military Uniforms, Appendix “B”*

Ordnance Depot reported that in a little over one month—between 5 January and 17 February 1940—its stocks of Service Dress Jackets rose from 551 to 25,139 and stocks of Service Dress Trousers from 4690 to 21,538.<sup>16</sup>

The Australian cotton textile industry, however, was still very small and although the mills reportedly produced khaki drill at the rate of 60,000 yards per week, further supplies were secured from India with an initial order of 100,000 yards and from Japan which would supply 500,000 yards of khaki drill, shirting and other cottons.<sup>17</sup> It was apparently of no concern to the Contracts Board at that time that Japan, which had already waged war on Russia and China and was seeking to expand into Southeast Asia and was regarded as a potential threat to Australia’s security, would economically benefit from the Australian military orders.

Despite the fact that the clothing industry was producing military uniforms to capacity, it was increasingly difficult for the military to procure supplies in sufficient quantity and in the required sizes. Complaints were received about men in training camps who were still without uniforms despite having been there several weeks. *The Argus* reported that two outsize men at Ingleburn Camp had been unable to sail for Palestine because of the lack of a suitably sized uniform. One of the men had written to his commanding officer that he had been forced to live for three months in a ‘giggle suit’ (working uniform of light khaki trousers and shirt), while the other man had been unable to even procure such a suit and was training in grey slacks, military boots and hat. While visiting the

camp and hearing about their ordeal, Stewart, Minister for Supply and Development, immediately signed an order that uniforms be delivered within 48 hours.<sup>18</sup> The shortages were evident not only in the Australian Army, but the Navy and RAAF suffered equally. When there are shortages of goods, it becomes important to economise whenever possible as the Navy's Director of Victualling suggested in June 1942:

The ever increasing difficulty in procuring supplies for uniform and clothing articles and the urgent necessity of effecting the utmost economy makes it imperative that modifications in the design and construction of such articles, consistent with Service requirements, should be made whenever possible to facilitate production and effect economy.<sup>19</sup>

The idea to standardise the materials used in the manufacture of the uniforms of the Army, Navy and Air Force had already been discussed at length after F.G. Shedden, Secretary of the Department of Defence Co-Ordination, referred the Secretary of the Department of the Navy to the different weights of cloth used for greatcoats for the RAAF and the Army. The Board of Business Administration then expressed the wish to standardise all items and established a special Committee under the chairmanship of C. Massey to look into the matter and discuss options with the three Services and the Inspection Branch, the latter being responsible for overseeing design and production quality. During the discussions the RAAF insisted on it being issued with the heavier weight cloth of 30oz. for greatcoats as the aerodromes were often cold and there was the possibility they were soon flying to Canada, the USA and France in wintertime. After due consideration of all materials and trimmings used for every item of clothing, the Secretary of the Committee was able to submit the Committee's report to the Board of Business Administration on 3 June 1940. The Committee recommended that the width of the khaki cloth fabric used should change from 56 inches to 60 inches as this would be more economical and that all linings, trimmings, threads, buttons and accessories should be standardised and that the Inspection Branch was to discuss these with the Clothing Factory. The Committee furthermore recommended that the specifications for clothing should be expressed in standard terms, similar to the lines adopted by the Technical Co-ordination Committee of Great Britain. However, the Committee decided against the adoption of a common table of sizes for uniforms for the three Services at this time.<sup>20</sup> All in all, the streamlining of the material resources was a

step in the right direction. Not only did it serve to save costs, it also made the manufacturing process in the Clothing Factory and private firms and in the textile mills more efficient. The use of a common width of 60 inches for khaki cloth, for example, made it possible for the Woollen Cloth Factory in North Geelong to run larger quantities without having to reset the weaving machines for a narrower width. At the Clothing Factory and elsewhere, the cutters were able to use a more economical layout of the patterns on the cloth. The sewing processes were simplified as there was now much more similarity between the Services in the use of cloth and trimmings.

The shortages also resulted in a review of the logistics in the supply of raw materials for the production of uniforms and in the forward planning by the Service Departments. Complaints had been received from firms about the irregularity of supplies which adversely affected their production. When supplies ran out, production would slow down and when they suddenly increased, all production had to be rushed through to fill current and back orders. On several occasions in 1940 and 1941 the Board of Business Administration conferred with the Department of Supply and Development and recommended that a production plan should be adhered to, which would consist of a 6-month programme for garments, 12 months for locally manufactured materials and 18 months for imported materials. The quantities required were to be divided into monthly quotas to maintain an even production process and the Service Departments should submit their proposals regarding clothing requirements three months in advance.<sup>21</sup>

The lack of sufficient supply of uniforms was further exacerbated by the fact that there were now additional services to be provided for. One such service was the Australian Women's Army Service (AWAS), which had grown to 23,988 women by early 1946.<sup>22</sup> The AWAS requirements for garments included jackets (winter and summer), summer dresses, skirts, collars, caps, hats, overalls as well as underclothing, stockings and gloves. Outside the Armed Forces, the Australian Women's Land Army (AWLA) had been created to provide for the nation's food supply by working the land and providing other rural services. By mid-1944 their number had grown to 3054, and although relatively small in number they, too, required a set of clothing, which included overall dresses, jackets, skirts, dress shirts, collars, bib and brace overalls, working gloves and other items.<sup>23</sup> But a third service with even greater amounts of clothing requirements came into being by 1944. A fact not generally known is that the Australian

clothing industry also produced clothing items for US troops in Australia. This occurred during the last phases of the Second World War when the USAFIA (US Armed Forces in Australia), including the US Navy and the American Army Nursing Service, placed orders for a variety of clothing items. The sample patterns for these items were lodged and registered in Australia under separate identification labels to distinguish them from the Australian patterns. American Stores supplied the fabric and therefore placed no additional strain on the Australian Trust Fund Account for clothing. It was later claimed that the fabric for the US Army was superior to that used for the Australian Army, mainly because the specifications of the Australian fabric included a price limitation which resulted in a lesser quality being used.<sup>24</sup> The supply of accessories (buttons, trims, etc.) for the uniforms was arranged through the Australian Department of the Army, which was to make them available at regular Army prices on receipt of a voucher or order from the Department of Supply and Shipping or the Board of Area Management. Contractors would pay for the accessories in cash.<sup>25</sup> Scores of private firms benefited from the additional orders, but for some the extra work became too much. An example of this was the contract held by Austral Hat & Cap Factory in Sydney for 41,500 herringbone twill caps, with a weekly delivery of 1200 caps. This contract had to be transferred to Stoddarts Ltd. on 6 June 1944 by the Director of Clothing & Textiles.<sup>26</sup> The value of this contract was £2737 16s.11d. However, many other clothing firms appear to have absorbed the US orders and were keen to have their contracts extended for a further period. These included American Fashion & Gruenfeld as well as Boyce Pty. Ltd. and David Jones Ltd. (all of which had supplied slacks for the American nurses, while Gruenfeld and Boyce had also provided the nurses' safari jackets).<sup>27</sup> The Department of Supply and Shipping took particular care that only the most suitable firms with previous experience in delivering the required garments were recommended to manufacture garments for the US Forces. One of their lists shows the names of Josephson & Sons, Bishop & Woodward Pty. Ltd. (both in Queensland), K.R. Hayman and David Jones Ltd. (in New South Wales) and Supremacy Clo. Co. and J. Roberts (in Victoria). These firms were to obtain contracts to the combined value of £32,441 13s.4d. to produce a total of 136,000 herringbone twill trousers for the USAFIA by the end of 1944.<sup>28</sup> Great care was also taken by the Department to ensure that the garments were priced correctly, taking into account current wage rates. A detailed calculation of manufacturing costs, excluding the cost of fabrics as these were supplied from US sources,

resulted in the fixation of £3 4s.8d. per dozen of drill trousers for Officers of the US Navy.<sup>29</sup> Needless to say, these and other contracts for the US military were a tremendous boost to Australian uniform producers in the private sector. It made their importance vis-à-vis the publicly owned Clothing Factory a point for public discussion in the decades to come when considerations started to shift away from favouring public towards private ownership of government businesses.

The end of the First World War signalled a dramatic reduction in the manufacture of Army uniforms and there was an oversupply of finished garments. However, the records of the Australian Government Clothing Factory have shown that non-defence orders kept the Factory afloat. The diversity of clients and their requirements for uniforms allowed the Factory to switch from defence to non-defence production. The value of production per employee in 1926 was at its height and never again reached the same levels. It is significant that at all times during the period 1912–1945 the value of production per employee in the Clothing Factory was much higher than in the private clothing industry.

The 1930s proved to be a busy decade for the Clothing Factory. Major capital investments took place to replace old machinery, change the electricity supply to a three-phase system and reorganise the Machine Room. In 1931, the uniforms for the volunteer Militia Forces were completely redesigned, resulting in large orders that needed to be filled quickly. But the new design would also have slowed down the initial work process as new sewing techniques, perhaps using new machines that were not yet familiar to the workers, had to be learnt. There were also new design elements and fabric changes as a result of scientific developments.

Up to 1939, the Clothing Factory supplied the whole of the defence clothing as well as the postal uniforms, but by 1941 the volume of uniforms needed as the Second World War took shape, necessitated the enlistment of private firms to supplement the output of the Factory. An agreement with the USAFIA in which the US troops in Australia were to be dressed by the Australian industry imposed further pressure upon the Factory and the private sector. It was no surprise, then, that reports of uniform shortages came to the notice of the Army authorities, which led to considerations to streamline the types of garments used by each of the three Defence organisations and to re-organise the forward planning and logistics for the supply of raw materials and delivery of finished products.

## NOTES

1. NAA: MP392/10,473/511/504, *Return of Orders, 1931/32*.
2. NAA: MP392/11,764/501/50, *Activities of Establishments from Inauguration of Munitions Supply Board 1920/22*, Appendix, p. 2.
3. NAA: MP392/10, 589/502/69, *Munitions Supply Board Annual Reports 1927/28/29*; NAA: MP891/17, 1, *Memorandum from A.F. Newey, Acting Manager of the Clothing Factory to Acting Secretary, Department of Supply & Shipping, 28 August 1945*, p. 2.
4. NAA: MP891/17, 1, *Memorandum from A.F. Newey, Acting Manager of the Clothing Factory to Acting Secretary, Department of Supply & Shipping, 28 August 1945*, p. 1.
5. NAA: MP392/10,589/502/76A, *Report of Munitions Supply Board, 1st July 1929*, p. 21.
6. NAA: MP392/10,589/502/123, *Report of the Manager for the Financial Years 1931–1932 and 1932–1933*, p. 23.
7. NAA: MP392/10,589/502/123, *Report of the Manager for the Financial Years 1931–1932 and 1932–1933*, p. 22.
8. NAA: MP392/10,589/502/123, *Report of the Manager for the Financial Years 1931–1932 and 1932–1933*, p. 21.
9. ABS, Catalogue 1301.0, *Year Book Australia*, No. 27, 1934, p. 338; No. 28, 1935, p. 345; No. 29, 1936, p. 348; No. 30, 1937, p. 267; No. 32, 1939, p. 241.
10. NAA: A663, 54/1/98, *Department of Defence—Clothing Contracts—Press Cuttings Regarding the Intrusion of Moneylenders*, Clothing Contracts—Departments of the Army and Air, 15 April 1941.
11. It should be noted that the data for the clothing industry produced by the ABS and used in this graph do not make a distinction between privately-owned or publicly-owned factories and therefore include the Government Clothing Factory. However, the distortion is only minor as there were tens of thousands of employees employed in the private clothing sector and only several hundred in the Clothing Factory. Similarly, the total value of output in the private sector dwarfed the value of production of the Clothing Factory. For example, in 1918 the Clothing Factory's output was £ 353,452 and the clothing sector's output was £ 10,671,416.
12. AWM54, 719/7/2, [*Ordnance Workshops and Depots—Supplies and Equipment.*] *Q instructions—provisions of equipment and clothing for AIF—1940, Appendix "C"—New Vocabulary Rates for S.D. Uniform as at 24 May 1940*.
13. *The Mail* (Adelaide), Saturday, 17 June 1944, p. 3.
14. ABS, *Year Book, Australia* (No. 22, 1929) shows a total production value for the clothing sector of £52,659,358 for 1927–1928, which is twice the

- value obtained in the years prior to and after that year. One must question this figure in the light of the general economic conditions of the period.
15. *The Herald*, 12 February 1940, in NAA: A5954, 694/1, *Press Extracts, Complaints Regarding Supply of Military Uniforms. 8/2/40–6/3/41.*
  16. NAA: MP508/1, 61/701/49, *Report on Supply Issue and Accounting for Clothing—Southern Command (3rd Mil. Dist.).*
  17. *The Herald*, 12 February 1940, in NAA: A5954, 694/1, *Press Extracts, Complaints Regarding Supply of Military Uniforms. 8/2/40–6/3/41.*
  18. NAA: MP508/1, 61/751/28, *Letter from P.C. Spender, Treasury, to Brigadier the Hon. G.A. Street, Minister for the Army, 26 July 1940.*
  19. NAA: MP151/1, 434/201/3273, *Letter from C. Massey, Director of Victualling, to the Victualling Store Officer in Sydney, 20 June 1942.*
  20. NAA: MP151/1, 434/201/3047, *Report by F.J.R. Penhalluriack, Secretary to Committee, to Board of Business Administration, 3 June 1940.*
  21. NAA: A5954, 320/6, *Notes for Action—Production Procedure—Clothing, 15 October 1940–10 December 1941.*
  22. ABS, Catalogue 1301.0, *Year Book Australia*, No. 36, 1944–1945, p. 1020.
  23. NAA: B551, 1945/11/12052, *Description of Clothes and Equipment for Members and Auxiliaries of the Australian Women's Land Army (AWLA); Statistics of Permanent members of AWLA on the Second Anniversary; Newspaper Clippings on the Second Anniversary AWLA, 27 July, 1944.*
  24. This claim was made by expert witnesses to the Committee on Post War Dress in 1947. NAA: MT1274/1, 65/02/167, *Committee on Post War Dress, Final Report—First Draft (incomplete)*, p. 9.
  25. NAA: MP263/4/1. Volume 100, *Minutes of Meeting—Contract Board Supply 5 April, 1944 to 26 April, 1944—Agenda Numbers 6703 to 7244, Department of Supply and Shipping, Contract Board Business Paper No. 6958, 6 June, 1944.*
  26. NAA: MP263/4/1. Volume 100, *Minutes of Meeting—Contract Board Supply 5 April, 1944 to 26 April, 1944—Agenda Numbers 6703 to 7244, Department of Supply and Shipping, Contract Board Business Paper No. 6955, 6 June, 1944.*
  27. NAA: MP263/4/1, Volume 100, *Minutes of Meeting—Contract Board Supply 5 April, 1944 to 26 April, 1944—Agenda Numbers 6703 to 7244, 5 April, 1944 to 26 April, 1944, Business Paper No. 6957, 6 June, 1944.*
  28. NAA: MP263/4/1, Volume 100, *Minutes of Meeting—Contract Board Supply 5 April, 1944 to 26 April, 1944—Agenda numbers 6703 to 7244, Business Paper No. 6957, 6 April, 1944.*
  29. NAA: MP263/4/1, *Minutes of Meeting—Contract Board Supply 5 April, 1944 to 26 April, 1944—Agenda Numbers 6703 to 7244, 5 April, 1944 to 26 April, 1944, Business Paper No. 6999, 14 April, 1944.* The cost of these garments, when produced in Western Australia, was approximately 14 shillings greater.



## Building a New Clothing Factory—1950s to 1971

The Clothing Factory's occupation of premises since its establishment in 1912 saw several expansions which were due partly to increases in workload and partly to the addition of work previously carried out by other government establishments. Heavy demand for uniforms in the First World War made it necessary for the Cutting Room to be enlarged and for additional investment in new equipment to be made in 1916. At that time the government was also operating a separate Harness, Saddlery and Accoutrements Factory at Clifton Hill, Victoria, but after the end of the First World War demand for these goods was minimal and the factory ceased operations altogether in 1923.<sup>1</sup> However, at the commencement of the Second World War new demand for some of the goods previously produced by the Harness Factory forced the governments to reconsider its manufacturing base and in 1941 it decided to add the production of the canvas goods to the operations of the Clothing Factory. But there was no room for these additional operations in the existing Clothing Factory buildings and separate premises were thereupon leased in Leicester Street, Carlton (a suburb of Melbourne). The goods produced here were mainly artillery textiles such as cartridge bags, as well as tents, flags and other canvas goods. The production of military caps was transferred from the Clothing Factory to Leicester Street, which then became known as the Caps and Canvas Department and was also referred to as the No. 2 Factory, the Clothing Factory in South Melbourne becoming the No. 1 Factory.

The story repeated itself after the end of the Second World War when, once again, the machines at the No. 2 Factory were idle except for the production of caps. In March 1947 the government resolved to cease the manufacture of canvas goods, close the factory and to transfer the caps back to the Clothing Factory. This posed a few spatial problems as the Clothing Factory was fully occupied with machines and equipment. The dining hall, which had been the pride and joy of the Factory's management in previous decades as a symbol of its considerations for the welfare of its employees, had become somewhat outdated after 35 years and was sacrificed to become the new Canvas Department. A number of buildings were purchased from the RAAF camp at Somers, Victoria, transported and converted into a new dining hall and bulk storage space. The Clothing Factory, on grounds bounded by Coventry, Miles, Dodds and Wells Streets in South Melbourne close to the Victoria Barracks, now consisted of eight 40-year old single-storey galvanised iron buildings joined by covered walkways, seven detached single-storey buildings (previously Services huts from Somers Camp), two detached boiler houses and a coal bunker.<sup>2</sup> The Clothing Factory had become a motley collection of buildings on an area of approximately three acres in the middle of Melbourne and was ripe for rejuvenation.

A Working Party chaired by C.K. Davies, the Deputy Director of Contracts at the Department of Supply, undertook a review of the Clothing Factory in 1951. In its Interim Report, the Working Party argued that the volume of work at the Factory had increased over time. The demand from the military had increased with the addition of uniforms for the RAAF and in general the Services had grown in numbers. The range of garments had also widened and now included protective clothing, such as raincoats and overalls and the like. Demand for uniforms from the Postmaster-General's Department had increased as a result of large-scale immigration and the resultant need for wider postal services. But the capacity of the Clothing Factory had been stretched to its limits and it was only able to produce 15 per cent of total Service requirements in 1951. The Working Party estimated that the Services would require a smaller volume of uniforms in 1952, which the Factory could fulfil only to 23 per cent, the remainder having to be put to tender to the private sector.<sup>3</sup>

It was never in the Working Party's mind to abolish the Clothing Factory. In the 1950s the continuation of government control of this business was still on the agenda and the cessation of production would cause further difficulties. During the following years, as is described below,

we see a number of reports recommending the streamlining of the Factory's businesses or, indeed, the construction of brand-new factory premises. Instead of abandoning the Factory, the government was planning to take a firmer hold.

The Clothing Factory played an important role in designing and experimenting with new designs for the uniforms and furthermore safeguarded the patterns and sealed samples. In addition, the production runs were very short, and for each production run the work processes and machines had to be set up differently, which cost both time and labour. The private sector had often expressed its dissatisfaction with short production runs and had pressed for higher prices for the garments. To order clothing from the private sector via the Contracts Branch for such small quantities would, the Committee argued, be very costly.<sup>4</sup> This was a flawed argument which flew in the face of the fact that the Clothing Factory only produced 15 per cent of Service requirements and that the remaining 85 per cent of short runs were already in the hands of the private sector. The aim, however, was for the Clothing Factory to produce half of the Services' future requirements and in order to achieve this, the Working Party recommended as an interim measure to expand or alter the existing Factory buildings by extending the canvas room and part of the tunic and trouser section, to purchase a separate annexe for the manufacture of caps and canvas goods, to establish a shirt manufacturing annexe inside an existing factory (it was suggested to acquire this from the Pelaco shirt company), to add a factory in Sydney for all items except caps, canvas and shirts. The Working Party estimated that the cost of the new establishments would amount to £140,000.<sup>5</sup>

The Joint War Production Committee, headed by Major-General L.B. Beavis in the role of Acting Chairman, reviewed the Davies Report in August 1951. The Committee concurred with the report that the capacity of the Clothing Factory was inadequate. It recommended to add capacity by transferring the cap and canvas sections from the present site in South Melbourne to a new annexe, yet to be purchased by the Commonwealth, elsewhere in a Melbourne suburb, to establish a shirt manufacturing annexe and to hold discussions with Pelaco or another shirt manufacturer, to negotiate with industry in New South Wales or Queensland for the establishment of a new factory for uniforms other than caps, canvas and shirts.<sup>6</sup> In order to save the Commonwealth further expense, the recommendation by the Davies Report to extend the canvas room and the tunic and trouser section in the existing premises had not been accepted.

In 1952 the Minister for Supply approved a reorganisation of the Clothing Factory, which involved the transfer of the cap and canvas sections to a Commonwealth building in Falon Street, Brunswick, Victoria, alterations and additions at the Brunswick premises to the value of £23,000, the purchase of plant and machinery for the transfer to the value of £25,000 and the setting up of a manufacturing annexe at the premises of shirt manufacturer Pelaco Ltd. without cost to the government.<sup>7</sup> The transfer of the cap and canvas sections took place the same year and they remained at Brunswick until 1969 when private industry offered to make the goods.<sup>8</sup>

However, these decisions did not alter the fact that the premises of the Clothing Factory in South Melbourne were outdated. In 1958 the Department of Works reported that the buildings were unsatisfactory and that the cost of repairs would be too high to warrant such a decision. An extract from the Department's letter on the condition of the Clothing Factory suggested that the floors were in a poor and dangerous condition, the lighting was poor, the working conditions were unsatisfactory and that the premises posed a fire hazard. To bring the buildings up to standard would require an estimated £30,000.<sup>9</sup> At that time the Board of Management for Munitions Factories recommended that the Brunswick site (the cap and canvas premises) should be extended to accommodate all of the Clothing Factory's operations.<sup>10</sup> However, this did not eventuate and the issue of the position of the Clothing Factory was revived in 1962. By then, the Commonwealth was divided over whether a new factory should be built or whether the production of uniforms should be handed over to the private sector. Cabinet decided, on 24 May 1962, to establish a Cabinet Committee (comprising the Acting Prime Minister, the Treasurer, the Minister for National Development, the Minister for Labour and National Service, the Minister for Defence and the Minister for Supply) which was given the following tasks: (a) to investigate the desirability of either public or private manufacture of clothing for the Services, the Postmaster-General's Department and the Commonwealth Police; (b) to seek the views of the Department of Defence and the Armed Services; (c) to investigate the relative costs of private and public production to the Government; (d) to determine whether priority should be given to the provision of capital for the building of a new Government Clothing Factory; and (e) if a Government Factory was to be built, whether it should be built outside the capital cities to promote the decentralisation of industry.<sup>11</sup> It is unclear whether the suggested Cabinet Committee had in

fact been established, but as no reports or further documentation have so far been uncovered it is quite possible that this committee never eventuated. It would have been an unwieldy heavyweight Committee consisting of Cabinet Ministers who were quite likely to push the importance of their own portfolio over those of others. What is clear, however, is that the proposal to rebuild the Clothing Factory was re-submitted to Cabinet and that Cabinet decided, on 25 September 1963, to have an independent inquiry conducted by Sir John Allison and Mr. Leslie Brewster.<sup>12</sup> At the time of their appointment Allison was Chairman of the Defence Business Board and Brewster was the Federal President of the Australian Clothing Manufacturers' Council as well as Clothing Adviser to the Minister for Supply. A letter of request from the Minister for Supply on 13 January 1964 led to the publication of the Allison–Brewster Report. The report investigated the current activities of the Clothing Factory and recommended that it should be retained as a valuable service. One of the report's key findings was the fact that the Clothing Factory acted as a 'laboratory for garment design and development'.<sup>13</sup> In other words, the Factory was driving innovation both in the design of uniforms and in the processes of manufacturing the garments. Allison and Brewster appreciated the value of the Clothing Factory and its role in spreading new knowledge and high standards of quality in the making of uniforms on to the private sector. They even suggested that the Clothing Factory should make a nucleus of trained staff available for assistance to private industry, particularly in the early stages of producing a new garment, and that a 'Manual of Production Technique' for the main lines be produced to guide the private sector, which would be complemented by control and inspection by the Department of Supply.<sup>14</sup> But they also made it clear that it would be impossible to hand over all production to the private sector, as there was an enormous variety of lines (some 2500 lines were identified) which were produced in uneconomically short production runs, preventing any factory from operating at optimum level.<sup>15</sup> Satisfactory levels of profit could only be made if there were to be specialisation within the private sector, such as specialisation in the production of coats and jackets or trousers or industrial clothing, and all orders for such items were to be directed to those specialised firms. A collaboration with the private sector was still desirable and could be expected from someone with a big role in the industry. The report recommended that a capacity study of the clothing industry be undertaken. At the same time it urged the Department of Supply's Planning Section to carry out a stock take of garments and their

sizes, raw materials (in particular imported materials), accessories, sealed samples, paper patterns, specifications, marked layers, inspection facilities and staff.<sup>16</sup> The idea behind this was that there would be scope for economy and for streamlining the supply of uniforms. Brewster's experience in the clothing industry gave this report a broader view than the investigations into the Clothing Factory until then. He had some familiarity with the clothing industry in the USA and recommended that the Clothing Factory's management should endeavour to visit firms there and observe production methods which could then be incorporated into a 'Manual of Production Technique'. There were, for example, better methods for pattern layout which would prevent wastage of fabric or 'cabbage' (bonus fabric for the tenderer).<sup>17</sup> Of particular interest was his recommendation for clothing standardisation and co-ordination with the USA, the UK and possibly SEATO.<sup>18</sup> It proved to be a forerunner of common design features in the Australian and US uniforms, in evidence during the Vietnam War where troops from both Australia and the US fought side by side.

After having investigated the Clothing Factory's operations, its role in the industry and its potential in a wider international setting, the Allison-Brewster Report concluded that the Clothing Factory was important. It would not be economical to rebuild or remodel the current 50-year old building and it was therefore put to the minister that a new factory building be erected at an estimated cost of £500,000. The report pointed to the land adjacent to the No. 2 Factory at Brunswick as being a suitable location.<sup>19</sup> As it turned out, a new factory could not be built on the Brunswick site as part of the land adjoining the existing No. 2 Factory had already been sold to an engineering firm.<sup>20</sup> The minister thereupon recommended that a new site be located elsewhere in a Melbourne suburb and a factory built at a cost of £970,000.<sup>21</sup>

But the matter was delayed for at least another year. Opinions were divided over the benefit or otherwise of the continued government ownership of the Clothing Factory and as soon as the minister had put forward his recommendation, a counter-argument, in the form of a Note on Cabinet Submission No. 823, was put to Cabinet from the Prime Minister's Office, indicating that the prime minister was 'not convinced that a good case has been made [to] spend about £1 million on a new factory'. After criticising a number of points made in the report, the note made clear that it was 'the aim of the Government... to get out of this venture and hand over to private enterprise'.<sup>22</sup> This view was repeated in a second Note from the Prime Minister's Department dated 15 August 1965.<sup>23</sup> Cabinet

thereupon discussed the matter and arrived at a decision that would meet both desirable outcomes in good measure. On 27 October 1965, Cabinet Decision No. 1349 was issued, making it known that a new Clothing Factory should be constructed along the lines recommended by the Allison–Brewster Report, but also that the report’s recommendation to transfer suitable garment lines to private industry should be acted upon.<sup>24</sup>

A few months later, on 18 January 1966, the Menzies Government gave way to a new prime minister, Harold Holt. Two years later, as a result of Holt’s disappearance at sea, the McEwen Government took the role of a caretaker government, followed three weeks later by the Gorton Government. Although Allen Fairhall had continually occupied the position of Minister for Defence since the Holt Government, the leadership changes were not conducive to the implementation of Cabinet Decision No. 1349. One of the main stumbling blocks in the implementation of the plan was the choice of location for the new Clothing Factory. Although the Cabinet Decision had called for the factory to be located in a Melbourne suburb, sentiments about decentralisation in general were beginning to saturate political thinking. Yet another committee, the Parliamentary Standing Committee on Public Works under the Chairmanship of the Hon. Frederick Charles Chaney, was given the task to sound out the industry in this respect. The committee interviewed a number of witnesses in the latter part of 1968, including Leslie Brewster in his capacity as Director of Latoof and Callil Pty. Ltd., D.R. MacSween, State Secretary and Federal President of the Clothing and Allied Trades Union of Australia and J.W. Wright, who was then manager of the Clothing Factory. Lloyd Forrester Bott, Deputy Secretary of the Department of Supply, represented the Department. Representations in favour of decentralisation came from H. Baskin, Acting Promotion Officer, Latrobe Valley Development Committee of the Division of State Development within Victoria’s Premier’s Department, R.G. Frappell, Promotions Officer of the Ballarat Development Committee and K. Houlahan, Acting Development Officer of the Bendigo Development Committee.<sup>25</sup> The interviews centred mainly on the supply of suitable labour for the new factory and whether or not this labour would be better sourced within Melbourne or in a regional town. Needless to say, the representatives from Latrobe Valley, Ballarat and Bendigo argued for locating the new factory in their respective region. The city of Bendigo had even guaranteed assistance with the building of roads, sewerage, water, power and other services.<sup>26</sup> But a counter-argument came from Brewster, who pointed out

that 40 male cutters, 20 to 25 pressers (mainly males), 15 to 20 tailors, 33 skilled embroideresses in silver and gold bullion, 600 female machinists, 2 cap cutters and 60 qualified cap machinists would be required. Even considering that the new Factory would be down-scaled as many larger lines would be outsourced to the private sector, it would still not be possible to obtain all required skilled labour from regional areas. He gave the example that expert embroideresses require at least two years' training and supervisors require several years of experience.<sup>27</sup> It would be presumptuous to assume that these types of workers would be available in a regional area where previously no such work had been carried out. Brewster argued strongly in favour of selecting the site at Coburg, which would retain the Factory's existing skills and so maintain continuity of production. After taking evidence from a number of other witnesses concerning several other possible regional towns, including Albury, as the site for the new factory, it became evident that the decision to choose Coburg was already made and the efforts in compiling the Minutes of Evidence by the Standing Committee for Public Works were a mere formality. This was made clear when Lloyd Bott of the Department of Supply stated during an interview,

What we are really planning at Coburg is a fully employed capacity on a one shift basis. We are building a factory which is the size to employ efficiently and effectively our current labour force of 900 on a one shift basis.<sup>28</sup>

The Chaney Report, a mere four pages long, was tabled in Parliament in 1968. It recommended the construction of the new factory at Coburg, on a site already selected, at a cost of \$1.3 million.<sup>29</sup> And so it appeared that the committee had cleared any potential last hurdles or had managed to avoid them, in relation to the question of decentralisation and the supply of regional labour, and the construction of the Clothing Factory at Gaffney Street, Coburg could now commence. The new Factory commenced operations in January 1971, and was officially opened on 19 April 1971 (see Fig. 6.1).

The government's role in the activities of the Australian Government Clothing Factory became the centre of debates during the 1950s and 1960s, but with Australian involvement in a number of conflicts in Southeast Asia ('Konfrontasi' and the Malaya Crisis, the Korean and Vietnam wars), it was important that the manufacture and supply of Army uniforms remained in strong hands. The government believed that this



**Fig. 6.1** The Commonwealth Government Clothing Factory at Coburg. Source: NAA: B6295, 2836C, *Commonwealth Government Clothing Factory at Coburg, Victoria*. Reproduced with permission from the National Archives of Australia

was not an industry in which the private sector could make healthy profits, due to short production runs. This argument, flawed as it may be as 85 percent of the production was already manufactured by the private sector, was convenient to those in favour of government control of defence industries. After a number of reports were commissioned and tabled, none of which recommended the abolishing or privatisation of the Clothing Factory and thus supported the government's view, the decision was made to modernise the Factory's operations. The period 1950–1970 served to reassess government involvement in the Clothing Factory, to intensify government control and, subsequently, to construct new premises in Coburg and to enable the business to retain its leading role in the uniform sector. The new building was, for its time, state-of-the-art and incorporated the best possible working conditions for the workforce, with good lighting and heating, a modern canteen and a safe environment devoid of

the fire hazards posed by the old building. Government ownership of the Factory continued and the new premises offered a platform for renewed innovation in the production processes in the years to come.

## NOTES

1. There was some demand for goods made by the Harness, Saddlery and Accoutrements Factory from returned soldiers, as is stated in NAA: MP392/10, 589/502/56, *First Report of the Munitions Supply Board*, p. 11.
2. NAA: A816, 14/301/486, and A5799, 247/1951, C.K. Davies (Chairman), *Interim Report of the Working Party established by the Defence Supply Planning Committee into the Commonwealth Government Clothing Factory*, 10 May 1951, pp. 1–2.
3. NAA: A816, 14/301/486 and A5799, 247/1951, C.K. Davies (Chairman), *Interim Report of the Working Party established by the Defence Supply Planning Committee into the Commonwealth Government Clothing Factory*, 10 May 1951, pp. 2 and 8.
4. NAA: A816, 14/301/486 and A5799, 247/1951, C.K. Davies (Chairman), *Interim Report of the Working Party Established by the Defence Supply Planning Committee into the Commonwealth Government Clothing Factory*, 10 May 1951, p. 9.
5. NAA: A816, 14/301/486 and A5799, 247/1951, C.K. Davies (Chairman), *Interim Report of the Working Party Established by the Defence Supply Planning Committee into the Commonwealth Government Clothing Factory*, 10 May 1951, p. 14.
6. NAA: A5799, 247/1951, *Minutes by the Joint War Production Committee at its 27th Meeting Held on 14th August, 1951*, p. 2.
7. NAA: A5799, 51/1952, *Supply Department's Three Years' Programme—Commonwealth Clothing Factory*, Memorandum from J.E.S. Stevens, Secretary, Department of Supply, to Secretary, Department of Defence, 11 February 1952. The Ministerial approval is also contained in NAA: A2031, 64/1952, *Supply Department's Three Years' Programme—Commonwealth Clothing Factory: Agendum Number—51/1952*, 6 March, 1952.
8. Senate Select Committee on the Government Clothing and Ordnance Factories, *The Future of the Government Clothing Factory at Coburg*, Canberra, 1982, p. 6.
9. NAA: A5827, Volume 25/Agendum 823, *Government Clothing Factory. DECISION 1349, Government Clothing Factory, Appendix A: Condition of the South Melbourne Factory, Extract from Letter dated 20th November 1958, Received from the Department of Works Concerning the Factory.*

10. Senate Select Committee on the Government Clothing and Ordnance Factories, *The Future of the Government Clothing Factory at Coburg*, Canberra, 1982, p. 6.
11. NAA: A5819, Volume 5/Agendum 160, *Replacement of Commonwealth Government Clothing Factory, Decision 250, Cabinet Minute, Decision 250, 24 May, 1962.*
12. NAA: A5827, Volume 25/Agendum 823, *Government Clothing Factory, Decision 1349, Submission No. 823*, p. 1.
13. NAA: A4940/1, C3567, *Report from Sir John Allison and Mr. L. Brewster on Commonwealth Government Clothing Factory Requested in Letter from Minister for Supply dated 13th January, 1964*, p. 1.
14. NAA: A4940/1, C3567, *Report from Sir John Allison and Mr. L. Brewster on Commonwealth Government Clothing Factory Requested in Letter from Minister for Supply dated 13th January, 1964*, p. 3.
15. NAA: A4940/1, C3567, *Report from Sir John Allison and Mr. L. Brewster on Commonwealth Government Clothing Factory Requested in Letter from Minister for Supply dated 13th January, 1964*, p. 4.
16. NAA: A4940/1, C3567, *Report from Sir John Allison and Mr. L. Brewster on Commonwealth Government Clothing Factory Requested in Letter from Minister for Supply dated 13th January, 1964*, p. 5.
17. NAA: A4940/1, C3567, *Report from Sir John Allison and Mr. L. Brewster on Commonwealth Government Clothing Factory Requested in Letter from Minister for Supply dated 13th January, 1964*, p. 5.
18. Southeast Asia Treaty Organization, for which a Pact was signed by the United States, France, Great Britain, New Zealand, Australia, the Philippines, Thailand and Pakistan in September 1954.
19. NAA: A4940/1, C3567, *Report from Sir John Allison and Mr. L. Brewster on Commonwealth Government Clothing Factory Requested in Letter from Minister for Supply dated 13th January, 1964*, p. 9.
20. NAA: A5827, Volume 25/Agendum 823, *Government Clothing Factory. Decision 1349, Addendum to Submission No. 823, Government Clothing Factory.*
21. NAA: A5827, Volume 25/Agendum 823, *Government Clothing Factory. Decision 1349, Submission No. 823, Government Clothing Factory*, pp. 2 and 4.
22. NAA: A5827, Volume 25/Agendum 823, *Government Clothing Factory. Decision 1349, Notes on Cabinet Submission No. 823, Government Clothing Factory*, 4 June 1965.
23. NAA: A5827, Volume 25/Agendum 823, *Government Clothing Factory. Decision 1349, Notes on Cabinet Submission No. 823, Government Clothing Factory*, 15 August 1965.

24. NAA: A5827, Volume 25/Agendum 823, *Government Clothing Factory, Decision 1349*, 27 October 1965.
25. NBAC: Z639, Box 37, D336/DDR438, *Textile, Clothing and Footwear Union of Australia, Minutes of Evidence Relating to Proposed Commonwealth Government Clothing Factory, File Starting 9 September, 1968, List of Witnesses*.
26. NBAC: Z639, Box 37, D336/DDR438, *Textile, Clothing and Footwear Union of Australia, Minutes of Evidence Relating to Proposed Commonwealth Government Clothing Factory, File Starting 9 September, 1968*, p. 33.
27. NBAC: Z639, Box 37, D336/DDR438, *Textile, Clothing and Footwear Union of Australia, Minutes of Evidence Relating to Proposed Commonwealth Government Clothing Factory, File Starting 9 September, 1968*, p. 35.
28. NBAC: Z639, Box 37, D336/DDR438, *Textile, Clothing and Footwear Union of Australia, Minutes of Evidence Relating to Proposed Commonwealth Government Clothing Factory, File Starting 9 September, 1968*, p. 44.
29. Hon. Frederick Charles Chaney (Chairman), Parliamentary Standing Committee on Public Works, *Report Relating to the Proposed Construction of a Commonwealth Government Clothing Factory at Coburg, Victoria*, Commonwealth Parliamentary Paper No. 160, 1968.



## Science Takes Command

### RESEARCH AND DEVELOPMENT IN THE SCIENCE OF CAMOUFLAGE

During the interwar years, particularly the 1930s, when the threat of yet another war loomed on the horizon, the attention of the Australian military authorities turned to the study of suitable camouflage designs and methods. By the middle of 1941 the threat of Japanese insurgence into Southeast Asia and even Australia prompted the Australian Government to take action for the civil defence of Australia and in July of that year the Department of Home Security was established. There was concern that the Japanese could fly over the continent and spot important military and civil establishments and it was considered essential that all critical establishments should be 'hidden from view'. Whilst it was not possible to physically move factories, they could be covered up to make them appear as part of the natural landscape. But it was also considered that soldiers were in need of concealment by the use of camouflage. Within the Department, a Camouflage Section was created under the leadership of Professor William John Dakin, a British-born Professor of Zoology at the University of Sydney.<sup>1</sup> As a zoologist, Dakin was familiar with animal camouflage and he believed this gave him

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The original version of this chapter was revised, due to repeating the same graph twice. An erratum to this chapter can be found at DOI [10.1007/978-3-319-71425-7\\_13](https://doi.org/10.1007/978-3-319-71425-7_13)

an advantage in the pursuit of military camouflage techniques.<sup>2</sup> Dakin was not the first scientist to study camouflage. According to Ann Elias, Charles Darwin had already influenced Abbott H. Thayer, an ‘artist, naturalist and innovator of military camouflage in the First World War’ in the United States.<sup>3</sup> Darwin had also had an impact upon Rudyard Kipling, who wrote the story ‘How the Leopard Got His Spots’, by arguing in the *Descent of Man and Selection in Relation to Sex* (1871)

... that superior tribes of ‘primeval man’ succeeded in conquering of others because they used deception in the form of artful “traps”.<sup>4</sup>

Theodore Roosevelt, a big game hunter, attacked Thayer’s statement that ‘almost all mammals are equipped with a full oblitative shading of surface colours; that is they are darkest on the backs and lightest on the belly, usually with connected intermediate shades’.<sup>5</sup> Roosevelt described various examples of colouration in animals that ran counter to the argument of concealment, such as the conspicuous white rump mark of the ‘prongbuck’ (springbok) and the markings of the zebra and the giraffe.<sup>6</sup> He also pointed out that many animals would be crouching low when in danger, such as the rabbit, hare and Virginia deer, thereby concealing the lighter bellies.<sup>7</sup> Instead, Roosevelt pointed to distance, the wearing of neutral-coloured clothing (for men) and remaining motionless as important factors for remaining undetected.<sup>8</sup>

The study of camouflage in Australia was still in its infancy as a branch of military science at the commencement of the Second World War. In 1939, Dakin had been heading a group of about thirty zoologists, geologists, physicists, chemists and artists known as the ‘Sydney Camouflage Group’, among whom were photographer Max Dupain and abstract artist Frank Hinder.<sup>9</sup> Together they produced natural patterns with light and shadow combinations and in different colour schemes. The aim of their experiments was to discover the best of these combinations to conceal the human form in various natural environments, the principle of camouflage being that ‘the colouring of an object should resemble that of its background’.<sup>10</sup>

Dakin used his knowledge of biology and showed examples of deceptive disguises used by animals in the wild, taking care to point out that animals about to attack blended into their environment and were perfectly still until ready to move. The tiger would hide among similarly striped bush, the snake among rocks, the polar bear on a snowy landscape. He emphasised the use of dark colours in jungle environments, not just to

disguise the clothing but more so to let the European pink skin mimic the dark green jungle foliage.<sup>11</sup> Any exposed skin should be camouflaged in a striped pattern using black grease.

In 1941 the Commonwealth Government seconded Dakin to the Defence Central Camouflage Committee within the Department of Home Security. The Camouflage Committee was to advise the military on camouflage, to research camouflage techniques and methods and to coordinate civilian and military camouflage operations.<sup>12</sup> However, the military had their own procedures and methods on camouflage. Moreover, when Dakin in a letter to Prime Minister Curtin accused the Army of bad practice with camouflage in New Guinea, they saw his efforts as interference in military matters and the Camouflage Committee was thereupon relegated to an advisory role only.<sup>13</sup> Ann Elias describes how Dakin had been trying to educate the soldiers on the need to blend into the background, but that he had originally encountered great resistance by the men as they, like many military men around the world, regarded camouflage as unmanly, an act of cowardice, of hiding from the enemy.<sup>14</sup> It ran counter to their pride, courage and manliness. However, the Japanese successes in Papua New Guinea and Southeast Asia, their ability to move through jungles unobserved by human eyes and their skill in mimicking animal behaviour to conceal themselves and surprise their opponents reversed the Australians' convictions. Soon they were blackening their faces and hands with grease. In September 1942, the Army through the Engineer in Chief approached Professor Dakin to obtain his advice regarding suitable material to colour the faces, arms and legs of men fighting in the North. Dakin had foreseen this requirement and had already developed, in collaboration with Colgate-Palmolive Pty. Ltd. in Sydney, a dark-brown grease which would not irritate the skin, would not come off too easily with humidity but would not resist soap and water if it had to be removed.<sup>15</sup>

Research to determine the best dyes for uniforms formed another element in the search for camouflage. Dakin mentioned that he had collaborated with Bradford Dye Works in Waterloo, Sydney, in his estimation 'one of the best and most reliable Dye Works in Australia'.<sup>16</sup> Three colours had been developed—Light Green, Dark Green and Dark Earth. Dark Green was, in his opinion, the best.

The Australian Army adopted a dark green colour for uniforms worn in tropical jungles. It was designated 'jungle green', abbreviated to J.G. in the Army's catalogue of clothing items. According to D.P. Mellor, jungle green outfits were first worn in New Guinea in September 1942.<sup>17</sup> But even jungle green dyes were stated to be inferior to green olive drab in the

New Guinea and other Pacific environments, according to Captain V.F. Tadgell of the Camouflage Wing, New Guinea Forces, who led the Australian field trials at Port Moresby.<sup>18</sup> It was but a half-hearted adoption of Dakin's experiments and still far removed from the series of disruptive patterns that we see on today's military combat uniforms. Nevertheless, the message seemed to be filtering through that a patterned outfit would ultimately be a better choice than a plain dyed outfit and that consideration should be given to the immediate natural environment in which military action was planned. To quote Captain Tadgell in his report under the paragraph headed 'Advice on pattern dyeing of future uniforms',

Two very different conditions of colour and light occur as between dense jungle areas such as Owen Stanley Range and also jungle areas beyond Milne Bay and the coconut plantation and grassy or less shaded scrub in less mountainous parts. A third condition, less important at present, is the dry season colouration of the Port Moresby type of coastal country.

Jungle areas produce a perspective of predominantly darker greens in a subdued light, rendering green olive drab the main background colour and tone. A medium dark brown of a neutral nature is a suitable tone to merge with the small gloomier pockets in the further background... A third colour would both add perspective and merge with jungle lichens—a light olive green...

The coconut plantation and fresher green parts (grassy and or [*sic*] less over-hung) produce mainly light yellowish greens in contrast with dark pockets of black-green shadow... Such areas exhibit an infinite variety of greens and local opinion calls for a variety of them combined for texture for close fighting.<sup>19</sup>

In the context of camouflage, to neglect to describe the hive of activity in experiments and discussions from a variety of sources that took place during 1942–1943 would do an injustice to the Australian Army, the scientists and the Australian chemical industry. The Army's needs for concealment in the jungle provided a 'demand pull' for the development of new products. It was part of a technological upswing dictated by war. The Army, research institutes and private industry worked hand in hand to deliver superior products to satisfy the Army's needs. Some known products or methods were discarded, while new ones were trialed. Mention has already been made of collaborations with industry in the manufacture of grease and dyestuffs. Apart from Bradford Dye Works and Colgate-Palmolive Pty. Ltd., several other organisations undertook extensive experimental research. Imperial Chemical Industries Ltd. (ICI) conducted experiments to obtain Malachite Green, Auramine and Brilliant Green dyes. But experiments with tartaric acid, citric acid (for better adhesion of the dye), soluble cellulose (as

a binding agent), basic dyes as opposed to sulphonic acid dyes were all hampered by the fact that wartime stocks were very low. ICI also prepared samples of two Vaseline-based grease paints, a brown and a green ointment.<sup>20</sup> The Walter and Eliza Hall Institute of Pathological Research in Melbourne was engaged to develop a suitable Lissamine dye for use on skin. They developed a new green dye, consisting of 50 per cent Lissamine Green V.S. and 50 per cent Lissamine Yellow B.R.F., which was deemed to be a satisfactory green colour. ICI adopted it under the name 'Lissamine Green B.R.F.' As all these dyes were water-soluble, the Institute continued its experimental work with dyestuffs which could be dissolved in vaselines, lanoline or other animal fat-based greases. The work was done in close collaboration with Colonel Charles Halliley Kellaway, a distinguished medical scientist and the first Director of Pathology at Army Headquarters as well as Director of the Walter and Eliza Hall Institute.<sup>21</sup>

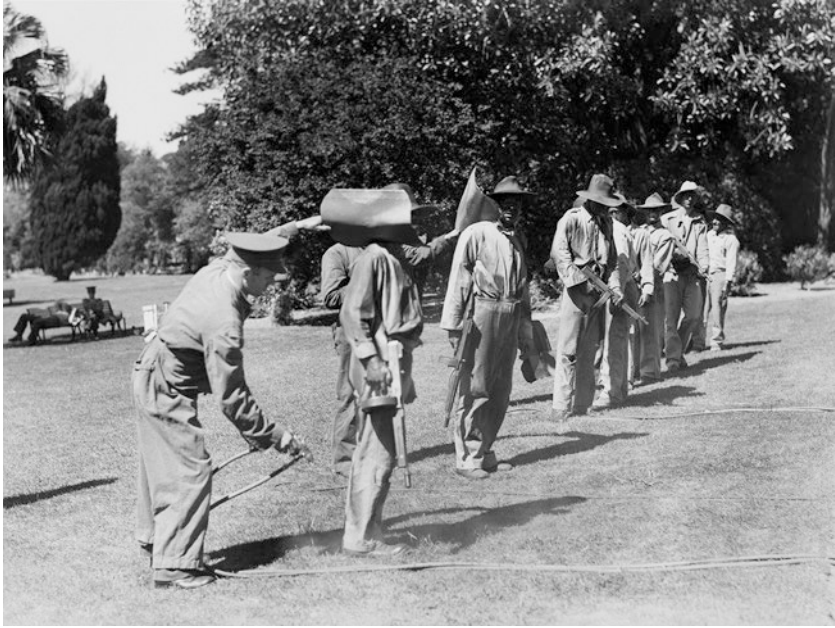
On 4 November 1942, Major Colin Wykeham Bayly, Commanding Officer of 2/8 Australian Independent Company, reported to the Deputy Director of Military Operations at Headquarters that his company had carried out experiments using foliage attached to helmets and clothing and, provided there was no movement by persons, this was found to be a satisfactory method of camouflage. The foliage quite effectively broke up the outline of a man. However, Bayly noted that the hands and face should also be coloured for further concealment. The experiments showed that foliage should be selected carefully and that the underside of many leaves showed up white and would be a clear marker to an enemy. He suggested that sprays of bush should be taken through two loops, one sewn about two inches below the first.<sup>22</sup>

At about the same time, Major Harry Harcourt, Commanding Officer of 2/6 Australian Independent Company, experimented with his unit by painting some uniforms in

dark green and/or dark brown stripes, 2" to 3" wide, obliquely across the uniform at an angle of approximately 15°–20° leaning from right to left. The angle was chosen because it was noticed that most of the smaller bush growth appears to have a lean this way.<sup>23</sup>

Unfortunately, the stripes nearly washed out when the uniforms were laundered due to the use of water-soluble 'Bitumenous Emulsion Camouflage Paint'. The method would have been satisfactory had a dye been used.<sup>24</sup>

An extraordinary experiment took place on 4 October 1942, in the Botanical Gardens in Melbourne, in which lines of men dressed in salvaged

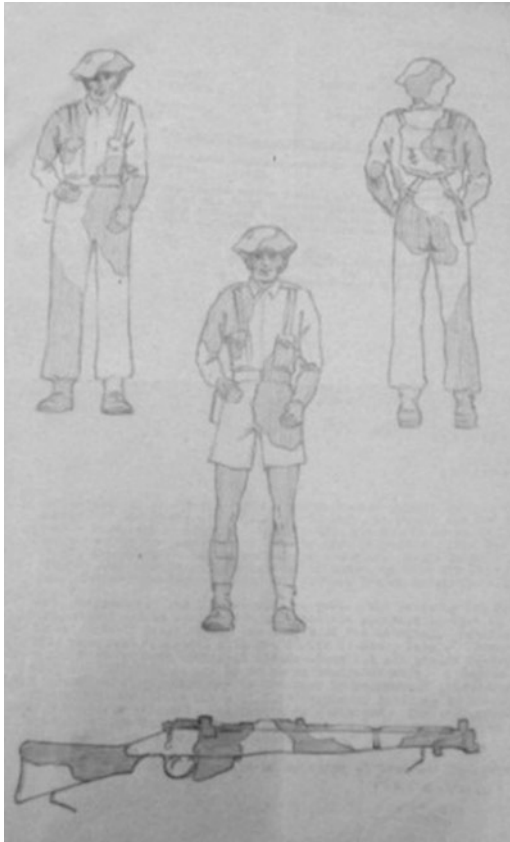


**Fig. 7.1** Spray painters at work in camouflage experiment in Melbourne's Botanical Gardens, 4 October 1942. Source: Australian War Memorial, Photo 027366A. Reproduced with permission from the Australian War Memorial

uniforms were spray painted in a three-colour mottled pattern (in red, black and green) as they filed past three painters with spray equipment (see Fig. 7.1). The report, by Captain V. Tadgell in Port Moresby, stated that this was a most speedy way to provide camouflage as and when needed. Although this harsh method would expose the men to paint fumes and chemical burns to the skin, the report merely concluded that it would be preferred if the garments were sprayed on the ground to avoid skin troubles or that all skin should be covered if spraying clothing when worn and that the clothing should be sealed. There was also a report from Port Moresby of the painted garments combusting spontaneously if rolled tightly or stacked in a heap before they were thoroughly dry.<sup>25</sup> There is no evidence to suggest that these types of experiments have been repeated.

The Army's Camouflage Unit and its Port Moresby 'trial site' were kept exceedingly busy during this period. No evidence has been found in the archival records that there was any consistent research or experimental coordination between the Army and the Sydney Camouflage Unit led by

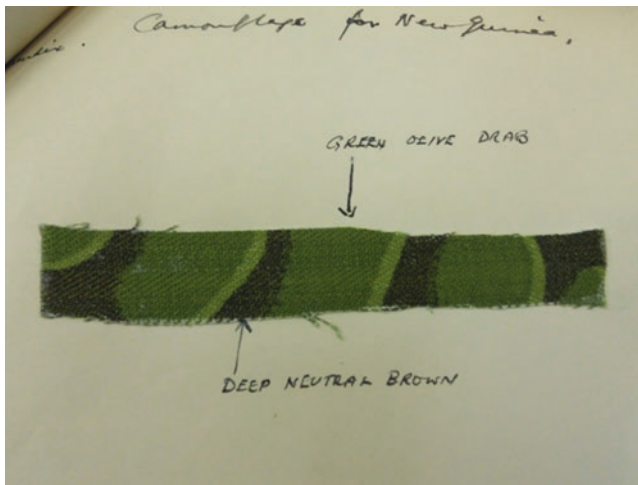
Professor Dakin and it appears that each party conducted their investigations and trials independently. The fact that Australia was now engaged in war in New Guinea and other parts of Southeast Asia drove home the immediate need for suitably camouflaged uniforms for the troops. This meant that the khaki drill uniforms which had been in use in tropical areas needed to make place for more suitably coloured uniforms. The Camouflage Unit even suggested using reversible fabrics with a jungle pattern on one side and a plantation pattern on the reverse and sketches were provided (for this jungle pattern, see Fig. 7.2). Textile printers had been engaged to design the fabric in a repeat pattern of 24 inches in size.



**Fig. 7.2** Sketches of patterned uniforms for tropical jungle. Source: NAA: MP222/1, 13 K, Letter from Captain V.F. Tadgell to Engineer in Chief, 13 October 1942. Reproduced with permission from the National Archives of Australia

The Unit worked with the Directorate of Ordnance Services (DOS) to obtain the preferred dyes and a separate Dye Stuffs Advisory Panel was established for that purpose. Cloth would be dyed in the darker green colour, used for an intermediate phase of uniforms, and lighter tones would be reserved for pattern dyeing under the next planned phase. Consideration was given to the fact that the disruptive pattern could not be controlled during the cutting and sewing process, resulting in straight lines through the patterns where the seams were located. Consideration was even given to dyeing the outfits *after* manufacture.<sup>26</sup> Trial fabrics were also produced in a mixture of green olive drab, dark brown and light green stripes as shown in Fig. 7.3.

D.P. Mellor states that the Australian clothing manufacturers strongly resisted the introduction of uniforms patterned in two or more shades and that experiments had shown them to have ‘little in favour’.<sup>27</sup> Whether or not the objection to patterned uniforms came from Australian manufacturers is debatable. The Government Clothing Factory would have had to lead such resistance and this is hard to believe. It was certainly the case that there was much debate on selecting patterned uniforms as opposed to



**Fig. 7.3** Camouflage for New Guinea—Trial fabric patches. Source: NAA: MP222/1, 13 K, Attachment to *Report from Captain V.F. Tadgell to Engineer in Chief, “Camouflage—Individual Concealment in New Guinea”*, 5 October 1942. Reproduced with permission from the National Archives of Australia

plain green uniforms. There is also evidence that some of the objections came in fact from the field. In 1943, the Engineer in Chief wrote of comments made in New Guinea concerning the Australian pattern camouflage uniform:

Formation and Unit Commanders of Field Units in NG have expressed strong views in favour of retaining the shirt and trousers. They also favour the present jungle green to the mottled pattern for general use in operation.<sup>28</sup>

However, he concedes that practically all parties had agreed that they would prefer to wear mottled suits for sniping purposes.<sup>29</sup> Brigadier J.W.A. O'Brien, Deputy Master-General of Ordnance (Engineers), related resistance to the mottled pattern uniforms not to the wearing of them but to ordnance issues,

The facilities however for maintaining stocks of clothing in forward areas in NG are practically non-existent, and units have indicated that they would prefer to bespatter a man with mud when required than be encumbered with additional stores.<sup>30</sup>

With both the Australian and US forces now operating in the Pacific region, it was during this time that the defence industries in both nations started to collaborate more closely, beginning a pattern that continues to this day. Camouflage experts in Australia and the United States had all been working to refine the design of the camouflage uniforms. In 1943 American pattern uniforms were held in stock in Brisbane and had been trialled by 2 Australian Corps, the New Guinea Force and the Conungra Training School.<sup>31</sup> Their comments contained some grave issues which would put the use of this particular suit on the back burner: the suit was made of one piece which would need to be removed altogether for ablution purposes. The suit offered no ventilation and was of too tight a fit to render it suitable for tropical conditions. In his letter to the Engineer in Chief, Brigadier J.W.A. O'Brien suggested experimenting with modifications of the suit, including cutting it in two pieces to obtain a blouse and trousers, held together with buttons.<sup>32</sup>

Research to identify the best camouflage patterns and colours for the Australian Army uniforms continued after the Second World War. Australia and other Commonwealth nations combined forces to compare notes on

the results of their research and tests. Regular Commonwealth conferences were held at four-yearly intervals in which scientists and other experts produced papers for discussion. It appears that Australian research efforts in regard to tropical camouflage which had started in the 1930s, were still well ahead of their British counterparts thirty years later: in 1962, during the Seventh Commonwealth Defence Conference on Clothing and General Stores, T.K.W. Overton, from the British War Office's Directorate of Stores and Clothing Development, described laboratory investigations into the relative effectiveness of different camouflage colours under jungle conditions and suggested that the present British camouflage colours were inadequate for tropical use and that a new colour, a lighter green, should be specified.<sup>33</sup> Australia's representative, G.H.S. Fry of the Department of Supply, concurred and noted that:

Clothing worn in that environment was more often than not wet from rain or perspiration, and in such conditions a dark green appeared almost black.<sup>34</sup>

At the same conference, Fry presented a paper outlining progress made on the design and development of a new jungle warfare uniform and Mr. Quinn reported on field trials carried out using different types of fabric: a wool/nylon mixture, polyester cotton, polyester flax. The latter would be the best fabric if it could be made more durable.<sup>35</sup> These fabrics were, of course, not new in the market, they had already been used in civilian clothing. But their application as a fabric to replace the current cotton drill materials could not only change the uniforms, but also the industry supplying the fabrics and their raw materials. Further discussion on the topic of fabrics can be found in the section on military textiles below.

#### RESEARCH AND DEVELOPMENT IN OTHER SCIENCES, SUCH AS DERMATOLOGY AND CHEMISTRY

It has been mentioned above that khaki-coloured uniforms did not provide sufficient camouflage when worn in tropical areas. Another problem became evident during the Second World War: reports had been received from the Australian Military Forces Medical Services of patients having presented with dermatitis. The patients had returned from New Guinea or were stationed in Northern Queensland. It was soon suspected that the chrome dyes used in khaki fabrics were the cause of the skin problems. The Deputy Adjutant and Quartermaster-General of the Allied Land

Forces in the Southwest Pacific Area referred to orders issued on 5 March 1943, to the effect that green drill garments would henceforth be issued in lieu of khaki for troops in Queensland north of latitude 23.8° and tropical territories outside Australia.<sup>36</sup> Questions were raised about the dyeing process used and the Director-General of Medical Services resolved that patients who had recovered and were ready to return to their units should be issued with vat dyed clothing.<sup>37</sup> This was considered safer than solvent-based or other types of dyeing. The matter was also of concern to the British War Office and a request for information about the dyeing process used for khaki fabric together with a recommendation to collaborate with the Dyestuff Panel in Britain was sent to the Chief Inspector of Stores and Clothing in Melbourne on 8 February 1943.<sup>38</sup> The problem of chrome dermatitis was acknowledged at the Second Commonwealth Conference on Development, Design and Inspection of Clothing and General Stores in 1949, by which time the need for cooperation between the member countries was agreed by all concerned.<sup>39</sup>

The research was not only confined to medical and chemical sciences, but reached out into other disciplines and into interdisciplinary research where research within two or more distinct disciplines combined for common solutions to problems. With the involvement of the United States in the Pacific War and the subsequent coordination of Australian and US troops in the Asia-Pacific area it came as no surprise that research developments in the United States became a significant part of the joint effort to overcome problems and to develop new military technologies and products for Allied use. Experts of entomology, medicine and chemistry collaborated to overcome problems with larval mites and mosquitoes in tropical theatres of war. An example of US–Australian research collaboration is provided in a 1944 report on protection against American chiggers (parasitic larvae of mites in the genus *Trombicula*) which had been found to hide in tight fitting clothing and to feed on skin tissue. The report stated that

There was already available considerable information on chemical means of personal protection against mites when the work on clothing treatment was begun at the Third Medical Laboratory in New Guinea.

A.W. Lindquist and A.M. Madden of the USDA Laboratory at Orlando, Florida, had developed a successful treatment for the protection of troops against American chiggers. They established that any of the

three recommended mosquito repellents would give effective protection when applied as a band along all openings in the clothing. Since it was frequently observed that chiggers refused to crawl on such treated areas, it was assumed that the effectiveness of the treatment was due to repellent action. Dimethyl phthalate was recommended as the chigger protection because it was more readily available and cheaper than the other repellents. These findings were brought to the attention of the Australian Army, and Major R.N. McCulloch of those forces conducted extensive tests against chiggers in New Guinea and obtained satisfactory results with dimethyl phthalate smeared thinly by hand over an entire set of clothes at the rate of one ounce over shirt, pants and socks.<sup>40</sup>

The issue of chrome dermatitis became a driving force in the investigations into the dyeing processes used for khaki fabric. It resulted in the recommendation to use only the vat dyeing process. More importantly, however, it became one of the factors, along with camouflage considerations, in the departure of khaki-coloured fabric in favour of green-coloured fabric, not only in Australia but also in other parts of the Commonwealth. These changes had been necessary on medical grounds, not military grounds, supporting the idea that external forces provided the push for innovation to the Australian Army uniform.

Parasitic problems in the tropics jolted laboratory and field research into the behaviour of larval mites. Extensive trials with different chemical mixtures were conducted to impregnate uniforms. Research collaboration was now focusing on joint US–Australian efforts in the Southwest Pacific area, benefiting both the Australian and US military. The changes made to treat the uniforms were necessary on medical grounds, so once again, external forces were driving innovation.

### THE DEVELOPMENT OF NEW MILITARY TEXTILES

Textile and fibre research intensified significantly during the second half of the twentieth century. The study of the textile fibres and fabrics used was no longer confined to each country separately. Within the Commonwealth, there had already been close research collaboration for some time and the results were presented at Commonwealth defence conferences, such as those mentioned in earlier sections. The list of titles of papers to be presented at the 1963 Commonwealth Advisory Committee on Defence Science indicated that Australian research at the Defence Standard Laboratories had made advances in the knowledge of the strength (or

otherwise) of textile fibres and the resistance of cellulosic fabrics to attack by cellulolytic fungi.<sup>41</sup> Some of the Canadian research concentrated on developing light-weight textiles for thermal protection and on flame-resistant fabrics. Both the South African, Indian and British papers included an evaluation of weathering resistance of textile yarns. India, as a major grower of cotton, produced research on various characteristics of cotton fibres, such as the course of deterioration of cotton cellulose in soil. The behaviours of a number of textiles in humidity and heat were also the subject of a number of the papers presented by the United Kingdom.<sup>42</sup>

The research on different types of textiles for the Army's clothing following the Second World War placed great importance on the maintenance of normal body temperatures. The message was not lost on the Australian Army. The first draft of the Final Report of the Committee on Post War Dress, established to determine a new set of uniforms for the Australian Army, stated that much scientific research had been conducted in recent years, particularly overseas, into the development of new clothing and cloth. It had been established that bodily efficiency and comfort depended mainly on surface body temperature. The Draft Final Report, therefore, suggested that the design of clothing should 'enable the wearer to control his surface body temperature according to the weather and the nature of his work.'<sup>43</sup> However, research had not yet advanced to the point where the Army could embrace new technologically advanced fabrics. The Committee merely recommended the use of layers of clothing, thus enabling the soldier to remove or add clothing when required, and of the control of closures to facilitate circulation of air around the neck, wrist and ankles.<sup>44</sup>

During the decades following the Second World War, textiles were tested for their strength, their resistance to deterioration under different conditions, their resistance to flames and penetration by projectiles. A Canadian paper presented at the Fourth Commonwealth Defence Conference on Clothing and Stores in 1953 by J.V. Weinberger and H.A. Delcellier under the title 'Ballistic Resistance of Textiles' described in detail the projectile tests that had been conducted and the subsequent evaluation of the fibre slippage within the fabrics. The research had also included the use of multiple layers of dis-similar fabrics to reflect the shock wave caused by projectiles. The presenters noted that research was ongoing and that the fundamental work done to date should be expanded to develop suitable textile materials for use in varying conditions of impact stress.<sup>45</sup>

The changing nature of combat methods, which after the Second World War included the potential use of nuclear materials, turned the attention to the development of protective clothing, impermeable to radiation and chemical dangers.<sup>46</sup> An Australian paper presented by J.P. Gleeson at the Seventh Commonwealth Defence Conference on Clothing and General Stores held in 1962 addressed the problem of protecting 'Service personnel engaged in operations such as rocket fuelling, handling war gases, or working in areas exposed to penetrating radiation...'.<sup>47</sup> The problem of maintaining an acceptable body temperature whilst wearing this type of permeable clothing was at the centre of the research. The Australians experimented with an outer wettable layer which could be sprayed with water to cool the wearer, the use of a portable pump located in the wearer's boots and operated when walking about, the installation of hoses to supply cool air into the suit, and a self-contained air conditioner consisting of a cooling pack containing a refrigerant such as solid carbon dioxide or liquid nitrogen.<sup>48</sup> During the discussions following the presentation of this paper, Wing Commander Whittingham pointed out that 'air ventilated suits in the R.A.F. went back about 13 years... they were now fully accepted as an important part of the aircrew equipment assemblies.'<sup>49</sup> It appears that the Australians may have been unaware of the RAF's use of air ventilated suits and, if true, the communication exchange at the Conference would have helped to prevent duplication of efforts in future endeavours.

Spurred on by Army clothing requirements, a number of industries in Australia were busy experimenting with new fibre technologies and processes, sometimes in collaboration with the Council for Scientific and Industrial Research (CSIR).<sup>50</sup> One such example is afforded by the attempts to obtain unshrinkable woollen socks for the Australian Army by Holeproof Ltd., Belworth Hosiery, Foy & Gibson, Lincoln Mills (Australia) Ltd. and Bond's Industries Ltd. The efforts concentrated on treating the wool prior to the knitting process to render it unshrinkable. Early experiments and trials by the Army with socks produced by Holeproof and Belworth Hosiery found that the wool of the socks appeared to 'lose a considerable amount of its natural elasticity and is inclined to stretch during wear; the socks are also harsh to the touch'.<sup>51</sup> Even before the Army had made its decisions or had prepared specifications regarding the unshrinkable socks, the industry was already investing in new wool treatment establishments. There were several types of treatment processes, but the best known were the Dri-Sol process and the Freney-Lipson process. The Dri-Sol process was developed in the United Kingdom and involved

the use of sulphuryl chloride dissolved in white spirit (kerosene) into which the wool is immersed. The Freney-Lipson process was developed at the McMaster Laboratory in Sydney by two research chemists, M.R. Freney and M. Lipson. In this process a gaseous chlorine is used in which the wool or wool product is placed in a gas-proof chamber, which is sealed and has the air pumped out of it. The chlorine is then introduced under reduced pressure to penetrate the fibres.<sup>52</sup>

Belworth Hosiery and Foy & Gibson had installed equipment for the Dri-Sol process, Holeproof was operating a plant based on the Freney-Lipson process and Bond's Industries was experimenting with that same process. Lincoln Mills was said to have a process of its own.<sup>53</sup> The technology for shrink-proofing wool was still in its infancy during the early 1940s and it is worth pointing out that the industry was then dependent upon Army purchases in order to increase capacity and enhance its technology. This was underlined in a letter from G. Lightfoot, Secretary of the CSIR, to F.R., Sinclair, Secretary of the Army, regarding the difficulties Holeproof had to obtain an even treatment of shrink-proofing the socks. To overcome these difficulties, an additional plant investment of £1000 would be required, but given that the company had already invested a substantial sum in cooperative experiments with the Army, it was reluctant to spend further sums unless there would be an assured use for it. The letter pointed out that other manufacturers were delaying investing in the Freney-Lipson process until it was proven to be working satisfactorily. Referring to the importance of the Army in this matter, Lightfoot continued his argument,

With little or no cost to itself, your Department could help to ensure that the capacity of shrinkproofing plant in Australia would be increased.

Your Department could in this way help in the development of an Australian process that may well assist wool in its struggle against substitute materials—a matter of importance to the whole of Australia in the post-war period.<sup>54</sup>

The example of shrink-proofing technology for woollen socks is important for a discussion of driving forces for change. The technology was being developed in the United Kingdom and in Australia and had been presented to the Army as a solution for the problems it had with shrinking socks. The new technology originated externally of the Army and became a driving force for field trials and, if successful in the experiments, for the drafting of specifications for the new type of socks.<sup>55</sup> At the same time, however, Army

requirements would drive the expansion in capacity building in the Australian industry and provide an incentive to refine the technology to obtain a better product. The Army is, of course, a significant consumer of goods and services and by its sheer size and requirements has the potential to reshape Australian industries. If this role is executed carefully, it can bring about a new dimension of technology, investment, industry structure and employment in Australia. This is one example in which the Army's role as a consumer of goods influenced the future of an Australian industry, in this case the industry involved in the shrink proofing of woollen socks.

An even more significant development of the Army's role in driving Australian economic development is illustrated by the requirement for higher-quality cotton drill fabrics. In the latter part of the 1930s the Army was gearing up for a possible war and was in need of large quantities of cotton goods. The government had for some time adhered to the policy of stimulating local industry through the imposition of tariffs, but the Australian cotton industry was still too small to supply all of the Army's requirements. As was customary, the Army had issued specifications for the fabrics it required to be made up and had asked interested local mills to produce samples. John Bentley & Sons, Davies Coop & Co. Ltd. (both Melbourne-based) and Bradford Cotton Mills (in Sydney) submitted samples of Blue Jean and Khaki Drill made of Australian-grown cotton. This prompted the Secretary of the Department of Defence, Malcolm Lindsay Shepherd, to write the following comment:

Though the Drills are not equal in quality to the Patterns, allowance might be made for the fact that they represent first attempts by local Mills to manufacture to our standard. A further factor is that same are of yarns made from Australian cotton whereas the cotton in the patterns is of American origin. There is a difference in these cottons which are the foundations of the materials, but I understand the local mills are representing the matter to the Queensland Cotton Board with a view to the American type being grown locally. It may reasonably be anticipated that some time will elapse before all the difficulties of local manufacture are overcome but it is considered that these samples are sufficiently encouraging to believe that ultimately the local manufacturers will produce cotton goods suitable for Defence requirements.<sup>56</sup>

Shepherd recognised that the efforts by the mills were first attempts in raising their standards of production, but the fact was that they were unable to match the requirements stated for the cotton drill materials. More importantly, the Army had set very high standards in its specifications by

stipulating the use of cotton ‘of American origin’.<sup>57</sup> The mills, however, only had access to locally grown cottons of dubious quality for spinning purposes (short and irregular fibres were a problem). To illustrate the importance to the cotton-growing industry and to the spinning mills of the Army’s decision to specify American cotton for drill fabrics, a brief overview of the position of the Australian cotton growing industry is provided.

The Australian cotton growing industry had commenced on a very small scale in 1860 in Queensland and underwent a rather patchy period of growth and decline. During the American Civil War, 1861–1865, cotton exports from America to Europe were severely restricted and there was a need for alternative cotton sources. This formed an incentive for Queensland growers to extend the area under crop, but as soon as American cotton became once more available, the Australian industry retracted. In 1913 the Queensland Government offered advances on the cost of seed cotton and from the early 1920s the Commonwealth Government granted bounties on the production of seed cotton grown in Australia, offering a higher rate for the better grades.<sup>58</sup> At the same time, the Commonwealth Government subsidised the cotton-spinning industry with bounties for yarn manufactured in Australia which had a content of at least 50 per cent locally grown cotton. The government’s policy to ‘foster and establish the primary and secondary industries concurrently’ was working well during the 1920s.<sup>59</sup> However, production experienced a somewhat tumultuous time until the mid-1930s, after which the industry collapsed almost entirely (see Fig. 7.1).

Until about the start of the Second World War, the majority of the cotton grown in Australia (mainly in Queensland) was of the species *Gossypium hirsutum* L. (or Upland cotton). There was a wide range of cultivars, grown in relatively small areas and with uneven characteristics. It was during the late 1930s, when Australian cotton was failing as an industry, that the Commonwealth Government decided that American cotton would be specified as the preferred cotton in certain military clothing items, such as cotton Drill. Several medium-staple varieties were imported from the United States in the 1930s. Of these, the cultivar ‘Miller’ became the most widely grown.

It was not until experiments with irrigation systems and the construction of dams in New South Wales transformed production capacity from the 1960s that the industry really took off (see Fig. 7.2 for the long-term movements). In 1961, the number of varieties grown had been reduced to four major cultivars—Miller, Empire, New Mexico, Acala and Arkot—which together represented 95 per cent of all lint produced, including Miller, which alone accounted for two-thirds of lint produced.<sup>60</sup>

The discussions with regard to the use of better cottons as the raw materials for cotton drills for the military also affected the operations of the Australian cotton-spinning mills. As cotton fibres of medium-length staple started to replace the shorter staple varieties from the 1930s, the spinning machines were better able to cope and the resulting yarns were stronger, having fewer breaks. But the spinners had yet higher demands for the required staple than was at that time available. They required staples at 1 inch— $1\frac{1}{16}$  inch with a value of 3.5 microns or above, but the vast majority of cottons, including Miller, were less than 1 inch in length.<sup>61</sup> The pressure was on for the cotton growers and plant breeders to produce quality, not only to satisfy the specifications of the Defence Department, but also those of the local spinning industry. Over the ensuing decades, CSIRO plant breeders further improved selected cotton cultivars and Australian cotton evolved into a major export industry. The Army's specifications for American cotton in the late 1930s provided a strong incentive to the Australian cotton industry to adopt American cotton cultivars and the cotton spinners provided a second push towards the refinement of the Australian cotton industry. Together, they brought about the transformation of an industry which to this day delivers one of the key export commodities of Australia (see Fig. 7.4 and 7.5).

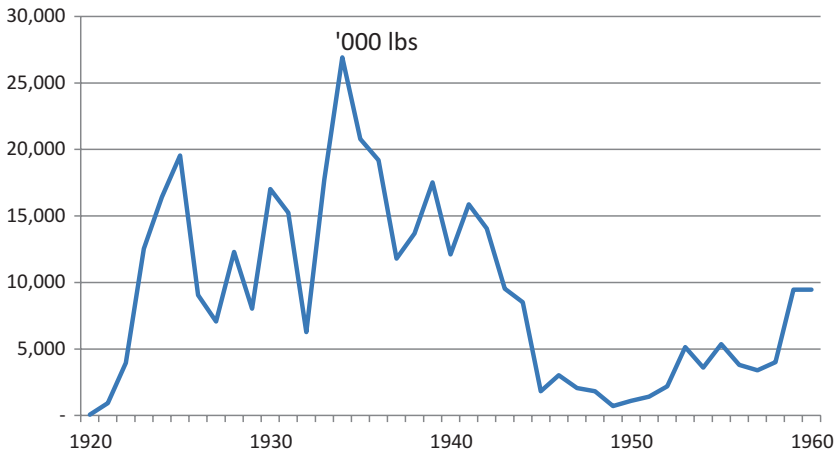
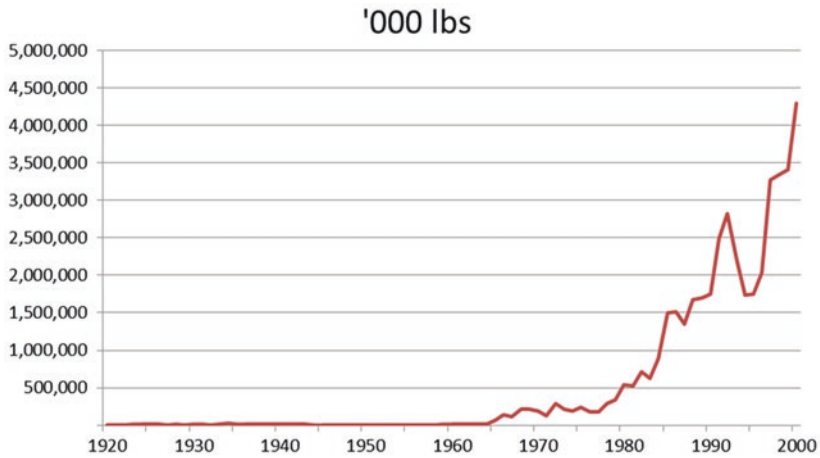


Fig. 7.4 Cotton production in Australia, 1920–1960. Source: ABS, Catalogue 1301.0, *Year Book Australia*, various issues, 1910–1965



**Fig. 7.5** Cotton production in Australia, 1920–2000. Note: Fig. 7.4 is a close-up view of a section of Fig. 7.5. The latter depicts billions of pounds of cotton produced, making it appear as if there was no cotton production between 1920 and 1960. The close-up view rectifies this

### IMPROVEMENTS IN TEXTILE AND CLOTHING MANUFACTURING TECHNIQUES

The business of making Army uniforms is closely linked with the clothing and textile industry as a whole and any developments altering the nature of the latter had an impact upon the former. As new technology and other innovative changes entered the industry—even if patchy at times and only affecting some firms while others lagged behind—the uniform business similarly adopted the changes. At times, the Australian Government Clothing Factory was ahead of the clothing industry in using the latest available technology. There were occasions when the Australian Army led the way in the methods specified for the construction of the uniforms, which in turn forced subcontracting firms to purchase the necessary machines, such as buttonhole machines, or to lay the patterns in a certain way upon the fabric which had been calculated as the most economical way and reduced the fabric cost of each garment. However, the new technology or innovative changes usually emanated from external sources and were subsequently taken on board when firms were ready to do so.

For an appreciation of the developments within the textile and clothing industry during the twentieth century, it is best to do a stocktake of the overall position by the end of that century and relate this to the conditions

prevailing a hundred years or so earlier. When the Industry Commission reported on the textile, clothing and footwear (TCF) industries in 1997 it marked the sector as much more efficient in its operations due to an increase in technology and labour-saving techniques, increased quality, increases in staff skills, the use of independent contractors and homeworkers, sourcing part of the product from offshore locations and introducing changes in management techniques, especially the use of quick response supply systems and rationalisation of production.<sup>62</sup> In the clothing industry, the most remarkable technological changes were the use of computer-programmable sewing machines, CAD (Computer Aided Design) systems to draft patterns and layouts, CNC (Computer Numerically Controlled) cutting systems, EDI (Electronic Data Interchange) and modern warehousing and distribution systems.<sup>63</sup> The smaller firms, in particular, would have lacked the financial resources to invest in expensive CAD and cutting systems and the Industry Commission noted that only one in three manufacturers in the TCF sector undertook technological innovation between 1991 and 1994.<sup>64</sup>

In 1971, the government had built a 'state of the art' Clothing Factory in Coburg, Victoria, to replace the old factory at South Melbourne. The new factory was the first in Australia to install a computerised cutting system, a Gerber S90 imported from the USA, linked to a CAD system in a separate room on which the patterns were designed and laid out on screen in the most efficient manner. An original cardboard pattern showing each pattern piece would be scanned onto the computer, which would digitally establish an origin or source position on each piece. From the origin position all corners and other important pattern locations would be measured. It would then produce a layout of all pieces on the screen (using a scale of the fabric width) in such a manner as to minimise fabric waste.<sup>65</sup> The Gerber S90 could cut two hundred layers of shirting fabric at once and one hundred layers of combat uniform fabric, as shown in the Fig. 7.6.

Innovation in the form of computerised machinery was one aspect of the changes that took place, not only in the clothing industry but across the manufacturing industry in Australia. New management techniques were also introduced and many firms experimented with smoother product processing systems that would suit their particular product lines. In the 1970s, the Government Clothing Factory made use of the so-called 'Gerber movers', a railing system suspended from the ceiling on which partly made up uniforms were suspended. The manufacturing



**Fig. 7.6** Multiple layer uniform pattern pieces cut on the Gerber S90 cutting machine at Australian Defence Apparel Pty. Ltd., Bendigo, Victoria. Source: Author's photo. Note the many layers of the camouflage combat uniform cut at once

process would begin with one worker undertaking the first step in the making up of a garment using a particular machine for that process, from where the partially sewn garment would be 'railed' to the next worker who would undertake the second step, which could make use of a different type of machine depending upon the task, and so on until the garment was fully completed.<sup>66</sup> The system was designed to speed up the manufacturing process by optimising a limited skill by each worker, often relying heavily upon a worker's experience with a particular type of machine and thus reducing to zero any other factory skills they might have had or would have developed. Workers became specialised in a particular skill and the entire manufacturing process is fragmented into skill-based operations. This has often been criticised as a 'de-skilling' of factory workers.<sup>67</sup>

There is a relationship between this division of skills and the system of ‘scientific management’ developed by Frederick Taylor and described earlier, but scientific management or ‘Taylorism’ had not been introduced in any of the government factories during the period when they were under government ownership. It is true that the initial price of a greatcoat in financial year 1912–1913 was 36s. and that this had been reduced to 29s.10d. the following year, but the reduction was partly due to increased skills of employees in the years following the establishment of the Clothing Factory and not to scientific management. In the words of Henry Slade, Manager of the Clothing Factory,

... it is to be expected that the cost of production will be at its maximum during the early stages caused by heavy initial costs, and to this has to be added the drawbacks mentioned in connexion with the lack of experience of the employéés [*sic*] and the consequent loss in training them to their new duties.<sup>68</sup>

Moreover, in the course of 1912–1913 a change of pattern was introduced for the greatcoats, reducing the cost of the new pattern greatcoat to 31s. 6d. Both pattern types and their respective costs (36s. for old pattern; 31s. 6d. for new pattern) were shown in the Annual Report.<sup>69</sup> It should also be noted that the prices for greatcoats increased slightly during 1914–1915 to 34s. 9d (old pattern) and 30s. 6d. (new pattern). According to Slade, this was,

...owing to the great uncertainty as to the landed prices of raw material used for trimmings... from Great Britain, a higher margin than usual was allowed for emergencies, and the costing of garments is not so close as last year.<sup>70</sup>

Clearly, there were other cost factors at play that would have negated any ‘scientific management’ if indeed this had been introduced into the Clothing Factory.

Returning now to the ‘Gerber movers’ process introduced in the Clothing Factory in the 1970s, it had its setbacks: if there was a breakdown in any part of the process, the entire output would be delayed. It was replaced by the Just-in-Time (JIT) management system, which is still in use at the factory today. JIT is based on fulfilling one particular customer order at the time so as to utilise only those machines needed for just that order, leaving the rest idle. The packing and freight components of

the process are set up at the same time so that at the end of the designated period (say, half a day) all product for the order has been made up, packed and is freighted away from the premises. At today's clothing factory—privatised in 1995, renamed Australian Defence Apparel Pty. Ltd. and relocated in Bendigo, Victoria—it has become customary to set up all machines for an order of a particular type of uniforms during one part of the day in one section of the floor. All machines are on wheels to enable stations to be moved easily to cope with the changing needs of the work. The garments are cut, made up, finished, folded and packed in boxes with a truck ordered in, ready for delivery. While this order is in progress, the machines would already be set up in another section of the floor for the next order and the workers would move to that section to complete that order. According to Maverick Spiteri, the company's Operations Manager, the application of the JIT system had reduced five-fold the value of 'work-in-progress'.<sup>71</sup> In other words, small batches of unfinished products moved much faster between start and finish, resulting in small or partial orders being filled quickly and delivered to the clients. It may be argued that the factory operations under Australian Defence Apparel management belatedly adopted Frederick Taylor's 'scientific management' process, dividing the manufacturing process into logical parts and assigning workers to particular machine skills, thus marrying the scientific management system with the JIT system.

Contrast the above technological and management developments with the situation at the Government Clothing Factory in the first decades of the twentieth century. When the Government Clothing Factory commenced its operations in 1912 it had the advantage of starting with the latest technology available at the time, imported from Great Britain. A few years later, as the demand pressures for uniforms reached its peak, the factory had already been expanded, as reported by Jensen,

In 1916 the Cutting Room was enlarged and other minor extensions to buildings were made, and the plant was increased by several hundred sewing machines. Altogether the items of plant exceeded six hundred; all were power driven, and included were many two-needle machines, button-hole making and button-sewing machines, steam pressing machines, etc.<sup>72</sup>

Note that the machines were all power-driven. This is in contrast to most contemporary sewing machines, which in the 1880s had been exclusively operated by treadle.<sup>73</sup> It can be safely assumed that the majority of

the numerous small clothing firms with little or no investment capital still used these treadle machines at the time the Government Clothing Factory commenced operations. The Clothing Factory became the leader in the use of sewing technology. The First World War saw the rapid adoption of powered machines by private firms, first in New South Wales, where tailoring shops with power rose from 1.3 per cent prior to the War to 23 per cent in 1918, followed closely by Victoria and the other states.<sup>74</sup>

In the Annual Report of 1918 the total value of sewing machinery at the Clothing Factory was shown at £8317.17.9 and included,

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4	Basting Machines in three sizes
1	Bar Tacking Machine
41	Button-hole Machines in various sizes
9	Button-sewing Machines in various sizes
12	Electric Cloth Cutting Machines of brands 'Wolf', 'Universal' and 'Eastman'
37	Eyelet Machines, including three with foot power and two of 'Universal' power
12	Presses, including Seam Presses
16	Gas and Air Irons
1	Blind Stitching Machine
472	Sewing Machines

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Twin-needle machines were not listed in the inventory of 1918, but the following year they were included in the inventory.<sup>75</sup> By 30 June 1922, there were not only twin-needle machines but also five-needle machines and ten electric irons had been added to the inventory.<sup>76</sup> Ellem found that the electric cutting machine had been in use in Melbourne since approximately 1910, but it is unclear whether this machine was located at the Clothing Factory or elsewhere. He goes on to explain that the proficiency of cutters using electric machines reached their peak during the 1930s when they were able to cut one hundred garments at a time—double their previous output.<sup>77</sup> Depending on the fabric used, this would compete closely with the modern Gerber S90 cutting machine which is able to cut two hundred layers of shirting fabric or one hundred layers of combat fabric.

The Factory's power in 1918 was driven by compressed gas plant, a 3 H.P. boiler, a 5 H.P. and a 7½ H.P. 'Century' electric motor and various types of heating and lighting plant, with a total written-down value of £3048.19s. 5d.<sup>78</sup> By 30 June 1920, the power plant was increased with two stationary petrol engines to provide electricity during power restrictions.<sup>79</sup>

At the beginning of the century, each worker would produce an entire garment. As machines were introduced, the work became more and more specialised and a division of labour became characteristic for the clothing industry, with a relatively small number of male workers dominating the higher paid jobs of cutters and pressers and the predominantly female workers carrying out the lesser-paid duties of sewing, trimming, embroidering, folding and packing. The Clothing Factory was the first in the industry to offer basic wages, defined for each skill, with a bonus for above-average output. This system was also introduced elsewhere in the industry where it was referred to as the 'Bedaux system'.<sup>80</sup> In today's Australian Defence Apparel this has evolved into something like Taylorism with no bonus element attached. The JIT production system thrives on specialised division of labour, but the short runs involved in the production process are time-based rather than volume-based, but at the same time any additional production speed achieved by the workers is inhibited by the need to re-set the equipment for each new run.

Innovation was most certainly in evidence, in the technology embedded in the new types of sewing machines and by the use of power for all machines, and also by the Army's specifications and sealed pattern system which dictated the use of new production methods and materials. But there was another path-breaking aspect of the defence manufacturing businesses in their early history, this time in innovative accounting management techniques heretofore not seen in Australia. Peter Foreman describes how Jensen, in the process of purchasing machinery for the Small Arms Factory, studied the accounting system used by Pratt and Whitney in the USA and introduced it to the Government factories in Australia.

His visit to Pratt and Whitney was to gain knowledge and understanding of 'cost accounting, time keeping and employee administration, progress of manufacture through the works, inspection methods, stores accounts, etc.' ... On his return to Australia, one of his first tasks was to prepare a set of accounting procedures to suit all government factories. Jensen's study tour ... was the primary vehicle of transfer, providing for the rapid adoption of North American accounting techniques within the government sector.<sup>81</sup>

Jensen's system was designed to ensure the accurate recording of actual historical costs that could be compared to the tender prices of private firms. The introduction of a card system to record costs in the factories may have been used in the private sector (although no evidence exists),

but was a first for Australian government operations. Cards were also introduced to record inventories, labour times and wages. Accounting for overhead costs remained a problem throughout: Jensen made no distinction between manufacturing and non-manufacturing costs, treating them all as product costs. For purposes of subcontracting and product pricing the Government factories needed to be in a competitive position in relation to the private sector and so Jensen included a profit of 9 per cent into the accounting system from at least 1915. Government factories were not supposed to run at a profit, and this was always a bone of contention with Slade, the Manager of the Clothing Factory, who on several occasions pleaded with the Government for permission to create a pool of savings to be used for future equipment replacements or additions. Also included in the overhead costs was the 4 per cent interest on the balance of the Treasury account from which raw materials were paid, in particular cloth for the military uniforms. Jensen did not distinguish between machine idle capacity and operating inefficiency and this was regarded as a non-recovered 'burden', which remained a problem in the factories' books for many years. While the accounting system was not perfect, it was innovative and changed the way the accounts were treated by the Government factories and very likely beyond as private firms were contracted which would then be under an obligation to manage their production costs in line with the Factory. The system, taken from the Pratt and Whitney accounts management system, was in use from 1910 until Jensen's retirement in 1949 and is an interesting example of international technology transfer. It is also a rather rare occurrence of technology transfer directly from the private sector to the public sector.

These few examples of the early years of the Clothing Factory and the previous examples of the state of the industry by the end of the twentieth century indicate the dynamic nature of the military clothing industry. The impact of its innovations upon the Australian economy as a whole may be negligible, with the notable exception of its impact upon the development of the Australian cotton industry, but at the unit or firm level the innovations introduced by the Clothing Factory produced a continuous rippling of the innovation waters, to use a metaphor that Joseph Schumpeter might have employed. It is also worth noting that Schumpeter's entrepreneurial figure was 'personified' in a few notable public servant figures within the Factory, in particular Jensen and Slade, who successfully pursued an entrepreneurial mentality that elevated the Factory to the status of profitable and influential manufacturing enterprise.

## INNOVATIONS IN ARMY LOGISTICS

Commonwealth discussions concerning the Clothing Factory in the early 1950s should be considered in the light of the position of the general clothing and textile industry at that time. As a result of the Second World War, shortages in fabrics and clothing were felt throughout the nation and as soon as the war had ended, a flurry of activity had uplifted the industry and by the early 1950s the pent-up demand had largely been met. By the end of 1951 the industry found itself floundering under excess capacity, particularly in the woollen and worsted weaving industry, which was in danger of collapse. The Government felt it could play a role in keeping the industry in work by placing advance orders for fabrics used in Services uniforms. The Departments of the Army, Air and the Navy were requested to submit their respective requirements for fabrics with a view to bring these orders forward. The contract demands submitted by the Department of the Army included £3.8 million for the procurement of tent fabrics, £1.7 million for 3 million square yards of cotton duck material, £7.9 million for 140,000 yards of calico and £280,000 for woollen piece goods for WRAAC personnel. In addition, the Department would require 200,000 sets of khaki drill working dress to the value of £7.9 million and uniforms for 6500 female personnel. These quantities are in addition to the Army's normal peacetime requirements, which included no more than 50,000 shirts and uniforms for 3000 WRAAC personnel.<sup>82</sup> The Department of Air used material for safari jackets imported from Japan, but also needed blankets and sheets to the value of £400,000 and a variety of other fabrics to the value of £517,000.<sup>83</sup> The Department of the Navy would submit contract demands for 130,000 yards of white drill, 100,000 yards of drill and 100,000 yards of shirting fabrics for tropical singlets. It also required 60,000 yards of woollen textiles and £166,260 worth of clothing kits which included footwear, knitted outerwear and knitted underwear. The Navy had placed all its peacetime requirements for made-up clothing with the Clothing Factory.<sup>84</sup>

During wartime, government control over the requirements of the three Service Departments had always influenced the health of the Australian clothing and textile industry, including the Clothing Factory. But it has been shown here that the Commonwealth also saw it as its duty to come to the rescue of the industry when times were lean and the industry was in danger of shedding labour and some factories were facing closure. Armed with contract demands from the Services the Commonwealth

could make a difference in some areas of the industry, thereby saving jobs, retaining industry skills and justifying the investments in plant and equipment.

The Department of Defence was greatly assisted in its effort by the fact that plans were afoot to introduce a new set of designs for the Army uniforms. To this end the Military Board established the Committee on Post War Dress in 1947 under the Chairmanship of Deputy Adjutant General Brigadier Cyril M.L. Elliott. The dress change, particularly in the walking-out and ceremonial dress, was spurred on by the planned Royal Visit, to take place in 1954, which would be accompanied by parades during which the Australian Military Forces wanted to make a good impression. Any change in the design meant a heavy workload for both the Clothing Factory and the private clothing firms that had been subcontracted. The whole Army would eventually need to be supplied with new uniforms as well as provided with sufficient quantities to be kept in stock. Minor changes in the design could usually be introduced by gradually replacing uniforms as they were issued to new recruits or as replacement items when the term of usage had come to an end, or on those occasions when clothing was returned as unserviceable. But a major design change would require a complete overhaul of the uniforms on issue which meant a speeding up of the manufacturing process, bringing with it challenges for the Army Stores. If any such major design change came in during wartime when many of the Australian troops were stationed in overseas locations, the logistical problems of supply in the correct quantities and sizes could be almost overwhelming. To exacerbate the problems, up to the end of the Second World War, Army Headquarters did not possess adequate administrative procedures documenting systems for the supply of ordnance (including clothing) during times of war. By 1946 Australia had participated in several international conflicts, during which lessons had been learnt to contain shortages of supply to a minimum, but none of these lessons had been recorded systematically.<sup>85</sup> The Ordnance Branch was making an attempt to rectify this by recording the collective memory in a manual.

Australian participation in the Second World War provided the Ordnance Branch with numerous supply challenges. The troops were spread over half the globe in climates ranging from temperate to dry/arid to tropical, each of which required climate-appropriate outfits. Supply lines were often disrupted and sometimes destroyed and clothing shortages had been the subject of many complaints. Soon after the war, the

Joint War Production Committee, representing Army, Navy and Air Force, organised for a full list of clothing requirements to be drawn up by the Services. The list was submitted to the Defence Committee on 18 October 1950. Among the items shown, were the quantities of each clothing item required in the event of an outbreak of a new war, then in the first year of such a war, the second year, third year and fourth year.<sup>86</sup> In other words, this was a five-year plan for the war production of Service uniforms. Over the five-year period the items required in largest quantities were 10,425,000 khaki shirts of the 1949 pattern, 6,714,000 khaki self-supporting drill trousers, 18,006,000 cotton short drawers, 9,558,000 wool and cotton long drawers, 18,363,000 cotton athletic singlets, 9,544,000 short sleeve singlets and 35,981,000 pairs of khaki worsted socks. All clothing items were to be supplied from local sources and these items alone would keep the Clothing Factory and private firms in profitable business in the event of a new war.

Past wars had also shown that the scales of issue and frequency of issue of clothing items provided to each soldier would need to be revised, particularly in view of the higher than expected wear and tear of clothing which reduced the period of their use. Climatic factors played a significant role in this: garments used in the tropics were subject to heat and moisture and required frequent laundering which reduced their time of usage. The Prime Minister, Robert Menzies, appointed a Committee on Defence Preparations in 1951 to examine and report on the scales of provisioning and other requirements by the Services. The Committee consisted of G.P.N. Watt, H.F. Richardson and Major-General J.H. Cannan and reported on 7 November 1951 with the recommendation to hold a portion of the reserve stocks in the form of cloth instead of made-up items and secondly, that patterns, specifications and manufacturing details of Service clothing and materials in common use by the three Services should be standardised.<sup>87</sup> Despite the information provided to the Committee by the Department of Supply about serious delays (up to 12 months) incurred by manufacturers to get capacity production running, even if all materials were available, the Committee took the view that it would be preferable to keep stock of materials for some of the reserves instead of fully made up clothing. The detailed recommendations for reserve stocks covered the Army forces in Australia and also in overseas locations. The locally based Army should keep only three months' reserves of made-up items, thirteen months' reserves of locally supplied materials and eighteen months' reserves of imported materials. The Australian Forces overseas should

keep six months' reserves of made-up items in their overseas location plus another three months' reserves in Australian depots, and ten months' reserves of local materials plus eighteen months' reserves of imported materials.<sup>88</sup>

The Committee also compared the scales of issue of clothing items between the three Services and discovered a large number of discrepancies. For example, Air Force personnel were supplied with six pairs of socks, but Army personnel, who would have a greater need for a larger number of socks, received only three pairs. There were several other instances in which Air Force personnel were issued with more clothing items than Army personnel. It led the Committee to urge the three Services to review their initial scales of issue. These efforts, together with a standardisation of patterns where possible and with a portion of reserves held in materials instead of made-up items, would, the Committee argued, result in economies without jeopardising the Services' ability to be mobilised at short notice. The Committee's recommendations would have an impact upon the forward planning of the Australian Army (and the other two Services), but they also had an impact upon the industry supplying the uniforms. The proposed standardisation of patterns between the three Services would assist the industry in achieving greater economies of scale by enabling them to produce larger runs of the same garment. This made it more attractive to private firms to take on subcontracts. Another advantage would be that the Army's Ordnance Department required less storage space for made-up items, but this was counteracted by the fact that the Clothing Factory's storage area for bolts of materials would be bursting at the seams or that the mills would be required to hold on to their finished cloth. Another disadvantage of keeping large amounts of materials (instead of finished garments) in reserve would be the risk that in times of war it could produce bottle necks in the production, resulting in delays in the supply.

The idea to produce uniforms only when required and simultaneously reduce storage space of finished garments really took hold in the early 1970s. In the wake of the Joint War Production Committee's recommendations and by now with the aid of computers, Army depots started to assemble schedules of monthly usage and frequency of use (MUFs) for uniforms to plan their holdings. One Sydney depot altered the MUF for almost the entire range of clothing items at their depot in order to down-scale the holdings. In his letter to Ordnance 12 of DOS, Major P.J. Eppel stated that a reprogramming of the computer for the MUF retained the

stock to a desirable level of six months' supply.<sup>89</sup> When stocks reached a level below the desired MUF level, requests for uniforms would be submitted and orders placed with the manufacturers. It is easy to see how the MUF system influenced the production levels at the factories and they, in turn, were made to change their logistics. Orders would be relatively small and directed at specific depots, but they must be filled immediately. This is exactly what later came to be called the JIT system of production, still in use at the Australian Defence Apparel factory, and it can be argued that the Australian Army's need for greater efficiency in the supply of uniforms played a significant role in enabling this system to be introduced into the clothing manufacturing industry.

### BODY MEASUREMENTS FOR A BETTER FIT

The logistics involving stockholdings of uniforms is not just a matter of keeping the required quantities of garments; they also must be on hand in the required sizes. To provide uniforms in the correct size for each serviceman or woman has always been a challenge. Each Army unit would at regular intervals draw up order lists of the number of garments needed in their corresponding sizes and often this was based on some form of body measurement by the local depot attendant or sizes were simply based on those prevailing in menswear shops. The British Army had been faced with the problem of fitting both British men of Northern European body lengths and weights and Indian men with different average body lengths and weights. Soon after the Second World War, therefore, the Second Commonwealth Defence Conference on Development, Design and Inspection of Clothing and General Stores, held in 1947, resolved that an investigation into body measurements and sizing of clothing should be carried out in the UK and in India. This was to be a scientific approach in collecting records of heights and weights using large samples of populations.<sup>90</sup> The idea of using anthropometric data for use in the making of uniforms was taken up and the results of research by several scientists were presented at the Third and Fourth Commonwealth Conferences. The scientists pointed out that the use of anthropometric information was not new, and that about 140 years earlier measurements of Scottish soldiers had been taken and also that US soldiers had been measured in 1919. However, the results of these data collections had been disregarded in clothing development, principally due to a lack of collaboration between the relevant authorities and the manufacturers.<sup>91</sup> The paper went on to say

that more recently, more data had been collected by the RAF on 16,000 RAF flying personnel, and 30,000 women in the Woman's Auxiliary Air Force. Of particular interest were the findings of Commonwealth flying personnel—1600 Australians, 4000 Canadians and 550 New Zealanders—whose average weight for the same age and height was found to be about 5lb. greater than their UK counterparts.<sup>92</sup> If these findings were correct, it would mean that the Australian Army should not adopt the standard sizing categories of the British Army, but should instead carry out its own data collection and draw up its own range of sizing from the results. The procedure for the development of the correct sizing of clothing involved making up a prototype garment for a particular body measurement, to be tested on at least 20–50 subjects with further measurements taken and estimates for tolerances used in the tailoring trade. A set of garments would then be made up—one in each size—and checked again and adjusted where required and the final results would form the basis for the correct sizing requirements. It would be a systematic way to design the Army's range of uniforms. Whether or not the Army at that time undertook any large-scale anthropometric collections is doubtful and certainly no reports have been located within the archival material researched. But it is known that in much later decades one or two such collections have taken place, including measurements of 40 Army and Air Force women in Canberra and Melbourne who until 2013 had been wearing DPCU combat outfits in men's sizes and a fit to suit male body shapes.<sup>93</sup>

In the evolution of the Australian Army uniform the hallmarks of science have been imprinted. Scientists have made their contributions to the development of camouflage uniforms, in the supply of dyes, in the battle against dermatitis, in the impregnation of fabrics to fight against tropical illnesses and parasites, in the development of new textiles and in shrink proofing of socks, in the development of new textile machines and in new manufacturing processes, in developing a more efficient logistical system and in determining a better fit and sizing of clothing. In some areas, the Army had been the driving force, such as in the demand for cotton material which boosted the importation and further development of selected cotton varieties and eventually led to a rapid development of the Australian cotton industry. In other areas, scientists drove the technology, but even then, without the collaboration of the Army the new technology could never be introduced. The examples described in this chapter are key reminders that throughout the history of the Australian Army uniform

there has always been a close collaboration between science and Army, between research and defence.

When scientists became involved in the development of the Australian Army's combat uniform, especially from the 1930s onward, innovation proceeded rapidly across a number of fronts and it resulted in new products and new processes of manufacture, providing backward linkages from the uniform industry to numerous suppliers of inputs. One development that stands out is the transformation of the uniform by the use of camouflage and dyes. It involved research, both academic and industrial, and also called for a strong working relationship between the Army and the chemical industry. A barrage of experiments were arranged, some successful and some less so, to determine the most suitable patterns and colours that would make the soldier 'melt' into his environmental background. Camouflage fabrics today are still the most visibly prominent aspect of the Army's combat uniform.

Notwithstanding the importance of the protection offered by the camouflage uniforms, science also paid attention to the health of the soldier. This was displayed by research to prevent dermatological problems caused by some dyes used in the 'jungle' green uniforms. As modern developments in warfare methods became more sophisticated with the application of highly toxic chemicals and radiation, innovation into military textiles was further accelerated. Health and protection became the key notes in the transformation of the uniform. Comfort also became a notable feature as the science of body measurement, a basic but often overlooked aspect of military uniform production, started to make its way into the design process.

The Schumpeterian interpretation of innovation includes improvements in manufacturing processes and these are clearly evident in the investment by the Clothing Factory in the computer-driven Gerber S90 cutting machine. The process of uniform design and the most efficient layout of the pattern pieces on the fabric became a simple CAD operation, complemented by the Gerber machine which was able to cut through 200 layers of shirting fabric and 100 layers of camouflage cotton at once. It eliminated the tedious cutting by hand previously a feature of clothing industry skills.

Tropical warfare demanded fabrics appropriate to the temperature and humidity. Perhaps one of the most intriguing finds of this research were documents pointing directly at the Department of Defence's Secretary, Malcolm Shepherd, as the instigator for a redirection of the Australian cotton industry and he could possibly be regarded as the 'father' of the

modern Australian cotton industry. In 1937, the cotton growers were given very direct instructions to replace the harsh cotton varieties then in use in favour of American cotton varieties with much softer characteristics and more suitable for the Army's uniform. The outbreak of the Second World War soon after delayed this change in direction of the industry and was further delayed due to the need to research and further develop American varieties that would be best suited to Northern New South Wales and Queensland conditions, resulting in field trials, seed growing and, finally, the availability of this seed to growers. It was not until the 1960s when the results of the change became obvious and the industry took on such dimensions as to become one of the leading Australian commodity export industry.

## NOTES

1. D.P. Mellor, 'The Role of Science and Industry', in *Australia in the War of 1939–1945*, Series 4 (Civil), Part V, Chapter 23, p. 531.
2. This assertion is based on Ann Elias, 'William Dakin on Camouflage in Nature and War', *Journal of Australian Studies*, 32, no. 2, p. 252. Ann Elias is Associate Professor of Theoretical Enquiry at Sydney College of the Arts. Until 2011 her particular interests were the study of artists and camouflage and the work of Professor Dakin.
3. Ann Elias, 'William Dakin on Camouflage in Nature and War', *Journal of Australian Studies*, 32, no. 2, p. 255.
4. Ann Elias, 'William Dakin on Camouflage in Nature and War', *Journal of Australian Studies*, 32, no. 2, p. 255.
5. Theodore Roosevelt, *African Game Trails: An Account of the African Wanderings of an American Hunter-Naturalist*, London, 1910, p. 506.
6. Theodore Roosevelt, *African Game Trails: An Account of the African Wanderings of an American Hunter-Naturalist*, London, 1910, Appendix E—Protective Colouration, pp. 501–520.
7. Theodore Roosevelt, *African Game Trails: An Account of the African Wanderings of an American Hunter-Naturalist*, London, 1910, pp. 506–507.
8. Theodore Roosevelt, *African Game Trails: An Account of the African Wanderings of an American Hunter-Naturalist*, London, 1910, pp. 509–510.
9. Ann Dirouhi Elias, *Camouflage Australia: Art, Nature, Science and War*, 2011, Part 5. Also referred to in Eileen Chanin's review of this book in *Journal of the Royal Australian Historical Society*, 98, No. 1 (June 2011), p. 151.

10. D.P. Mellor, 'The Role of Science and Industry', in *Australia in the War of 1939–1945*, Series 4 (Civil), Part V, Chapter 23, p. 534.
11. D.P. Mellor, 'The Role of Science and Industry', in *Australia in the War of 1939–1945*, Series 4 (Civil), Part V, Chapter 23, p. 541.
12. AWM81, 77 Part 1, W.J. Dakin, *Camouflage Report 1939–1945*, p. 46, listed in Ann Elias, 'The Organisation of Camouflage in Australia in the Second World War', *Journal of the Australian War Memorial*, <https://www.awm.gov.au/journal/j38/camouflage.asp> (accessed 18 September 2014).
13. Ann Elias, 'The Organisation of Camouflage in Australia in the Second World War', *Journal of the Australian War Memorial*, <https://www.awm.gov.au/journal/j38/camouflage.asp> (accessed 18 September 2014). Dakin's letter to the Hon. John Curtin is located in NAA: C1707, 19, *Camouflage Association with Army and War Cabinet Addendum*.
14. In explaining that 'camouflage has an historical connection with cowardice', Elias draws on the work of Alexander Nemerov who explained that both Roosevelt and Nietzsche had independently argued that 'camouflage was a form of effeminate cowardice' and that 'it all but announced an unmanly desire to hide instead of fight'. Ann Elias, 'William Dakin on Camouflage in Nature and War', *Journal of Australian Studies*, 32, no. 2 (2008), p. 257.
15. NAA: MP222/1, 13 K, *Letter from W.J. Dakin to Engineer in Chief*, 19 September 1942.
16. NAA: MP222/1, 13 K, *Letter from W.J. Dakin to Engineer in Chief*, 19 September 1942.
17. D.P. Mellor, 'The Role of Science and Industry', in *Australia in the War of 1939–1945*, Series 4 (Civil), Part V, Chapter 23, p. 540.
18. NAA: MP222/1, 13 K, *Report from Captain V.F. Tadgell to Engineer in Chief*, "Camouflage—Individual Concealment in New Guinea", date obscured, approximately October 1942.
19. NAA: MP222/1, 13 K, *Report by Captain V.F. Tadgell*, 'Report on Colouration of Uniforms and Skins for Service in NG', 5 October 1942.
20. NAA: MP222/1. 13 K, *Report by C.L.O. Streeton*, *Result of Discussion with Officials of Imperial Chemical Industries, Ltd.*, 23 September 1942. Charles Ludwig Oliver Streeton was Technical Director of the Army Inventions Directorate and the only son of well-known Australian painter Sir Arthur Streeton.
21. For an overview of Colonel Charles Halliley Kellaway's distinguished career, see *Australian Dictionary of Biography*, 9, Melbourne University Press, 1983. <http://adb.anu.edu.au/biography/kellaway-charles-halliley-6910> (accessed 31 July 2014).

22. NAA: MP222/1, 13 K, *Letter from Major C.W. Bayly to Deputy Director of Military Operations*, 4 November 1942.
23. NAA: MP222/1, 13 K, *Letter from Major H. Harcourt to Director of Military Operations*, 13 January 1943.
24. NAA: MP222/1, 13 K, *Letter from Major H. Harcourt to Director of Military Operations*, 13 January 1943.
25. NAA: MP222/1, 13 K, *Report by Captain V. Tadgell to Engineer in Chief*, 7 November 1942. Captain Tadgell was frequently asked to test Australian-developed dyes, paints and greases under jungle conditions.
26. NAA: MP222/1, 13 K, *Letter from Captain V.F. Tadgell to Engineer in Chief*, 'Uniforms for New Guinea', 13 October 1942.
27. D.P. Mellor, 'The Role of Science and Industry', in *Australia in the War of 1939-1945*, Series 4 (Civil), Part V, Chapter 23, p. 540.
28. NAA: MP222/1, 13 K, *Report from Engineer in Chief to Chief Engineer, First Australian Army, 'Camouflage Uniforms'*, 16 October 1943. 'SORE Camflg' stands for Staff Officer, Royal Engineers, Camouflage.
29. NAA: MP222/1, 13 K, *Report from Engineer in Chief to Chief Engineer, First Australian Army, 'Camouflage Uniforms'*, 16 October 1943.
30. NAA: MP222/1. 13 K, *Letter from Brigadier J.W.A. O'Brien to Engineer in Chief*, 5 October 1943.
31. 2 Australian Corps was established in early 1942 and disbanded at the end of the Second World War. It contained the 3rd, 5th and 11th Divisions of the Australian Military Forces. 2 Australian Corps operated first in Sydney, then in Queensland and subsequently in New Guinea. There were two other Corps at the time: 1 Australian Corps and 3 Australian Corps. Sources sometimes use Roman numerals for the Corps, i.e. I, II or III Australian Corps.
32. NAA: MP222/1, 13 K, *Letter from Brigadier J.W.A. O'Brien to Engineer in Chief*, 5 October 1943.
33. NAA: A5799, 25/1962, T.K.W. Overton, 'Camouflage Colours for Tropical Theatres, Summary of Paper U.K. 17', *Seventh Commonwealth Defence Conference on Clothing and General Store*, 1962.
34. NAA: A5799, 25/1962, 'Discussion of Paper U.K. 17', *Seventh Commonwealth Defence Conference on Clothing and General Store*, 1962.
35. NAA: A5799, 25/1962, 'Design and Development of a New Jungle Warfare Uniform: Progress to Date', presented by Australia, 'Summary of Paper Aus.7', *Seventh Commonwealth Defence Conference on Clothing and General Store*, 1962.
36. NAA: MP742/1, 61/17/68, *Letter from Deputy Adjutant and Quartermaster-General, Allied Land Forces, Southwest Pacific Area to LNG*, 21 May 1943.

37. NAA: MP742/1, 61/1/441, *Letter from Director-General Medical Services to 2/2 and 2/6 Australian General Hospital and 3 Australian Camp Hospital*, 9 May 1944.
38. NAA: MP742/1, 61/5/16, *Letter from Director of Ordnance Services, Allied Land Forces, to Chief Inspector of Stores and Clothing*, 8 February 1943.
39. NAA: A5799, 93/1949, *Second Commonwealth Conference on Development, Design and Inspection of Clothing and General Stores, 1949, Recommendations*, p. 2.
40. AWM54, 187/9/1, *Report by Raymond C. Bushland, 'Treatment of Uniforms for Protection against Larval Mites (Chiggers)'*, 3 June 1944, and summary reports by Major R.N. McCulloch to 10 October 1943.
41. NAA: A705, 39/1/1963, Part 1, *Clothing—Design and Inspection of [Uniforms] under Commonwealth Advisory Committee on Defence Science*. The document provides only the titles of paper presented and thereby gives an overview of the widespread nature of clothing-related research conducted at that time. A separate article written in 1962 by A.B. McQuade, scientist at the CSIRO in Parkville, Victoria, of which the Defence Standard Laboratories were a part, relates the responses of test cultures of *Memnionella-Stachybotris* fungi (which utilise cellulose as a major carbon source and thus damage fabrics made of plant fibres), which were placed in test tubes plugged with cotton wool and kept in a dark environment. An understanding of the types of cellulose materials preferred by this type of fungi would have been crucial to determining ways in which the fabrics could be made resistant to the fungi. It is therefore quite possible that the research by McQuade was part of the research presented at the 1963 meeting. A.B. McQuade, 'Morphogenesis and Nutrition in the Memnionella-Stachybotrys Group of Fungi', *Journal of General Microbiology*, 30, no. 3 (1963), pp. 429–435.
42. NAA: A705, 39/1/1963, Part 1, *Clothing—Design and Inspection of [Uniforms] under Commonwealth Advisory Committee on Defence Science*.
43. NAA: MT1274/1, 65/02/167, *Committee on Post War Dress, Final Report, First Draft (Incomplete)*, (1948), p. 6.
44. NAA: MT1274/1, 65/02/167, *Committee on Post War Dress, Final Report, First Draft (Incomplete)*, (1948), p. 7.
45. NAA: A816, 11/301/848, Attachment 9, Fourth Commonwealth Defence Conference on Clothing and Stores, Paper Presented by Canada, 'The Ballistic Resistance of Textiles' by J.V. Weinberger and H.A. Delcellier.
46. The two atom bombs dropped on Hiroshima and Nagasaki were made of highly enriched uranium-235.
47. NAA: A5799, 25/1962, *Summary of Paper AUS.9, 'Impermeable Protective Clothing' by J.P. Gleeson, Australia*.

48. NAA: A5799, 25/1962, *Summary of Paper AUS.9, 'Impermeable Protective Clothing' by J.P. Gleeson, Australia.*
49. NAA: A5799, 25/1962, *Summary of Paper AUS.9, 'Impermeable Protective Clothing' by J.P. Gleeson, Australia.*
50. The CSIR was the forerunner of the CSIRO—Commonwealth Scientific and Industrial Research Organisation.
51. NAA: 508/1, 61/704/564, *Memorandum from F.R. Sinclair, Secretary, Department of the Army, to The Secretary, Council for Scientific and Industrial Research, 27 October 1941.*
52. 'Unshrinkable Wool—New Process Evolved—Work at McMaster Laboratory', *Cairns Post*, 8 August 1940, p. 1.
53. NAA: MP508/1, 61/704/564, *Letter from G. Lightfoot, Secretary, Council for Scientific and Industrial Research, to The Secretary, Department of the Army, 24 September 1941.*
54. NAA: MP508/1, 61/704/564, *Letter from G. Lightfoot, Secretary, Council for Scientific and Industrial Research, to The Secretary, Department of the Army, 24 September 1941.*
55. Specifications are required to enable tenders for contracts to be written and to inspect the products upon receipt in stores.
56. NAA: B1535, 733/1/251, *Drill Khaki Local Manufacture*, Report from Secretary to the Contract Board, to the Minister, 9 April 1937, p. 3.
57. NAA: B1535/0, 733/1/251, *Letter from Secretary, Department of Defence, to Minister for Defence, 9 April 1937.*
58. The cotton bounty system, amended periodically, remained a feature of the cotton industry until 1971 when it ceased to operate.
59. ABS, Catalogue 1301.0, *Year Book Australia, 1930*, p. 518.
60. J.J. Basinski, *Cotton Growing in Australia: An Agronomic Survey* (CSIRO, 1963), p. 81.
61. J.J. Basinski, *Cotton Growing in Australia: An Agronomic Survey* (CSIRO, 1963), pp. 90 and 98.
62. Industry Commission, *The Textiles, Clothing and Footwear Industries*, Report No. 59 (Canberra, 9 September 1997), pp. xxv–xxvi.
63. Industry Commission, *The Textiles, Clothing and Footwear Industries*, Report No. 59 (Canberra, 9 September 1997), p. 31. Some of the computer-related terminology used in the report has since been changed, but CAD and the related term CAD/CAM (Computer Aided Design and Computer Aided Manufacturing) are still in use today.
64. Industry Commission, *The Textiles, Clothing and Footwear Industries*, Report No. 59 (Canberra, 9 September 1997), p. 32. In the latter decades of the century, the commercial clothing sector was under siege from cheaper imports and this was also a factor in the reluctance of firms to invest in innovation in Australia.

65. This information was obtained in an interview with Maverick Spiteri, Operations Manager, Australian Defence Apparel Pty.Ltd., on 27 June 2013.
66. Interview with Maverick Spiteri, Operations Manager, Australian Defence Apparel Pty.Ltd., on 27 June 2013.
67. See Raelene Frances, *The Policy of Work: Gender and Labour in Victoria, 1880–1939* (Cambridge, 1993), Introductory chapter, especially pp. 2–3 and 7, which contains comments on arguments about de-skilling of workers versus skilled workers and the process of specialisation versus fragmentation of skills. For a brief overview of Frederick Taylor's *The Principles of Scientific Management* (written in 1911), refer to Anne M. Blake and James L. Moseley, 'Frederick Winslow Taylor: One Hundred Years of Managerial Insight', *International Journal of Management*, 28, 4, Part 2 (December 2011), pp. 346–353. Blake and Moseley summarise Taylor's four principles on pp. 348–349: (1) scientifically examine each element of a job; (2) systematically select, train, teach and develop each individual worker; (3) work cooperatively with the worker to ensure that the job is being done in the best possible way; (4) give the manager the responsibility to determine how the job should be done, while giving the worker the responsibility to do the job.
68. Commonwealth Government Clothing Factory, *Annual Report for the Year Ended 30th June, 1912*, Commonwealth Parliamentary Paper No. 16/1913, p. 4.
69. The prices quoted here refer to greatcoats of 25 oz. woollen cloth, dismounted services. There were different coats for the mounted services and there were also coats for both services made of 18 oz. cloth. The Clothing Factory's garment rates are the actual selling price and are inclusive of a profit of 9 per cent, packing and freight. Commonwealth Government Clothing Factory, *Annual Report for the Year Ended 30th June, 1913*, Commonwealth Parliamentary Paper No. 16/1914-17, Table B, p. 7; Commonwealth Government Clothing Factory, *Annual Report for the Year Ended 30th June, 1914*, Commonwealth Parliamentary Paper No. 312/1914-17, Table B, p. 6.
70. Commonwealth Government Clothing Factory, *Annual Report for the Year Ended 30th June, 1915*, Commonwealth Parliamentary Paper No. 313/1914-17, p. 3.
71. Interview with Maverick Spiteri, Operations Manager, Australian Defence Apparel Pty. Ltd., on 27 June 2013. 'Work-in-progress' costs the factory in labour, materials and overheads, but is not reimbursed until the work has been completed and payment has been received. It is therefore important for a business to render the period between 'order in' and 'product out' as short as possible.

72. NAA: MP 956/2/0, 14, "Jensen Papers", *Defence Production in Australia, Chapter 5—The War of 1914–1918: The Government Factories and Establishments*, pp. 162–163.
73. Bradon Ellem, *In Women's Hands? A History of Clothing Trades Unionism in Australia*, Kensington, 1989, p. 18.
74. Bradon Ellem, *In Women's Hands? A History of Clothing Trades Unionism in Australia*, Kensington, 1989, p. 81.
75. NAA: A1952/2, 474/9/130, *Annual Report of the Manager for the Year Ending 30th June, 1919*.
76. NAA: A1952/2, 474/10/42, *Annual Report of the Manager for the Year Ending 30th June, 1922*.
77. Bradon Ellem, *In Women's Hands? A History of Clothing Trades Unionism in Australia*, Kensington, 1989, p. 163. Ellem presumably means 'layers of fabric'.
78. NAA: A1952/2, 474/9/57, *Department of Defence Clothing Factory Annual Report, Statement Giving Particulars of Plant and Depreciation Written Off to 30th June, 1918*.
79. NAA: A1952/2, 474/10/26, *Clothing Factory Statement of Accounts, 1919–1920*.
80. Bradon Ellem, *In Women's Hands? A History of Clothing Trades Unionism in Australia*, Kensington, 1989, p. 163. Charles Eugène Bedaux was a follower of Frederick Taylor and applied the concept of a rating assessment system for defined skills together with a timing element based on the time-and-motion system.
81. Peter Foreman, 'The Transfer of A Technology: A Study of the Commonwealth of Australia Government Factories, 1910–1916', *Accounting History*, 6, no. 1 (2001), p. 39. Foreman's source material is NAA: MP598/30, 3, MSS and "Supporting Papers", Chapter 3, "General Administration of the Government Factories", p. 195 (not AAV MP/598 item 3, p. 195 shown in his article).
82. NAA: A705, 39/1/1748, *Surplus Capacity in Clothing & Textile Industries, Advancing of Service Procurement Programmes, Notes on Conference with Representatives of Service Departments and Treasury, 14 March, 1952*, pp. 1–2.
83. NAA: A705, 39/1/1748, *Surplus Capacity in Clothing & Textile Industries, Advancing of Service Procurement Programmes, Notes on Conference with Representatives of Service Departments and Treasury, 14 March, 1952*, pp. 2–3.
84. NAA: A705, 39/1/1748, *Surplus Capacity in Clothing & Textile Industries, Advancing of Service Procurement Programmes, Notes on Conference with Representatives of Service Departments and Treasury, 14 March, 1952*, p. 3.

85. An attempt to compile this important information was made by staff of the Master-General of Ordnance Branch (MGO) in 1946 when a *History of the MGO Branch of the Staff; L.H.Q., 1939–1945* was produced. NAA: MP767/3, WHOLE SERIES, Preface, p. 1.
86. NAA: A5954, 1794/19, *Joint War Production Committee, Army Requirements on “Basis of Enquiry” Laid Down in Defence Committee, April, 1949.*
87. NAA: A4933, DPC51/44, *Committee on Defence Preparations, Report of Committee, 7 November 1951*, p. 15.
88. NAA: A4933, DPC51/44, *Committee on Defence Preparations, Report of Committee, 7 November 1951*, p. 7.
89. AWM328, R8400/1/1C, *Letter from Major P.J. Eppel, SOSCO, to Ordnance 12 of DOS, 10 January 1971.*
90. NAA: A5799, 93/1949, *Resolutions and Recommendations of the Second Commonwealth Conference on Development, Design and Inspection of Clothing and General Stores, 1947*, Item 4.
91. NAA: A816, 11/301/848, Attachment 61, R.A.F. Institute of Aviation Medicine, *Further Experience of the Use of Body Measurements in Sizing Clothing*, p. 1.
92. NAA: A816, 11/301/848, Attachment 61, R.A.F. Institute of Aviation Medicine, *Further Experience of the Use of Body Measurements in Sizing Clothing*, p. 2.
93. ‘Uniform Fit for Females’, *Army*, 24 October 2013, p. 7.



## Driving Forces of Military Innovation

One look at the Australian Army combat uniform today shows that the design has come a long way since the First World War. There have been dramatic changes in the fabrics, the type of garments, their cut, closures and colours. The very first Australian *Dress Regulations* were introduced on 19 December 1903, and described the dress for officers of the Military Forces of the Commonwealth of Australia. It took another three years before the Orders for Dress and Clothing, published on 12 November 1906, described the dress to be worn by officers, rank and file as well as cadets. These 1906 Regulations were much more extensive and covered all dress occasions for all Army Service Corps existing at the time.<sup>1</sup> Needless to say, these regulations represented a vast array of garments of different patterns, colours and fabrics. However, as noted earlier, this investigation is concerned solely with combat uniforms, also known as the Service Dress or Field Service Dress, worn by all personnel in the Infantry, Artillery, Light Horse, Engineers and Signals sections.

The first Australian Service Dress is best remembered for its drab coloured service jacket, breeches, puttees and distinctive slouch hat, which was complemented by a greatcoat for protection in cold weather. This was the outfit worn in the field during the First World War. The jacket was made from a sturdy woollen fabric, the breeches from strong Bedford cord and the greatcoat from a warm, waterproofed material. Remarkably, the overall look of the uniform remained essentially unchanged until close to

the Second World War, some forty years later, giving the impression that it was simply reproduced over and over.<sup>2</sup>

To fully understand the rationale behind these changes we should reflect upon several factors that were crucial in driving change in the making of the Australian military uniform. A number of key external factors have already been discussed in the previous chapter. They were directly linked to scientific progress: research and development in the science of camouflage; research and development in other sciences, such as dermatology and chemistry; the development of new military textiles; and improvements in textile and clothing manufacturing techniques. However, they do not tell the whole story. There were also factors more directly linked to war situations, combat and Army personnel: the locations where Australians fought in battle; changes in combat methods (focusing on chemical warfare); and comments and complaints from the wearers of the uniforms. The driving forces discussed in these two chapters together led to the changes we have seen in the Army uniform over the past century. At times, several of these forces combined to bring about change; at other times, only one factor was responsible. It is unsurprising that advances in military technology appear to reach peaks during periods of war when the need to outsmart the enemy is the greatest. If technological advances could be quantified and depicted on some graph, we should see periods of upswings succeeded by periods of latency, followed by another upswing during the following unrest, and so on. At all times, however, and in general, innovation does not occur in isolation from the general historical, economic, social, geographic, scientific, technological and organisational context. In this sense, innovation, and by inference innovation in the Australian Army uniform, depends on one or several driving forces to occur. For example, research into physical forces may lead to new technology in the construction of a machine, which impacts upon the way a factory operates. It may lead to organisational changes, labour and wage changes. It will most often result in changes in product output, which may be either of a higher quality or a higher quantity, which will have an effect upon values and prices of these products. In turn, this will impact on yet another aspect of the process, and so on. Within the economic system as a whole there is perpetual instability, old technology is dislodged and new technology takes its place. Design changes and improvements in the military uniforms are no exception to these interactions.

## LOCATIONS OF WAR AND CLIMATIC FACTORS

During the First World War, the Australian military forces found themselves in a variety of natural environments. Using the classifications of Köppen-Geiger, the troops were in the hot and arid desert climate in Egypt, the dry, hot temperate climate of Gallipoli and, later, in the humid temperate conditions of France and Belgium.<sup>3</sup> Three decades later, in the Second World War, Australians again fought in contrasting climate zones: once more in the dry desert and hot arid conditions of North Africa and the temperate, dry and hot environments of Greece and the Middle East, but also in the humid equatorial climate of New Guinea, Malaya and Borneo. The environment was different again during the campaigns in Korea in the 1950s and in Vietnam in the 1960s and 1970s, where the men encountered a mixture of hot tropical jungle conditions and cooler upland climates. The variations in these conditions called for dramatic changes in the clothing worn by the troops. There could hardly be a greater contrast between the heavy woollen outfit worn by Australian troops in the early part of the twentieth century and the loose-fitting, camouflage cotton drill outfit worn in Afghanistan and Iraq in the late twentieth and early twenty-first century. The nature of a century-long series of pattern changes is worthy of historical investigation, but a tedious description of every individual modification provides no insight into the rationale behind the changes or into any technological or scientific advances that may have provided the 'push' for innovations in the development and manufacture of the Army uniform. Embedded into the rationale is the fact that every campaign has been fought in a different geographic and climatic environment. Clearly, the combat uniform would have to be appropriate for each of these conditions in order to provide optimal functionality and protection and the desire to develop such a uniform required substantial research, design, experiments and field trials.

When the Australian Imperial Force (AIF) was stationed for training in Egypt in 1915, prior to embarking for Gallipoli, they soon discovered that their uniform was uncomfortable in the hot and dry weather they encountered. They had been sent out in (or belatedly issued with) their Service uniform, leaving the men sweltering in their woollen tunics, cord breeches and puttees. While stationed in camps waiting to be called to the ships that would bring them to Gallipoli, the men were wearing fatigues (overalls) and when the sun was beating down on them during the day they were quick to find relief by altering their fatigues. This 'modification' was carried out

throughout the ranks and, according to General Sir John Monash, was in fact instigated by himself and also adopted by the leadership, as is evidenced from a letter he wrote to his wife Victoria on 18 July 1915,

We allow the men great freedom in dress. I started it and the others followed. You know what 'shorts' are? They are khaki overalls, cut down so as to finish four inches above the knee, like a Scotsman's trews. These worn with short underpants, and with boots and puttees, look really well, the leg showing from two inches below to four inches above the knee and soon getting as brown as the face and hands. I have dressed like that for some weeks, with khaki short and no collar or tie. Even Godley dresses the same now and all the other brigadiers also. It is a very comfortable kit, especially for climbing hills.

As to the men, well, they wear the same kit as the above, but no shirts, no puttees, and no socks, so you see here is nothing left but the boots and trews ... Of course, the men don't fight in that kit (or want of it), but that is how I allow them to run about in their spare time, and they enjoy it immensely.<sup>4</sup>

The men's adaptation of their fatigues to the climatic conditions became a topic of discussion among Commandants and the Quartermaster-General's Department, but it took another three years before the latter issued a request to all Australian Divisions for comments as to the introduction of khaki drill shorts as an additional garment to the trousers,

In view of the cases of cutting down trousers into shorts which have occurred repeatedly during previous summers, and of the causes which have lead [*sic*] to this practice, the question of introducing khaki drill shorts as an additional summer garment has been considered... It is desired to have the opinions and recommendations of Army Commanders on this proposal, based on the experience of summer campaigning in this war...<sup>5</sup>

However, by the time any decision regarding the provision of shorts could be made, the war had ended and the question was no longer a high priority. Whereas Monash had approved of the improvisation in the men's camp dress, the nurses were not so lucky. Upon arriving in Egypt in their close-fitting uniform dresses, they had, quite sensibly, been ordered by their Matron, a Miss Creal, to alter their uniforms, loosen their belts and make some other alterations to achieve greater comfort in the heat. Word soon got back to Melbourne where the Matron in Chief made a complaint

and requested that the Cairo-based Deputy Director of Medical Services, Colonel R.M. Downes, issue an order that no alterations were permitted and that any alterations already made should henceforth be reversed. The only concession made to the nurses was the wearing of tropical hats, 'as they will only wear those while they are in Egypt'.<sup>6</sup> It is entirely reasonable to argue that the Matron in Chief, stationed in Melbourne in a temperate climate, possessed no appreciation of the hot and dry conditions with which her nurses in Egypt were faced and that by loosening their belts some welcome air flow would have been introduced into the dresses.

The Matron in Chief's insistence upon retaining the current nurses' uniform without change was but a rare occurrence in the history of the Australian Army uniform. Modifications to provide for a higher degree of comfort under the different battlefield conditions were the order of the day, as is testified by the enormous amount of correspondence emanating from the Commanders of units, the Quartermaster-General's Department and, in later years, the Ordnance Services Department. Some of the recommendations, such as the decision to use a different fabric for breeches, had an impact beyond the immediate Army. Just prior to the First World War, Army authorities realised that light-weight uniforms should be provided whenever appropriate and that breeches made of a wool-based whipcord instead of Bedford cord would be more suitable under certain circumstances.<sup>7</sup> As an added bonus the whipcord would be cheaper to produce. The technology to manufacture this fabric rested in Britain and when the Military Board made the decision to establish the Woollen Cloth Factory in Geelong, it instructed James Smail, then Manager of the Factory, to investigate the latest machinery available in Britain and to report on the feasibility of producing the whipcord at the Geelong plant.<sup>8</sup> When the Woollen Cloth Factory commenced operations on 23 September 1915, it was able to produce, among other fabrics, a whipcord of 24oz. in weight and thereby created greater diversity in the manufacturing capacity of the Australian woollen textile industry.<sup>9</sup>

After the AIF had landed in Gallipoli and taken up positions against the Ottomans, they were commanded to continue their vigil during the night. However, there was some difficulty in distinguishing one's own men from the enemy moving close by and this caused the men to create ad hoc adaptations to the uniform. Roy Kyle, one of the Anzacs taking part in the Battle for Lone Pine at Gallipoli, remembered how the Australians sewed

white calico patches upon their backs in order to be distinguished from their Ottoman enemy in the darkness,

As the fighting would take place in the late afternoon and during dusk, the Australian troops wore white calico patches sewn to their backs and sleeves so that they could be distinguished from the Turk in the approaching darkness.<sup>10</sup>

The white calico patches were a unique example of the practical approach taken by AIF men and their leaders. It was an ‘in-field’ decision, driven by the circumstances, and resolved on the spot. It was perfectly suited to the environment and the semi-darkness in which the men were fighting.

It can be argued that the design of the Australian uniform of the first decades of the twentieth century bore little relevance to the Australian environment and would have been better suited to the temperate Northern European climate. However, when the troops were fighting the Germans in France and Belgium in the winters of 1916 and 1917, even the thick fabrics of which their uniform was made or the long woollen greatcoat they wore over the uniform hardly provided sufficient protection against the cold and wet. The men were thereupon issued with sleeveless sheepskin vests featuring the wool on the outside and fastened with three leather straps and worn over the jacket. Keeping the men warm was a task taken seriously by the Ordnance Services and a request was circulated among Commanders to provide suggestions and feedback on the clothing issued for winter. Brigadier General Evan Alexander Wisdom, who was command of the 7th Australian Infantry Brigade, even recommended that long-sleeved sheepskin coats be introduced.<sup>11</sup> His recommendation does not appear to have been taken up and the sleeveless sheepskin vests remained a key winter garment. The comfort of the men under these environmental conditions was also in the mind of King George V when he met briefly with General Monash and reputedly asked him,

‘Have the men all got overcoats?’ When I told him they had, and also water-proof capes, he said: ‘That’s fine. It always pays to look after the men’s comfort, doesn’t it!’ ... As we rode along, he constantly referred to the question of warm clothing, saying: ‘Take my advice and make sure you get the best of woollen warm clothing. It’s really very cold in France in the winter.’<sup>12</sup>

Fortunately, the King's mind could be put at ease as the AIF had left Australia dressed in uniforms made of thick Australian woollen cloth and their greatcoats were not only warm, they also reached to within a foot from the ground to keep the legs warm and could even be used as a blanket.<sup>13</sup>

When the troops encountered snow on the fields at the Western Front, another challenge arose: it was easy to spot the men in their khaki uniforms and greatcoats against the white background of a landscape in snow. This spurred Brigadier-General Evan Alexander Wisdom into making recommendations for the issue of white overalls, to be worn whenever there was snow on the ground.<sup>14</sup> Whereas the white calico patches sewn on the backs of the uniforms in Turkey would stand out against the khaki uniform and against the darkness and thus facilitated in the identification of one's own men, the white overalls recommended for issue in the snow in France served to blend the men into the background, so it was more difficult for the enemy to spot them. It was an early form of camouflage in the history of the Australian uniform.

The climate and the prevailing cold and wet weather in Europe posed even greater dangers to the men. The conditions in the trenches had proven to be detrimental to the health of the men, many of whom were suffering from pneumonia, diarrhoea and other illnesses. Trench foot was a particularly serious condition, which could lead to gangrene and the loss of a foot or a leg. It was caused by lengthy exposure of the feet to wet and usually cold conditions, a particular danger in trench warfare. Prior to the First World War, in 1912, socks had not been listed on the Scale of Issue and it was generally assumed that the men supplied their own.<sup>15</sup> This was at least partially confirmed in 1916 when a survey of the battalions in training camps in the United Kingdom revealed that, 'in fully 50% of the cases private socks are being worn'.<sup>16</sup> However, from the account of Roy Kyle it appears that two pairs of socks had been supplied along with other essential items on approaching Gallipoli in 1915, in which he noted that the backpack contained rations as well as '... one towel, one extra vest, socks, two pairs, greatcoat, cap, comforter, a change of underclothing (must die with clean underpants)...'.<sup>17</sup>

Socks were also on the Army's list of clothing and other items obtainable in Belgium during the First World War.<sup>18</sup> The list shows that the 'Socks—worsted' could be purchased for 1s.8d. It is believed that the Australian Red Cross was also supplying socks knitted by hundreds of

volunteers as part of 'comfort' parcels for distribution to the troops at the time.<sup>19</sup>

However, it was insufficient to have items of clothing supplied or otherwise available, it was equally, if not more, important to wash and dry items already worn for long periods. The collection, cleaning and re-supply of worn clothing was taken very seriously by Army authorities in the field. Lieut.-Colonel Robert Jackson, Assistant Adjutant and Quartermaster-General of the Third Australian Division, wrote to this effect to General Carruthers on Christmas Eve 1917: 'The first duty is to the troops in the front line, to see that they are kept with an adequate supply of clean and dry underclothing.'<sup>20</sup>

To prevent illness due to wet and dirty clothing, bath and laundry services were established in or near the camps, at times even local breweries and other factories with suitable hot water equipment were commandeered to be converted into baths and laundries. The men were placed on rotation to use the baths, hand in their dirty garments upon entry into the baths and receive clean clothing upon exit. Some of the laundry services were outsourced to existing French laundry services located near the camps, but in other locations the Ordnance Corps took control of the laundry needs and employed its own laundry staff. By late 1917, Ordnance Services managed laundries in Northern France and Belgium at Poperinghe, Mopouter, Moolenacker, Blendecques, Reningelst, Westouter, Ottersteene, Loker, St. Jans Cappel, Bailleul, Palmer, Steenwerck, Dranouter and Abbeville.<sup>21</sup> On the subject of laundries and baths, Monash wrote to his wife,

I have two divisional baths, one at Steenwerck, one at Pont de Nieppe, a suburb of the large town. In these are washed 2000 men daily, with hot water in great brewery tubs. Each man hands in his old under clothes and gets in exchange a complete clean outfit. I employ over 200 girls in the laundries washing and ironing the soiled clothes.<sup>22</sup>

This letter confirms that the baths and laundries were, in fact, a major undertaking, involving hundreds of civilians for the facilities under Monash's command and probably thousands of civilians when all the Army's bathing and laundry facilities in Northern France and Belgium are taken together. The bathing and laundry operations formed a major part of the men's regular routine and they played an enormous contribution in keeping the men clean and healthy. The regular washing, ironing and

mending of uniforms also lengthened the useful life of the garments and helped to diminish the need for shipments of new Army clothing. In other words, the laundry facilities contributed not only to the health of the men, they reduced the Army's budget for new clothing and the need for the production and shipment of new clothing from Australia to Europe. The role played by the laundries is generally overlooked in the literature, so a few words on the construction of these facilities will help to appreciate their value.

At times, 'in-house' engineering expertise was called upon to draw up a plan for the construction of a laundry or to make alterations to existing facilities to suit the needs of the Army. These were no mere afterthoughts or hurriedly set up camp facilities. Figure 8.1 shows the plans of the facilities at Palmer, used by XIII Corps from 28 September 1917.

The central building is divided into two sections: on the right are the dirty clothes boiler (using coal as fuel), the laundry, ironing room, steam disinfection chamber and the clean clothes store; on the left are the undressing room, baths room, drying room with towel room and dressing room. There are separate buildings for the drying of clothes and for mending. This was a building complex more akin to a factory, divided into separate processes and with 'specialist' labour. It was run as efficiently as war conditions would allow and was a credit to the Army's management of supply lines and of the health and comfort of the men.

Keeping a steady supply of clean and dry clothing and providing hot baths was just as much part of keeping the forces battle-ready as was the issue of their first uniform and arms. But here, too, different environments called for different solutions. In the tropical, humid environment of Vietnam, for example, there were special challenges in drying the washed clothing and keeping them free from mildew in storage.

It is not a particularly well-known fact that the Army had recognised Australia's own climatic challenges right from the beginning of the twentieth century. The range of outfits started to diverge from its British counterpart as early as 1906 when the *Orders for Dress and Clothing* was complemented by tropical clothing, to be worn by units in the northern, tropical parts of Australia and on Thursday Island. The material for the tropical jackets and trousers was a khaki cotton drill fabric which was much lighter in weight and allowed the body to breathe in the hot, moist climate. Breeches were replaced by long trousers except for mounted men, who still wore the knee breeches of either khaki cord or khaki drill. Instead of a greatcoat, the men were issued with a waterproof coat or cape.<sup>23</sup>



The tropical uniforms appeared to have been very popular among the men about to be sent to Thursday Island and were considered as good as, if not better than, their civilian clothes. There is evidence from the records of the Military Board that a number of men deserted prior to embarkation with their newly issued uniform. A hasty order ensued for the issuing of uniforms only after arrival on Thursday Island.<sup>24</sup>

The hot environment in Australia's northern regions with its tropical monsoon storms presented a special challenge for the design of suitable waterproof garments and soon the search was on for materials which would provide protection in the wet. In 1908 the Military Board received samples of waterproof coats or capes for use in the tropics from the Commandant in Queensland. The coats/capes were made of 'Tempeste' or oil skin and the Board issued a directive that fifty of these items be trialled in the Northern District and another fifteen on Thursday Island for a period of six months, whereupon a report as to the suitability of the material was to be presented to the Board.<sup>25</sup> This is an early example of field trials of military garments being held in Australia.

### CHEMICAL WARFARE

When gas was first employed in the First World War in October 1914, chemical warfare had entered the scene and war took on a new characteristic. At first, the French introduced an irritant gas (tear gas)—to little effect. A new shell for delivering poisonous gas (xylyl bromide) in stabilised liquid form together with an explosive had been developed by Professor von Tappan for the German army and designated the 'T-shell' in his honour, but when it was used by the Germans on the Eastern Front on 31 January 1915 it was found that the gas had failed to vaporise due to the cold weather.<sup>26</sup> A few months later, in April 1915, the Germans started filling artillery shells in large-scale attacks using chlorine, another poisonous gas, and chemical warfare henceforth became entrenched as a military strategy. The following year, both the Allied Forces and the Germans were using phosgene, bromine, arsenic and cyanide. But of all the gases employed, mustard gas (dichlor-ethyl-sulphide, also referred to as yperite), used for the first time by the Germans in July 1917, became the best known and was the most effective until the end of the First World War.<sup>27</sup> Although masks and respirators offered some protection against poisonous gases, an investigation by Major C.G. Douglas R.A.M.C. of the British Gas Directorate into casualties from yperite revealed that,

The face was frequently congested and swollen, small blisters were visible in many cases on the lower part of the face. A few had painful patches of blisters on the backs of thighs and buttocks and even on the scrotum,...<sup>28</sup>

These symptoms caused terrible discomfort to the men and field hospital beds were filled quickly with casualties. The number of casualties from gas rose in direct correlation to the usage of mustard gas, although the number of deaths from gas poisoning was actually very low. Between 1916 and 1918, the number of casualties from gas was 16,496, but only 323 men had died of gas poisoning, as Table 8.1 shows. However, the long-term after-effects of exposure to mustard gas expressed themselves in skin cancer, leukemia, several eye conditions, bone marrow depression and subsequent immunosuppression, psychological disorders and sexual dysfunction.<sup>29</sup>

By way of protection against gas inhalation, the British troops on the Western Front (and presumably also the Australian troops, as Britain supplied their war equipment) had been instructed on 23 April 1915 to cover their nose and mouth with cloths impregnated in a solution of sodium bicarbonate.<sup>30</sup> This was soon replaced by a cowl helmet impregnated with hyposulphite of soda and then by a phenate helmet. From the end of August 1916 and for the remainder of the First World War the British 'box respirator' was in use, consisting of 'a canister of large capacity, connecting by rubber tube with a flanged mouth-piece, ... slung from the shoulders and carried on the chest'.<sup>31</sup>

The respirators afforded protection to the respiratory system and to part of the face, but could not shield the men from yperite entering under the clothing. Some of their injuries to non-facial body parts may have been caused by particles of gas, rather than gas clouds, having descended upon the men and invaded the fabric of the clothing. The men required

**Table 8.1** Australian casualties from gas

<i>Year</i>	<i>Died of gas poisoning</i>	<i>Gassed</i>
1916	18	230
1917	84	4462
1918	221	11,804
Total	323	16,496

Source: *Official History of the Australian Army Medical Services, 1914–1918*, Volume II—The Western Front, 1st edn, 1940, Appendix I—Statistics of Casualties in the Great War, pp. 864–865

clothing that offered the highest level of protection against gas particle invasion. However, no mention is made of any research during the period, either in Britain or in Australia, to develop protection of the body against such particle invasion, but it has been recorded that impervious oil-proofed clothing had been employed during the First World War as protection against gas (as well as inclement weather). However, the heavy oil cloth restricted movement and was uncomfortable to wear, particularly in tropical areas.<sup>32</sup> An Army list of clothing and equipment items and prices paid for new issue while in Belgium during the First World War shows that no specially developed anti-gas clothing was on issue at the time and the list includes only box respirators, anti-gas goggles, anti-gas helmets with tube and anti-gas satchels and wallets.<sup>33</sup>

Lessons had been learnt from the employment and effects of chemical warfare during the First World War and both the British and Australian armies were better prepared during the next war. But progress was still very slow in the development of protective clothing. A list of anti-gas clothing held by the Clothing Section of the Australian Military Forces—Northern Command in March 1942 shows the items shown together with their sealed pattern numbers (see Table 8.2). These garments were made of oilskin and the gloves and over-boots were made of rubber, none of which could be stored for more than two years, even if in cool dry stores, before deterioration set in. It appears, therefore, that after a period of

**Table 8.2** Anti-gas clothing—sealed patterns, March 1942

<i>Pattern no.</i>	<i>Item</i>
Clo. 325	Gloves anti-gas
Clo. 328	Hoods anti-gas
Clo. 329	Jackets black anti-gas
Clo. 330	Sou'westers anti-gas
Clo. 331	Trousers black anti-gas
Clo. 341	Coats anti-gas light
Clo. 342	Capes anti-gas light
Clo. 343	Aprons anti-gas light
Clo. 345	Over-boots anti-gas light
Clo. 346	Jackets anti-gas light
Clo. 347	Trousers anti-gas light

Source: NAA: MP508/1, 305/737/264, *Letter from Lt.-Col. H.D. Morgan, Officer i/c Administration, Base Northern Command to Army Headquarters, Melbourne, 11 March 1942*

three decades oilskin and rubber were still employed as the major anti-gas protective material.

However, research into effective impregnates for clothing was progressing in the US, Britain (at the Chemical Defence Experimental Establishment in Porton) and also in Australia. A Chemical Warfare Board was established in 1924 under the chairmanship of Arthur E. Leighton, a British-born chemical engineer who at the time of his appointment was Chairman of the Board of Management of the Commonwealth Government Factories. Five years later, the board was renamed Chemical Defence Board to reflect more closely its purpose.<sup>34</sup> The board had a close link to the Chemical Defence Laboratories, which were also under the leadership of Leighton, and after the establishment of the Gas Protection Subcommittee further experiments were conducted in Australia to discover a method of impregnation of ordinary light-weight cloth. It was soon found that the British chemical composition code-named 'Anti-verm' when trialed under tropical conditions in Innisfail, Queensland, was absorbed into the skin instead of warding off mustard gas, and so defeating its purpose. The Australian Army rejected it immediately. Attention turned to products developed by the United States instead, resulting in the adoption of the impregnate CC-2, a chloroamide developed in 1924 at the Edgewood Arsenal of the US Chemical Warfare Service. The Secretary of the Defence Committee reported in 1943 that a number of tests had been carried out on 'the American type of impregnated clothing', in which presumably CC-2 impregnate was employed. An extract from the summary of results of the trials in Northern Queensland reads,

Complete protection was afforded to all areas which were covered by the clothing. It is to be noted that, in the absence of protection, an exposure to a C.T. 468, as was used here, would have resulted in over 75% of casualties. This high casualty incidence would have still resulted if impregnated under-pants only were worn in addition to ordinary battle dress.

From the results described in this report, it is clear that impregnated clothing of the type worn in these experiments, 'will give excellent protection over long periods, even though worn under service conditions for one week prior to exposure'.<sup>35</sup>

The document concluded that the 'American type of clothing' was satisfactory for use in tropical areas and the Defence Committee thereupon recommended that this type of clothing be made available for the RAAF.

All Australian Services, including the Army, were in need of impregnated clothing to afford reasonable protection against vesicant gases from the Second World War and beyond. And this posed some problems: the impregnate CC-2 was applied in the USA, where it was produced, using the so-called M1 process. This was a solvent-based technique. But Australia had neither the impregnate CC-2 nor the plant required for impregnation using the solvent process. Australia had been using the vat process (a water-based process) for the dyeing of the uncut fabric to obtain the 'jungle green' colour of the Australian Army uniforms adopted from the late 1930s and this was the only method applied in Australia at the time. However, a 1944 report by the Chemical Defence Board stated that 'the majority of the dyeing processes used for dyeing uniforms "jungle green" are not compatible with any known impregnation process'.<sup>36</sup> The American uniforms, on the other hand, were a different shade of green and offered protection against vesicant gases. Clothing impregnated by the American M1 process offered effective protection for a period of about three to four weeks, providing the American method of washing was used and the clothing was not washed more than twice during that period. Therefore, it was imperative to re-impregnate the clothing after washing. It was also recommended that the uniforms have flaps to cover openings so that any vesicant chemical warfare agents would be prevented from entering onto the skin.<sup>37</sup> Not only did Australia not have the capacity or the technology to apply the M1 process of impregnation; as explained above, it was also impossible to use the 'jungle green' vat-dyed clothing in combination with a solvent-based impregnation system and the uniform needed to be redesigned so any openings were covered with flaps. Australia had to either make drastic changes to its processes or look for alternative solutions. In order to overcome all these problems at once, the Chemical Defence Board wrote a draft statement for and on behalf of the Defence Committee. This statement included recommendations to obtain impregnated uniforms using the M1 process from the United States in the first instance, financed under the Lend Lease arrangements. But it was immediately recognised that these uniforms would need to be re-impregnated after some use and that it would be necessary to investigate the possibility of setting up a re-impregnation plant in Australia as well as the means to produce the impregnate locally. The draft statement handed to the Defence Committee read,

Upon consideration of the foregoing information, it appeared to the Defence Committee that the only practical way of acquiring initial supplies

of reasonably satisfactory impregnated clothing within a predictable time would be by obtaining from the United States outfits of clothing impregnated by the M1 process...

The Defence Committee also considered that as it was apparent that it would be necessary to make provision for the re-impregnation of such outfits by special solvent impregnation plants, the Department of Munitions should investigate and submit a report upon the possibilities of local production of the plant and impregnate for this, and the demands that such production would make on manpower and material resources.

[The Defence Committee thereupon decided] ... that supplies of impregnated clothing be obtained from the United States under Lend Lease arrangements; that the Services furnish statements of impregnated clothing requirements; that the Department of Munitions investigate the possibility of manufacturing locally the plant required for re-impregnation by the M1 process and the impregnate itself; that investigations should be made as to the availability of the plant from the United States to be imported into Australia; that the Defence Committee should then make recommendations as to whether the plant and impregnate should be imported or locally produced.<sup>38</sup>

The decision to obtain supplies of impregnated clothing from the United States—and not from Great Britain—indicates a significant turning point in Australia's war efforts. It is significant because in this instance Australia could not rely on technology from Britain and instead turned its attention to technological developments in the United States; by doing so, it signalled a new direction not only in an industrial but also in a political (defence) alliance. Australia's uniforms were now made and impregnated in the United States. The new alliance between Australia and the United States was subsequently reflected in other areas, including closer relations in the fields of science and foreign trade. The US–Australian alliance has played out ever since, in the Korean conflict, the war in Vietnam, the Middle East and in preventative defence strategies in the Western Pacific region to the present day.

### COMPLAINTS AND COMMENTS FROM USERS

As we shall see in this section, the Australian Army has always been open to suggestions and comments made by Army personnel and others in connection with the design of the uniform. The users or 'consumers' of the

uniform had first-hand experience of the way in which the uniform performed under various conditions and their feedback was regarded as valuable. In the context of innovation theory, the opinion of consumers is important but is not generally critical to driving product or system changes. Usually, the comments from consumers concern peripheral data or issues, which can be incorporated into the product or system without materially changing the latter. The production and innovations of the Australian Army uniform follows a similar pattern: comments from the field were considered and sometimes applied, but critical change still came from the Clothing Factory itself (the producer).<sup>39</sup> However, it must also be noted that the Army has been in the habit of listening carefully to the comments made by its personnel and other interested parties and that user reports following field trials of new types of uniforms were a common feature prior to the final garment production runs and distribution. With this in mind, the examples shown in this section did indeed have some impact on the data at the periphery and resulted in modifications to the designs that increased the functionality and comfort of the uniform.

Although there were no major changes in the pattern of the 1903 Army uniform during the next four decades, there was continuous activity from several quarters to make small improvements. The Military Board, which reported directly to the minister, was ultimately responsible for the military uniforms and discussed every proposal for change in the patterns at its meetings. There was, certainly prior to the establishment of the Commonwealth Government Clothing Factory, close communication on these matters with the Commanding Officers of the various military regiments, who presented their own recommendations to the board's resolutions with regard to clothing. It was the board's intention to simplify the patterns as much as possible to reduce costs, but not all simplifications were to the taste of the Commanding Officers. For example, when the board resolved in 1905 to omit the yoke in the Commonwealth Pattern of the tunic, which would reduce the amount of fabric needed, several Commanding Officers disagreed as it would be detrimental to the appearance of the tunic.<sup>40</sup> One Commanding Officer was of the opinion that the omission of the yoke 'leaves the shoulders of the soldier with only one fold of cloth over that portion of his body most vulnerable to cold'.<sup>41</sup> The board also considered using cheaper lining, for the same reason. The Military Clothing Board, which in 1906 was still in existence, offered its opinion in much stronger wording,

The Board are averse to the proposal to omit the yoke from the Commonwealth pattern jacket, as without it the garment will not retain its proper shape. They disagree also with the proposal to lessening [the] amount of cloth turned back to meet the lining, and the idea of substituting cheaper lining is considered a fatal mistake. These changes may and probably will to a slight extent cheapen the garment, but at the expense of its durability and life, and would therefore prove false economy.<sup>42</sup>

Their opinion weighed in favour of the retention of the tunic, which continued to be made with a yoke and with strong lining.

Opinions on clothing issues were voiced also from within the units. The Military Board's resolution that khaki be universally adopted for field service dress set off a complaint by the No. 1 Electric Company Engineers, whose Commanding Officer wrote on 8 March 1906, that khaki was 'absolutely unsuitable for the work of the Electrical Company, Engineers'.<sup>43</sup> In an extract from a previous memorandum, attached to his letter, it is reported that,

It is impossible to keep clean working in Engine Rooms, and handling the general gear and equipment of the Company. The cloth and material is susceptible to the slightest stain of oil or grease. Even when proceeding by steamers from Dawes Point to Electric Light Stations at the Heads, many Members of the Company have had their uniforms soiled with smuts from the smokestack. For actual dirty work... the men are provided with Dungaree Suits, but it is not always convenient to change into overalls. It does not look very well to have men equipped in Service Uniform and under Arms carrying a bag of Dungarees...<sup>44</sup>

Working in engine rooms, handling greasy equipment or simply moving in dirty environments paid its toll on the khaki uniforms and thus a general protective dress was needed. The Commanding Officer of the No. 1 Electric Company Engineers therefore proposed that the blue serge working dress laid down for S.M. and Electric Light Company should be issued to all men in the Company, both Officers and men alike.

The functionality and general look of the Army uniform remained the subject of ongoing discussions within the Army organisation and is an indication that the fitting out of the men for service or training was considered an important matter. Suggestions for the alterations of existing patterns were continuously put forward from units and reviewed by the

Military Board. The board was not averse to discussing new materials or methods and provided opportunities for new items to be trialled in the field. The Army was open to new ideas and as early as 1909 (and possibly even earlier) every district boasted an Inventions Board where written suggestions of all types, not just for uniforms, could be lodged. Reports about complaints and experiments with altered patterns reached the board and were taken seriously and discussed at length. By doing so, the Military Board was setting the scene for a system of testing and adoption of innovative ideas which has continued until the present day.

The introduction of compulsory, universal military training on 1 January 1911 for all male inhabitants of Australia, who were British subjects, between the ages of 18 and 26 years and the accompanying need for the free issue of uniforms put great financial pressures on the Defence account as well as on the businesses producing the uniforms. The following year, the Minister of State for Defence, George Foster Pearce, approved a proposal by the Quartermaster-General to simplify the patterns and to reduce the number of articles not otherwise needed for training and active service to a minimum.<sup>45</sup> From that point onwards, clothing worn by men in the training schools (under Universal Training or U.T. regulations) did not escape the notice of their training officers and the Military Board. In 1913 the Quartermaster-General reported that experiments were in progress to obtain a better cut in riding breeches worn in the schools. There had also been problems with the wearing of the riding breeches together with the U.T. Military Shirt. The Military Board generally recognised that the wearing of braces would have been more satisfactory than wearing a belt, but the shirt did not allow for this. The current shirt pattern sported shoulder straps whereas the old pattern did not, which would have made it easier for braces to be worn. It seems the matter was dropped at this point.<sup>46</sup> A further indication that clothing matters were taken seriously right throughout the ranks and up to the highest levels is shown by the *Annual Report* of 1911 of the Inspector-General, Major-General George M. Kirkpatrick, who called for attention to a number of serious shortcomings of the uniform then on issue,

The breeches are often too short from the fork to the knee, and will consequently soon split when used mounted, as well as rub the rider:

Boots are generally too light for continuous marching; the serviceability of the sealed pattern should be examined:

Great Coats are reported not to be waterproof, but to be spongy. This is a serious matter, and I understand a new and reputed more waterproof pattern is under trial.<sup>47</sup>

The fact that the Inspector-General had been made aware of problems with the breeches, boots and greatcoats would have resulted in discussions with the designers of clothing and footwear, although no documentation has so far been located in evidence. However, the Inspection Branch worked in close liaison with the Clothing Factory and acted as overseer of the integrity of the patterns and quality of output (especially by subcontractors), so it may be assumed that management of the Factory had been alerted to the clothing problems and had been requested to seek solutions.

As the uniforms were put to heavy use in the field and trenches during the First World War, it became clear that there were problems with the socks and the boots worn by the men. The AIF Headquarters investigated the matter of socks in collaboration with the Assistant Quartermaster-General, based in the United Kingdom, who sent out a request for comments from Commanding Officers on 29 September 1916. The replies received included:

The quality of socks on issue is undoubtedly poor. They appear to be composed principally of cotton, and consequently will stand very little wear.

It is hardly possible to draw any conclusion as to the result of the route March as the majority of the men were wearing privately owned socks.<sup>48</sup>

And

There are some pairs which contain much less wool than others and are therefore harder and more inclined to stretch and ruck up thereby causing blisters. These socks were all issued in Australia, the percentage of poor quality is about 10 percent.<sup>49</sup>

The investigation revealed that at least 50 per cent of the men wore privately owned socks of varying quality, which fact made it difficult to arrive at a general recommendation. The General Officer Commanding of the AIF Depots in the UK thereupon decided that more extensive enquiries would be required.<sup>50</sup>

On the matter of the quality of the boots, General Birdwood, Commander of the Australian and New Zealand Army Corps, took it upon himself to cable the following complaint to the Australian Headquarters in London,

Issues recently made of Australian boots giving grave cause for anxiety. Uppers are all right but contractors evidently using shoulder leather for outer soles. These are wearing through immediately and General Hobbs Commanding 5th Division reports 3,000 pairs practically worn out after two marches... Small beads on soles seem useless and wear through at once. Good nails would be preferable. Our Battalion Bootmakers state combination of Blake stitching and standard screws causes destruction inner sole when repairing necessitating new inner sole... Matter serious.<sup>51</sup>

It had been the Australian Government's intention to stimulate the local leather and footwear industry with war demands for boots, but it had taken some effort to convince the British authorities of the desirability of issuing Australian-made boots to the Australian forces in France. Birdwood's complaint was nothing less, therefore, than a slap in the face. Needless to point out that his cable was immediately acted upon and a conference was held at Tidworth, UK, of Staff Captains of all Groups and Command Depots. The meeting concluded that Birdwood's men may have been issued with Old Pattern boots that became mixed up with a shipment of New Pattern sent to France earlier and that Lt.-Colonel E.T. Leane be instructed to carry out a detailed investigation. Thereupon the Ordnance Officer at the Clothing Depot in Rouen, France, advised that some of Australian Pattern Clothing, including 48,174 Ankle Boots of the Australian Pattern (but not specifying whether Old or New Pattern) had been offloaded at Rouen and forwarded to Calais. This shipment may possibly have included the old pattern boots which caused Birdwood to complain. A second source of the old pattern boots is indicated by a Stock Sheet taken at Millwall, UK, for the week ending 15 December 1917, which showed that one quarter of the Brown Ankle Boots located at the Australian Ordnance Depot there were of the old 1916 Pattern.<sup>52</sup> No further correspondence on the matter was found and it may have been solved by replacing the old pattern boots with the new pattern.

Excessive wear on boots was again the subject of complaints during the Second World War, especially in tropical areas, and this time unit formations were asked whether or not the addition of metal toe plates might

alleviate the problem. The response was mixed, but two out of the three responding formations were in favour of toe plates.<sup>53</sup>

In 1934 new pattern uniforms were issued, which gave rise to a new round of questionnaires and comments. The Arncliffe and Victoria Barracks, both in New South Wales, suggested that a shoulder patch be added to the left shoulder to keep it free from grease when using a rifle.<sup>54</sup> From the 1930s, when experiments with camouflage and jungle green outfits took place, several comments were received regarding the garments' suitability. A number of these have been discussed in earlier pages.<sup>55</sup>

Not only did the clothing and equipment worn by the Army receive comments from within, suggestions for improvements were also arriving from the community at large. Some of the comments came from tailors, others from milliners and some from unrelated trades, and not every suggestion was implemented. Such was the case when Melville Anderson, painter and decorator of Singleton, NSW, wrote to the Minister of Defence with a method to improve the webbing equipment (which was rejected as it would put all the strain across the chest of the wearer).<sup>56</sup> But when an [unnamed] South Australian firm submitted a tender in 1940 for the manufacture of khaki drill hats for Working Dress, it also proposed innovations to the brim of the hats by introducing a new stiffening material called 'leno'. This material would not lose its stiffness during washing. The millinery firm had also suggested a cost-saving way of cutting the crown of the hat, rendering the hat 2s. per dozen cheaper than the current Sealed Sample. The Director of Contracts felt the use of 'leno' would improve the appearance of the hat, but as the tender was closing it could not be introduced for the current series of hats.<sup>57</sup> The matter was put before the Chief Inspector of Munitions who considered the changes 'a decided improvement upon the Departmental sample': the use of the 'leno' interlining of the brim would make the hat more shapely and easier to be adjusted similarly to felt hats, the centre piece of the hat could be domed or dented as desired and the general construction with three metal air holes in each of the padded sides he considered to be good.<sup>58</sup>

Nothing further was recorded on the 'leno' innovation until five years later. In 1945 a new type of hat was trialled as a result of reports received from the field. The new hat was a washable drill cap with a peak in front and a flap at the back, but after field trials had been conducted this hat was deemed to be unsuitable. The designers were set to work once more and this resulted in the Drill Hat, Stitched. The hat was made of a light-weight, washable, American olive drab cotton drill with a crown made up of six

panels which incorporated eyelets high in the crown for ventilation. The brim had special interlining which would retain its semi-rigidity even after washing. Very likely this was the 'leno' referred to earlier. With the exception of one report, the comments of all units had been in favour of this hat.<sup>59</sup> From the description of this hat it appears that the South Australian firm's innovations had at length been adopted.

On 19 February 1941, an Adelaide tailor, H.L. Clisby, wrote to the Secretary, Contract Board in Melbourne with a proposal for alterations to the design of the AIF jacket worn by the Volunteer Defence Corps. These men had served in the First World War and had now reached middle age. Clisby proposed to delete the pleats at the back of the jacket and to have the belt terminate at the front pleat without crossing over the pleat to eliminate bulge. There were also darts cut in front under the top pocket to streamline the fall of the jacket and the collar sizes would be reduced by ½ inch. Clisby considered that the changes would serve 'a twofold object, smarter relative to age and cheaper in production'. He estimated that the cost would be 18–24s. per dozen cheaper than the present garment.<sup>60</sup> Clisby's recommendations had been successful and in May of the same year, a new specification for Jackets, Service Dress, Volunteer Defence Corps had been drawn up from the sample garment provided by him.<sup>61</sup>

When new Gaiters, Canvas (Australian Pattern) were trialed in 1945, a questionnaire was sent to relevant units for comments. Several reports are on file, including one from Brigadier John Rowstone Stevenson, confirming that the gaiters provide 'excellent protection against tropical foot diseases to which troops are subject in island operations, and are vastly superior to the anklets web at present on issue'. To improve the gaiters, Stevenson and several others suggested that the stirrup straps be made of webbing as the leather strap would not be durable.<sup>62</sup>

To satisfy everyone on the fit of general-issue trousers proved to be an impossible task. In order to fit the leg length they were often too wide in the waist and too long in the rise—or the reverse. Or at times they might have the right length and waist, but would still be too short in the rise causing significant discomfort. Problems with trouser fittings persisted for many years and were being attended to by the Quartermaster-General's office, as is evident from a complaint by the Deputy Adjutant and Quartermaster-General, 2 Australian Corps on 6 July 1945,

Advice has been received that following user reports that trousers self-supporting were made too high in the rise... As a result of these trials, an

amended specification for size fittings is being introduced featuring a lower rise from crutch to band than the present issue.... Samples of trousers, self supporting made from “preshrunk” material to the amended specification are being forwarded... These trousers can be identified by a blue square sewn on the descriptive material label.<sup>63</sup>

This advice in fact shows that two solutions had been found to the problem of trousers of which the rise was too high. The first solution was to improve the design and lower the crutch line in the pattern. The second solution introduced a new type of material, namely a ‘pre-shrunk’ material. Pre-shrinking added a new process to the fabric as it had to be either washed and dried or steam-treated before cutting and sewing. Most modern pre-shrunk fabrics are subjected to steam, so it is likely that this was the process also used for the Army’s trouser fabric. In this example, the complaints by soldiers resulted in the addition of a process to the production system, altering the overall system and improving the final product.

Significantly, there was one period in the history of the Australian Army uniform when complaints reached such heights that they forced a complete about-face of the uniforms on issue. On 11 June 1947, the Military Board established the Committee on Post War Dress to determine two basic orders of dress for the Australian Military Forces, namely (i) battle dress and (ii) walking-out dress (khaki). The Committee, chaired by Brigadier Cyril Maurice Lloyd Elliott OBE, Deputy Adjutant General, conducted two questionnaires on preferences, the first to determine general preferences and the second to determine the preferred colour and design of the walking-out/ceremonial dress.<sup>64</sup> By combining walking-out and ceremonial dress in the second questionnaire, the Committee may have caused confusion among the respondents, some of whom interpreted the walking-out dress as the purely ceremonial (dark blue) dress and gave it their tick of preference. At the same time, the Committee showed a decided bias towards copying the British Army, whose uniform was dark blue. The result was that the Committee recommended that the dark blue uniform be adopted for walking-out dress. Military parades soon after became ‘a vision in blue’. However, it did not take long for the public and the Services to realise that the blue uniform did not represent the image of the ‘Australian-ness’ most of them entertained and complaints started to be conveyed to Army Headquarters. There was dislike of the blue uniform as there was ‘a close resemblance to firemen’s dress’, was ‘too colourful for the Australian way of life’, ‘too dressy for the troops’, ‘unsuitable for hot

weather'.<sup>65</sup> Also the white collar and tie were considered unmilitary. The matter came to a head in 1956 when a Question Without Notice was raised in Parliament on 30 May 1956. Major-General Stanley Ferguson Legge, Master-General of the Ordnance, produced a brief history of the Australian Army uniform and diplomatically placed great emphasis on the fact that the Australian khaki battle dress (in contrast to the blue walking-out dress) had all the features expected of an Australian outfit, including the well-known slouch hat. He also implied that no matter which colour scheme was selected, it could be changed if required by the environment, as had happened in the island war of 1942–1945 when jungle green replaced khaki.<sup>66</sup> The end result was that the Army's Dress Committee reconsidered the issue and the *Dress Manual* of 1963 incorporated the following colours for Ceremonial Dress, depending on corps or unit: khaki (winter), khaki (summer), blue, jungle green, khaki or green (tropical), white (restricted to personal staff of Governor-General and certain officers and to Staff Cadets). Jungle Green was also the colour for the General Duty dress and became well-known as the colour used in battle dress during the war in Vietnam.<sup>67</sup>

The 1950s may therefore be regarded as a turbulent decade as far as the Army uniforms were concerned. First, there was the change to blue colour for ceremonial and walking-out uniforms, in the midst of the nation's preparations for the Royal Visit. This was followed by a period of discontent over the choice of colour by Army Officers, the news media and the public alike. Finally, reason prevailed and the Army settled back into the khaki colours in which it had been serving in several wars since the First World War. One could almost hear a collective sigh of relief when in the new decade the well-known khaki was on show for all ranks, ceremonial, walking-out and battle dress. It is interesting to note that today it is virtually impossible to obtain a copy of the *1952 Orders for Dress* and one is inclined to the thought that copies have been destroyed as they would have been a reminder of a period of embarrassment in the history of the Army uniform. In 1958 the Master-General of the Ordnance Branch reported that the public frequently asked for illustrations of the Australian Military Force uniforms, but that they did not hold any and therefore suggested to the Army Headquarters Suggestions Committee that a publication be commissioned. The Secretary of the Committee responded that it would have been too costly, also in view of frequent amendments that would be required.<sup>68</sup> One can only surmise that the Secretary may have had some prior knowledge of the forthcoming colour change. All these

changes and turn-arounds had an immediate impact on the mills, the Clothing Factory and private firms. It was perhaps fortunate that the key change had been in the use of colour rather than in major design alterations, but it still meant that the colour of the dye (for the blue uniforms) had to be the exact colour as specified. The blue jacket and trouser materials, if worn together, had to be colour-matched, so the cutters had to plan their pattern layouts from the same colour batch each time. The same, of course, held true for the khaki colour and also for the jungle green. The most important impact on the clothing manufacturers was the fact that all Officers had to be fitted out, first in the blue uniforms and later back in the khaki, and this meant much extra work and use of materials, not to mention cost to the taxpayer. Huge quantities of the required cloth due to the design changes, larger scales of issue of clothing to personnel and larger quantities of cloth held in stock in the early 1950s meant that a very large appropriation of £2,610,000 had to be set aside for the Trust Fund Account.<sup>69</sup>

The Department of Defence continues to evaluate comments received from soldiers to the present time. In 2006 numerous complaints had been received from soldiers in combat zones concerning ill-fitting boots, potentially flammable jackets, camouflage jackets which glowed when viewed through night vision goggles, backpacks that were falling apart and clothing being affected by mould. *The Courier-Mail* reported that the Department ‘has promised to do better’.<sup>70</sup>

The correspondence uncovered in the National Archives of Australia and the Australian War Memorial highlight the fact that the Australian Army has always made an effort to obtain the views of its personnel with regard to the functionality and comfort of the uniform by issuing questionnaires whenever sample garments to new specifications were drawn up. Suggestions from the community and from firms involved in tenders for subcontracts were similarly considered and assessed. The Army’s own Inventions Directorate dealt with hundreds of proposals across the board (covering not only clothing, but also military hardware) and there was a clear system in place to pass on relevant proposals to relevant offices. In this way it has been possible to incorporate some innovative changes to the design or material of the uniform. At other times the changes were minor, such as new measurements for leg lengths and waist widths, and these cannot be classified as innovation, but they had a function in rendering the garments more comfortable to wear. The comments and proposals did indeed change the *data*, as Schumpeter would have it, and some may have

caused a minor ripple in the manufacturing process at the firm level at the time (such as the introduction of 'leno'), but none of the changes would, by themselves, have disrupted the economic equilibrium to such an extent as to cause serious friction and to reach a new height in economic development. However, when one takes a long-term view and considers the changes in the uniform over the past one hundred years, it is obvious that there were major innovations that impacted upon the making of the uniform. These ranged from new technology in equipment to new raw materials (such as cotton), new fabrics and new accounting methods. First introduced or applied by the Clothing Factory, some of these innovations reached the wider economy. Some were imposed by the Clothing Factory or the Contracts Board upon subcontractors by the use and obligation to comply with detailed specifications and the Sealed Sample system. Starting from a relatively small core, the making of the Australian Army uniform reached beyond the Services into other areas of the industry and so created processes that pushed the clothing industry to higher efficiency levels.

The locations and climates in which the Australian Army fought presented new stimuli to apply innovative changes to the Army's uniform. There were novel adaptations to the clothing, such as the creation of shorts under Monash in Egypt, the adaptations made by the nurses to loosen their uniforms in the heat, the white calico patches sewn to the uniforms to distinguish AIF soldiers from their Ottoman enemies in the semi-darkness at Gallipoli. The white overalls worn in the snow in France represented an early form of camouflage. The cold and wet conditions of the trench warfare on the Western Front demanded special care of both the soldiers and their clothing and found expression in the establishment and management of large-scale bath and laundry facilities spread throughout the battle zones.

Changes in warfare, in particular the use of chemicals, forced other innovations into existence. The need for protection against poisonous gases resulted in research across the continents and the issue of British-made box respirators. Innovation in clothing protection remained somewhat primitive and proceeded no further than clothing made from rubber and oil cloth, and even remained at that stage by the start of the Second World War. By then, new trials with impregnated clothing were conducted in the US, Britain and in Australia. The tests involved dyes which afforded protection against vesicant gases. The M1 process developed in the US, was a key reason for closer Australian collaboration with the US instead of

with Britain. By the end of the Second World War, Australian uniforms had been impregnated in the US.

But it can never be denied that comments and complaints from Australian Army personnel throughout the Army's history have always been an important driver of innovation into the uniform. Some complaints resulted in minor modifications, such as a better fit of the trousers, others involved a new invention from outside the Army such as the 'leno' used in collars. The universal complaints and ridicule which resulted from the new blue uniforms in the 1950s caused a complete turn-about and the re-design of the entire Army issue. The Army's Inventions Directorate was a direct link with inventors in other sectors and indicated the Army's openness to novel ideas and processes.

## NOTES

1. To provide some idea of the great variety of clothing to be issued, the list included the dress to be worn by the General Staff, Australian Light Horse regiments, Royal Australian Artillery, Australian Field Artillery, Australian Garrison Artillery, Corps of Australian Engineers, Submarine Miners, Infantry (which also incorporated Scottish Regiments), Australian Army Service Corps, Corps of Australian Signallers, Australian Army Medical Corps, Australian Ordnance Department, Army Veterinary Department, Chaplains and Army Nursing Service.
2. For an appreciation of the design details of Australia's first and long honoured Service Dress, a brief outline is provided in Appendix A.
3. The Köppen-Geiger climate classification is used to indicate climate zones. This uses averages of temperature and precipitation patterns and degree of summer heat and divides the world climates into Group A (Tropical/megathermal), Group B (Dry/arid and semiarid), Group C (Temperate/mesathermal), Group D (Continental/microthermal) and Group E (Polar and Alpine) climates. These are then further modified using precipitation and summer heat temperatures. For our discussion, France/Belgium belongs to Group Cfb—Temperate/fully humid/warm summers, Egypt to Group BWh—Dry/desert/hot arid, and Gallipoli to Group Csa—Temperate/dry summer/hot summer. Northern Australia belongs to Group Aw—Equatorial with dry winters.
4. A.K. Macdougall (ed.), *War Letters of General Sir John Monash*, Sydney, 2002, pp. 68–69.
5. AWM25, 187/1, *Memorandum from R.S. May, M.-G, for Quartermaster-General, to Australian Divisions*, 8 December 1918.
6. AWM27: 373/56, *Letter to Colonel R.M. Downes, D.D.M.S.*, 2 May 1917.

7. Whipcord is a strong, worsted or cotton fabric made of hard-twisted yarns with a diagonal cord or rib. The weave used for whipcord is a steep-angled twill, essentially the same weave as a cavalry twill or a steep gabardine. However, the ribs of whipcord are usually more pronounced than in either of those fabrics, and the weft (filling) may be visible between the ribs on the right side, which is usually not the case for gabardines. In practice, marketing considerations, rather than technical details, determine when the specific term whipcord is used. Whipcord is usually found in durable outdoor clothing (typically pants, sometimes jackets) as a 16–18oz. (ounce per square yard fabric weight) wool, or in durable workers' clothing (typically overalls) as a 9–12oz. cotton. In the latter case, whipcord is an alternative to duck, which has a different weave. Whipcord should not be confused with corduroy. Whipcord has a hard smooth finish with diagonal ribs. Corduroy is fuzzy with vertical ribs. Bedford cord, named after the town of Bedford in England, is a durable fabric that resembles corduroy. The weave has faint lengthwise ridges, but without the filling yarns that make the distinct wales characteristic of corduroy. Trousers made with Bedford cord are sometimes called 'Bedford cords'. For further details see A.J. Hall, *The Standard Handbook of Textiles*, 6th edn, London, 1965.
8. NAA: MP153/9, 12, *Minister's Decisions*, Minutes of the Military Board No. 26/1913; Approval by the Minister, 6 June 1913.
9. NAA: A1952/2, 473/7/2. *Woollen Cloth Factory, Annual Report for the Period Ending 30 June, 1916*.
10. Roy Kyle, A.I.F., *An Anzac's Story* (introduced and edited by Bryce Courtenay), Camberwell, VIC, 2003, p. 161.
11. AWM25, 187/1, *Letter from Director of Ordnance Services to Headquarters, Fifth Army*, 26 March 1917; *from Evan Alexander Wisdom to Headquarters, 2nd Australian Division*, 6 April 1917.
12. A.K. Macdougall (ed.), *War Letters of General Sir John Monash*, Sydney, 2002, pp. 119–120.
13. The AIF uniform and greatcoat are shown in Illustrations A1 and A4 in Appendix A.
14. AWM25, 187/1, *Letter from Evan Alexander Wisdom to Headquarters, 2nd Australian Division*, 6 April 1917.
15. NAA: MP153/9, 6, *Decisions of the Military Board, Australian Military Forces, Standing Orders for Dress and Clothing (Citizen Forces)*, 1912.
16. AWM15, 8605, *Memorandum from General Officer Commanding, A.I.F. Depots in the United Kingdom, to Administrative Headquarters, A.I.F., London*, 15 November 1916.
17. Roy Kyle, *An Anzac's Story*, Camberwell, VIC, 2003, pp. 137–138.
18. AWM25, 905/52, *Rates for Certain Articles of Clothing, Necessaries and Equipment*.

19. <http://centenary.redcross.org.au/groups/red-cross-comfort-parcel-wwi> (accessed 17 September 2014).
20. AWM25, 101/15, *Letter from Lieut.-Colonel Robert Jackson to General Carruthers*, 24 December 1917.
21. AWM25, 101/15, Memorandum from Deputy Adjutant and Quartermaster-General, Second Army Headquarters, to VIII, IX and X Corps and I and II Anzac, 26 September 1917. A second document in the file is titled *Allotment of Laundries*, it is undated and unsigned, but probably originates from the same source.
22. A.K. Macdougall (ed.), *War Letters of General Sir John Monash*, Sydney, 2002, p. 130.
23. NAA: MP153/9, 2, *Minutes of Meeting of the Military Board Held 27 July, 1909*.
24. NAA: MP153/9, 2, *Minutes of Meeting of the Military Board held 27 July, 1909*.
25. NAA: MP153/9, 2, *Minutes of Meeting of the Military Board held 5 October, 1908*.
26. Major (P) Charles E. Heller, 'Chemical Warfare in World War I: The American Experience, 1917–1918', *Leavenworth Papers No. 10*, Combat Studies Institute, US Army Command and General Staff College (September 1984), p. 7.
27. The information describing the gases employed is taken from Peter Dennis et al., *The Oxford Companion to Australian Military History*, 2nd edn, online version (2009) (accessed 10 July 2014).
28. *Official History of the Australian Army Medical Services, 1914–1918*, Volume III—Special Problems and Services, 1st edn, 1943, p. 40.
29. Mary Fox, Frank Curriero, Kathryn Kulbicki, Beth Resnick, Thomas Burke, 'Evaluating the Community Health Legacy of WWI Chemical Weapons Testing', *Journal of Community Health*, 35 (18 November 2009), p. 96. A second worthwhile source of information on chemicals used in warfare is provided in [https://en.wikipedia.org/wiki/Chemical\\_weapons\\_in\\_World\\_War\\_I](https://en.wikipedia.org/wiki/Chemical_weapons_in_World_War_I) (accessed 27 September 2015). It was a former featured article of the Wikipedia encyclopaedia. It has been included here as it uses an extensive list of academic source material and provides an excellent overview of the chemicals used and their impact on soldiers.
30. *Official History of the Australian Army Medical Services, 1914–1918*, Volume III—Special Problems and Services, 1st edn, 1943, p. 7, footnote 5.
31. *Official History of the Australian Army Medical Services, 1914–1918*, Volume III—Special Problems and Services, 1st edn, 1943, p. 25.
32. *Official History of Australia in the War of 1939–1945*, Volume V—The Role of Science and Industry, p. 376.

33. AWM25, 905/52, *Rates for Certain Articles of Clothing, Necessaries and Equipment*.
34. *Official History of Australia in the War of 1939–1945*, Volume V—The Role of Science and Industry, p. 368.
35. NAA: A5954, 243/11, *Defence Committee Agendum No. 114/1943*, “*Impregnated Clothing for Anti-Gas Protection for R.A.A.F.*” signed by Douglas I. Menzies, Secretary, Defence Committee, 10 November, 1943.
36. NAA: A2031, 51/1944, *Minutes of the Defence Committee Meeting*, 16 February, 1944, *Agendum No. 27/1944*, entitled No. 51/1944—*Impregnated Clothing for Defence Against Vesicant Chemical Warfare Agents*.
37. NAA: A2031, 51/1944, *Minutes of the Defence Committee Meeting*, 16 February, 1944, *Agendum No. 27/1944*, entitled No. 51/1944—*Impregnated Clothing for Defence Against Vesicant Chemical Warfare Agents*.
38. NAA: A2031, 51/1944, *Minutes of the Defence Committee Meeting*, 16 February, 1944, *Agendum No. 27/1944*, entitled No. 51/1944—*Impregnated Clothing for Defence Against Vesicant Chemical Warfare Agents*.
39. This is discussed at length by Joseph A. Schumpeter, *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*, translated from the German by Redvers Opie and with a new introduction by John E. Elliott (New Brunswick and London, 2012), p. 65, where he states: ‘To be sure, we must always start from the satisfaction of wants, since they are the end of all production, and the given economic situation at any time must be understood from this aspect. Yet innovations in the economic system do not as a rule take place in such a way that first new wants arise spontaneously in consumers and then the productive apparatus swings round through their pressure.... It is, however, the producer who as a rule initiates economic change, and consumers are educated by him if necessary; they are, as it were, taught to want new things, or things which differ in some respect or other from those which they have been in the habit of using.’
40. NAA: B168, 1905/10010, Item 1 of 7, *Recommendations of Commanding Officers with Regard to the Determinations of the Military Board on the Question of Military Clothing for the Citizen Forces*, December 1905, Recommendations in response to Resolution 3. Note: the Board referred to the yoke mistakenly as the ‘yolk’ and so did several Commanding Officers. The Jacket, Field Service, was often referred to as ‘tunic’.
41. NAA: B168, 1905/10010, Item 1 of 7, *Recommendations of Commanding Officers with Regard to the Determinations of the Military Board on the Question of Military Clothing for the Citizen Forces*, December 1905, Recommendations in response to Resolution 3.

42. NAA: B168, 1905/10010, Item 3 of 5, *Minutes of Meeting of the Military Clothing Board Held on 12 January, 1906*.
43. NAA: B168, 1905/10010, *Clothing and Dress Regulations—Item 3 of 5*.
44. NAA: B168, 1905/10010, *Clothing and Dress Regulations—Item 3 of 5*.
45. NAA: MP153/9, 11, *Minister's Decisions, 20 June, 1912*.
46. NAA: MP153/9, 7, *Decisions of the Military Board, Meeting held 21 July, 1913*.
47. NAA: MP84/1, 1902/7/117, *Annual Report, 1911—Inspector General*.
48. AWM15, 8605, *Memorandum from Officer Commanding, 8th Training Battalion, A.I.F. to Headquarters, "C" Group Training Area, A.I.F., 9 October 1916*.
49. AWM15, 8605, *Memorandum from Commanding Officers, 11th Battalion, A.I.F. to Commanding Officer, "C" Group, 3 October 1916*.
50. AWM15, 8605, *Letter from General Officer Commanding, A.I.F. Depots in the U.K. to Administrative Headquarters, A.I.F., London, 15 November 1916*.
51. AWM25, 187/4, *Copy of Cablegram from General Birdwood, 1st Anzac Headquarters, British Expeditionary Forces., France, to Australian Headquarters, A.I.F., London, 10 August 1917*.
52. AWM25, 187/4, *Stock Sheet for the Week Ending 15 December 1917*.
53. AWM54, 187/3/1. *Report from Assistant Quartermaster-General, "Q" Branch Minute 15, 7 September 1945*.
54. AWM61, 436/3/1951 Part 6, *Memorandum from Commanding Office, 45 Battalion, Drill Hall, Arncliffe, to 9th Infantry Brigade, 20 June 1934; Report from Commanding Officer, 9th Infantry Brigade to 2nd Division, 27 June 1934*.
55. See the section on camouflage in Chap. 7.
56. AWM27, 382/9, *Letter from Melville Anderson of Singleton, NSW, to the Minister of Defence, 17 October 1914; and associated correspondence from John Stanley, Quartermaster-General, 30 October 2014, and Secretary, Department of Defence, 4 November 2014*.
57. NAA: MP508/1, 61/716/91, *Letter from Deputy Director of Contracts to Master-General of Ordnance through Chief Inspector, 20 August 1940*.
58. NAA: MP508/1, 61/716/91, *Letter from Chief Inspector of Munitions to Director of Ordnance Services, 30 August 1940*.
59. AWM54, 187/3/1, *Letter from Deputy Adjutant & Quartermaster-General, First Australian Army to 2 Australian Corps, 6th Australian Division, 28 February 1945*.
60. NAA: MP508/1, 61/707/39, *Letter from H.L. Clisby to Secretary, Contract Board, 19 February 1941*. Clisby refers to an earlier letter written by him on 14 February; however, this letter is not on file.

61. NAA: MP508/1, 61/707/39, *Memorandum from Inspector General of Munitions to Director of Ordnance Services*, 6 May 1941.
62. NAA: MP508/1, 61/707/39, *Memorandum from Brigadier John Rowlstone Stevenson, 11 Australian Infantry Brigade, to Headquarters 2 Australian Corps (AIF)*, 5 June 1945; *Memorandum from Deputy Adjutant & Quartermaster-General, First Australian Army to 2 Australian Corps, 5 and 6 Australian Divisions*, 22 May 1945.
63. AWM54, 187/3/1, *Letter from Deputy Adjutant and Quartermaster-General, 2 Australian Corps to 3 Australian Division, 11 Australian Infantry Brigade and 23 Australian Infantry Brigade*, 6 July 1945.
64. NAA: MT1274/1, 65/02/167, *Committee on Post War Dress, First Draft (Incomplete) of Final Report*, 1948, p. 1.
65. NAA: MT1131/1, A87/1/96, *Question Without Notice—Blue Uniform*, 7 June 1956, Explanations, pp. 1–2.
66. NAA: MT1131/1, A87/1/96, p. 2 of letter.
67. Australian Military Forces, *Dress Manual*, 1963 (Canberra, reprinted 1966).
68. NAA: MT1131/1, A308/1/170, *Pictorial Representation of AMF Uniforms*, Memorandum from Secretary of the Army Headquarters Suggestions Committee to MGO Branch, 6 May 1960.
69. NAA: A1831, 1953/369, *Letter from F.R. Sinclair, Secretary of the Department of the Army, to The Chief Auditor, Commonwealth Audit Office*, 23 September 1953.
70. ‘\$300 m for Combat Gear’, *The Courier-Mail*, 28 October 2006, <http://search.proquest.com/docview/35003092> (accessed 14 December 2012).



## CHAPTER 9

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# Military Control over Intellectual Property

### NATIONAL IDENTITY

The identity of a national defence force is embedded in the design and colours of the uniforms worn by its members. Over millennia, nations, tribes and other socio-geographic groups have traditionally marked themselves out in battle by donning clothing of distinguishing colour or shape, accoutrements or other articles which would clearly identify them as belonging to their specific group. The military uniform belongs to those sets of clothing which allows a group of people, in this case the defence force, to be identified as distinct from the rest of society. The uniform creates boundaries between those within and those without the group.<sup>1</sup> In their analysis, Hacker and Vining identified four major reasons for the use of the uniform: control, utility, status and symbol.<sup>2</sup> A uniform can be the means by which the wearer is made to conform to the regulations and behaviours of the group. It can also serve as a symbol of status and rank.<sup>3</sup> By its sheer visibility, the wearer is immediately identified as both belonging

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This chapter is based around a paper, ‘Innovation and Intellectual Property Management at the Australian Government Clothing Factory’, presented at the *Business History Conference*, Miami, Florida, 24–27 June 2015. The paper has subsequently been published in *Business and Economic History On-Line*, 13 (2015) and is accessible on [http://thebhc.org/sites/default/files/Mosseveld\\_BEHO\\_Final%20Draft\\_0.pdf](http://thebhc.org/sites/default/files/Mosseveld_BEHO_Final%20Draft_0.pdf)

to, and occupying a certain rank within, that group. The wearing of their country's military uniform is also a major source of pride and purpose felt by men and women enlisted to serve their nation, whether in peacetime or during times of war. The military uniform signifies national identity, rank and status and unifies those serving to protect and defend their country and the principles it represents. According to Hacker and Vining, the uniform also has a utility function. It must assist the wearer in performing his/her duties. History has shown how ad hoc adaptations in the field and formal changes to the Army's uniform provided for greater comfort, usefulness and made the uniform fit for purpose.

Apart from the sociological and psychological aspects of the uniform, there is another perspective to the military uniform.<sup>4</sup> In contrast to uniforms worn by employees in, for example, offices, workshops and supermarkets, the designs and standardisation of the military uniform have been legally sanctioned and are protected by law. The uniform is the property of the nation, it is manufactured and supplied by the nation to serving men and women and replaced when necessary. There are strict design rules for the making of a military uniform and, while it is not always possible to prevent unapproved manufacture, the uniform's design and stipulated methods of the fabrication processes which must be applied are indeed the intellectual property (IP) of the nation. And just as commercial IP must be described in detail and registered with the country's IP office to protect against unlawful copying, so is every garment made for the Australian Army described in great detail, from the fabric to be used to the last stitch to be made, and is registered on a national system. The only difference between commercial IP registration and the Army's system is that the former is managed by IP Australia (the Government's IP Office in Canberra) and the latter by the defence force administration itself.<sup>5</sup>

In Australia, protection of the design of the military uniforms came to be of special significance after Federation in 1901, when the colonial uniforms were replaced by a set of garments, to be worn by all Australian Servicemen. Prior to that, each Australian colony had its own set of colourful uniforms, which were often based on those worn by certain regiments in the United Kingdom. After 1901, the wide diversity of uniforms was streamlined into one single uniform, used by soldiers and officers alike, and from the first *Dress Regulations* issued in 1903 by Major-General Edward Hutton a system of Commonwealth Pattern—later Australian Pattern—of Army uniforms evolved. To enable faithful reproduction of the original designs required the setting out of descriptions or specifications

detailing the separate pattern pieces for each garment, the type of fabrics and other materials to be used and the method of construction. It then required a system by which the completed garments could be assessed as being in compliance with the specifications.

Such a system was already in existence in Great Britain. Katherine Elliott describes how Britain's 'New Model Army' of 1645 introduced a centrally controlled clothing purchasing system with the patterns held by the Ordnance Office. Inspections of these uniforms were increased during 1707 and 1708 as the uniforms were compared with the sealed patterns held in the Office.<sup>6</sup> Elliott was able to trace the design history of four Justaucorp coats back to France and then to Sweden, both were among the most important military powers of the seventeenth century. The system thus adopted in Australia entailed the design and production of a perfect sample of each garment, which was inspected and, if approved, it was labelled, numbered and sealed with a metal tag. A register of all sealed sample numbers and a depository of sealed sample garments was kept as a reference. Clothing firms with government contracts to manufacture quantities of military garments were provided with a sealed sample, upon which they were required to produce their own sample which was then inspected by a government clothing inspector. If the sample conformed in every detail to the sealed sample, the firm was given approval for the full production run.

From time to time changes were made to the standard Army uniform, either in the design, in the fabric, in the technology used or in the manufacturing process itself. Much of the design activity was carried out in the Clothing Factory itself. Whenever a change was made to a design, such as the removal of cuffs on sleeves, a revision was made to the specification for the garment. After this was approved (in the early years, by the Military Board), the specification was returned to the Clothing Factory, which then produced a pattern and made up the first sample. After inspection and approval of the sample as a true representation of the specification by a specially appointed examiner, it was tagged and labelled with a registration number. The new sample garment thus became the official sealed pattern. An example of such a sealed pattern is shown in Fig. 9.1.

Figure 9.1 shows the sample of the shoulder tabs which had been sealed and labelled in 1962. The metal seal is clearly visible in the photo and in this instance it was produced by the clothing firm A. Warhoft of Huntingdale, Victoria. The Inspector of Stores and Clothing in Victoria carried out the inspection and approval. The label further indicates the



inspector before being allowed to manufacture the full run of their contract.

The system of sealed patterns lent itself to become a vehicle for innovation and the Clothing Factory was the crucial driving force for its implementation and for the dispersion of innovation among the private clothing firms. A 1964 report by John Allison and Leslie Brewster reflected upon the activities of the Clothing Factory as being 'a laboratory for garment design and development'.<sup>7</sup> It also became the driving force behind innovation in the processes adopted by those private firms contracted by the Clothing Factory to manufacture uniforms. The specifications of the sealed patterns would dictate particular ways of sewing and would identify which part of a garment would require specific machines. In this way, a clothing firm interested in tendering for a contract but without the necessary techniques or machinery would be obliged to introduce the required methods or new machinery in order to stand a chance of winning the tender. The result was that innovative techniques and investment in new sewing machinery permeated the clothing industry. The Interim Report of a 1951 Working Party chaired by C.K. Davies recognised the significance of the Clothing Factory in spreading innovation through its supply of samples and patterns to the private sector.<sup>8</sup> Not only did this enable private firms to supply large quantities of the Defence Department's demands, but it also forced them to produce this in specified ways. The following illustrates one instance in which the private sector adopted new technology specified in new sealed patterns. On 17 April 1916, instructions were sent to the Senior Ordnance Officer of the Fourth Military District, Adelaide, regarding changes to the sealed patterns for jackets and trousers. The changes involved replacing higher-cost thread with cotton thread and the replacement of hand-sewn buttons with machine-sewn ones. The letter of instruction reveals just how minor some of the changes to a sealed pattern could be. However, these particular changes effected a reduction in the price of the jackets and trousers by 6d. per dozen compared to the previous sealed pattern.<sup>9</sup> Special button-sewing machines replaced the hand sewing of buttons onto garments, not only saving time but also reducing the cost of labour. Contractors willing to manufacture to the new sealed patterns therefore had to have these machines in their establishment.

The sealed pattern system and everything that was part of it (design, samples, sealing, inspecting) was a system underpinning the way in which Australian troops were recognised around the world and the Army's

administrators therefore treated it with great respect. A warning by Lieut. Colonel Legge, Quartermaster-General, written on 2 February 1911, to the Commandant of the Citizen Military Forces of all States except Victoria, underlines the importance of the sealed sample system,

Cases have recently been noticed in which sealed patterns signed by the Quartermaster General have been altered without reference to Head-quarters.

This is a serious matter and might involve the Government in serious loss in the event of a contract for the supply of such articles being made the subject of a suit at law.

A sealed pattern is by reference made part of a contract for supply, and any alteration during currency of a contract without the consent of the Minister and the contractor is the same as an unauthorised alteration of the wording of the contract.

Sealed patterns or labels attached thereto are not to be altered in any way without authority from Head-quarters.

When alterations are approved from Head-quarters to be made locally, and only in such cases, a label, on which will be quoted the authority for making the alteration, will be attached to the article and signed by the D.A.Q.M.G. of the State concerned.<sup>10</sup>

Although these warnings clearly indicate that some form of administrative system was in place to record and label the Army's sealed patterns, very few documents remain that further illustrate how the system operated. Over the years, responsibility for military clothing and their inspection changed from one department to another and it is quite possible that records may have been either mislaid or destroyed. At first, the Clothing Factory was administered by the Board of Factory Administration, a branch of the Military Board. On the recommendation of the Royal Commission on Navy and Defence Administration in 1918, the Factory came under the responsibility of the Board of Factory Administration, established on 1 September 1920, but less than a year later it was moved to the Munitions Supply Board, a body which was created on 13 August 1921. It is from the period of the Munitions Supply Board administration, headed by Arthur E. Leighton and with John K. Jensen as its Secretary, that some of the more detailed correspondence on the system of sealed patterns and on inspection has remained intact. On 21 September 1939, ultimate responsibility for the Clothing Factory was transferred once more, this time to the Department of Supply and Development and again,

in 1942, to the Department of Supply and Shipping. From about 1939, however, direct responsibility for the administration of the sealed patterns and inspection came under the control of the Master-General of the Ordnance Branch. The historical progression in the administration since then is not clear, but it appears from correspondence in 1941 that the specifications for the garments were prepared by the Inspector-General of Munitions in the Inspections Branch of the Department of the Army.<sup>11</sup> By 1943, the Master-General of the Ordnance Branch under the Directorate of Supply and Clothing held responsibility and was, among other things, in charge of pattern design.<sup>12</sup> A 1945 document reveals that the office of the Director of General Stores and Clothing, still under the Master-General of the Ordnance Branch, designed the patterns.<sup>13</sup> In 1950, the Department of Supply and Shipping was restructured to become the Department of Supply, which oversaw the Clothing Factory's operations until at least 1967. Further research is required to track the changes in responsibility since that time. It is unclear whether the Clothing Factory was placed under the Department of Defence Production along with the munitions factories upon the creation of this Department on 7 May 1982. However, it is known that the Factory did come under the umbrella of the Office of Defence Production at some date in the 1980s and was transferred for privatisation from there to the newly incorporated Australian Defence Industries Pty. Ltd. on 4 May 1989.

In the decade following the First World War, when the troops had returned home, the numbers enlisted on active duty in the Australian Military Forces remained steady at first, but they were reduced at the end of the 1920s. The number of men on the active list as at 30 April 1930 amounted to only 27,454. This number was even below that recorded at 1 March 1901, when there were 28,886 men in the Military Forces. However, throughout the 1920s the training strength of the Military Forces had been between 37,156 (1922) and 47,931 (1929), but on 1 November 1929, the government introduced a scheme of military training on a voluntary basis, which accounted for the drop in numbers.<sup>14</sup>

The period of peace afforded an opportunity to consolidate the lessons learned during battle and to reinforce the Army's administrative system governing the patterns, labels and specifications of each garment on issue. This was a matter of some priority for the Military Board, which had established a Co-Ordination Committee to establish working relationships with the Contract Board and the Munitions Supply Board on the matter of supply to the Australian military. On 14 April 1927, the Secretary

of the Contract Board invited the Chief Inspector of the Munitions Supply Board to comment on the procedure to be followed. On 28 April 1927, the latter submitted a detailed proposal for the registration of military clothing patterns, which he described as ‘an effective and economical method of dealing with the Sealed Pattern question’.

Two articles to be sealed as Patterns—One for the Service concerned; one for Munitions Supply Board.

In the event of a Pattern being required for each State: Eight (8) to be sealed and issued: two as above and one for each State.

The Sealed Pattern to be made available for those submitting tenders to view. This pattern must not be issued to contractors and must not leave Departmental Custody.

When a contract has been entered into for the supply of the article, the Sealed Pattern may be taken by the Inspecting or Examining Officer to the works of the contractor, but must remain in the custody of such Officer.

From the first output of work under the Contract, the Examining Officer to select a sample which is equal in all respects to the Sealed Pattern and submit if for sealing.

When this is done the Sealed Pattern is to be immediately returned to the Officer who is the custodian of sealed patterns.

All future output to be governed by the sample which could be included as part of the supplies to be made under contract.<sup>15</sup>

This procedure was henceforth adopted for all military clothing and this ensured that the designs were protected by the use of sealed patterns, effectively the protected prototype for each garment. If the garments had been produced exclusively by the Australian Government Clothing Factory the need for design protection would not have been an issue, but during the war the Clothing Factory had been overwhelmed by the volume of work and had been forced to subcontract large amounts of work to private contractors. This required a system of exact specifications, spelled out in the contracts, and the provision of a physical sample of each pattern to be followed stitch by stitch. There was always a risk that someone might make unauthorised copies of the design or deviate from the sealed pattern, possibly to save cost, and this set into motion the question of how the garments were to be checked and marked. The Secretary of the Co-Ordination Committee raised the matter in his memorandum to the Military Board on 6 February 1928, recommending that the

responsibility for approving working samples and of all clothing manufactured should rest with the Chief Inspector. Later that year, on 26 September he thought it desirable that a distinguishing letter for each of the three Services should precede the number on the labels attached to the sealed patterns and specifications: 'N' for Navy, 'L' for Land [Army] and 'A' for Air Services. He proposed that these letters be used for all items to be sealed, whether they be clothing or other specified designs in use by the Services.<sup>16</sup> However, as many of the items were in fact prescribed across the board this would have resulted in much duplication and it appears that these recommendations were not adopted. Instead, all specifications were preceded by the letters M.S.B./Aus. (referring to Munitions Supply Board) or M.G.O./Aus. (used after 1939 when the Master-General of Ordnance Department was in charge), followed by a number which in itself would indicate the Service in which the item was used. The letters 'CLO' prefixed the sealed pattern designation of each clothing specification.

By the late 1930s, the sealed pattern system had become a streamlined operation within the Army. The Chief Inspector, Munitions Supply Branch, had responsibility for the preparation of specifications, which would then be submitted for approval to the Director of Ordnance Services, under the direction of the Quartermaster-General. As soon as a sealed pattern sample garment had been made up by the Clothing Factory, the Director of Ordnance Services would register the sealed pattern and attach a label with its registration number under seal to the garment. This sealed pattern was to be kept at the Ordnance Depot of the Third Military District (Victoria), ready for lending to private contractors.<sup>17</sup>

The correspondence generated by the system provides an insight into the plethora of changes in the clothing patterns and would have provided a full-time occupation for many members of the Ordnance Services and the Inspection Branch. Each time a pattern was modified or designed, the Director of Ordnance Services would request that the Chief Inspector draw up new specifications for it. Once the draft specifications were drawn up, a memo went flying back to the Director of Ordnance Services with the request to approve and sign the original copy of the specifications. Once completed, a request was issued to the Clothing Factory to make up a sample pattern for sealing. This sealed pattern then became the prototype and was to be copied in every detail in subsequent production runs.

The list below from an archived Army Headquarters file gives an indication of the garments affected by the pattern changes during 1938 alone. These items were all subject to new specifications and made up as new sealed patterns:

Jackets, militia, blue or khaki  
 Jacket, khaki, drab mixture, 13/14 oz. and 18 oz.  
 Jacket, drill, khaki, P.F. [Permanent Forces]  
 Trousers, militia, blue or khaki  
 Trousers, drill, khaki, militia  
 Breeches, woollen, M.S. [Mounted Services]  
 Breeches, woollen, D.S. [Dismounted Services]  
 Shorts, drill, khaki  
 Caps, S.D. [Service Dress], khaki, Permanent Forces  
 Caps, forage, blue, militia  
 Cap, F.S., militia [Field Service]  
 Leggings, leather, brown  
 Capes, W.P. [Water Proof]  
 Puggarees, Hat, khaki, with or without colour folds  
 Puttees, khaki, 3 yard  
 Shirts, flannel, silver grey, ordinary  
 Shirts, military, khaki, other ranks.<sup>18</sup>

These activities were stepped up even more in the latter part of the 1930s when the Australian military forces were readying themselves with improved uniforms and other supplies. As Australia prepared for war, it reached a new milestone in the design of combat uniforms. It should be noted at this point that the basic structure of the military uniform had not changed in any major way since the first *Dress Regulations* of 1903. Over the intervening period, the styling of civilian clothing had moved on: the fit of men's clothing offered far greater comfort, the fabrics had improved and breeches had been out of fashion for a century. It was high time for the design of military uniforms to follow suit. A new type of battle dress was adopted, consisting of a Blouse, Battle Dress—Drab Mixture and Trousers of the same description and sealed under Sealed Pattern Numbers Clo.375 and Clo.376, respectively, to be made up in sizes ranging from size 4 to size 34, a much wider range than had hitherto been produced. The Director of Ordnance Services requested that two hundred copies of the specification be provided, an indication that large-scale tenders for



**Fig. 9.2** New uniforms for the Australian Army, Second World War. Photos taken by the Author at the Army Museum Bandiana, Wodonga, Victoria

manufacturing contracts were about to be publicised.<sup>19</sup> This marked a turning point in the design of Australia's military uniform and a farewell to the uniform that had been worn in the First World War (see Fig. 9.2).

The trousers of the new design were long and closed in at the bottom by anklets. The jackets still featured the four pockets which had proven so useful during the First World War, but there were now two versions: a khaki drab woollen version for winter and a cotton drill version for summer. The buttons were oxidised and non-reflective, a lesson learnt from the experiences of the Boer War in 1899–1901 when the Boers had been able to spot their opposite numbers as the buttons on their uniforms reflected back in the bright sunlight. Importantly, cotton uniforms were now an integral part of the uniform range. They were worn during summer and in tropical climates and also incorporated shorts. The importance of the Army's specifications for cotton uniforms was to have significant implications for the Australian economy.

## WIDER IMPLICATIONS OF THE SEALED PATTERN SYSTEM TO INNOVATION

The requirement to manufacture military garments to specification had repercussions beyond the operations of individual contractors—at times the system required an entire industry to make new inroads into its production methods. Mention has already been made of the requirements to use buttonhole and button sewing machines which resulted in technical improvements within the clothing sector. More significant economic changes were the result of pressures imposed by the Department of Defence upon the Australian cotton producers in the late 1930s. These pressures created an extraordinary stimulus to streamline the cotton industry, which resulted in Australian research and development of better-quality American cotton varieties. Until then, there existed no clear Australian-grown strain of cotton that promised to comply with the military specifications. As Henzell points out,

The chief deficiencies of the local fibre were its inadequate length and strength, and its excessive variability. One of the main reasons for the variability was varietal diversity... a 'hopeless mixture of American, Brazilian, Egyptian and Sea Island varieties'.<sup>20</sup>

There was now not only pressure upon the cotton industry to change its production methods, but also upon the spinning and weaving mills producing the yarns and fabrics for military uniforms also had to keep up with technological changes or they would lose out on contracts.

The mill owned by Davies Coop & Co. Ltd. in Melbourne had obtained the contract for 50,000 yards of khaki drill and, in the hope of remaining a supplier to the Defence Department in the foreseeable future, had standardised a section of the mill for this particular cloth.<sup>21</sup> It was not unusual for mills or clothing manufacturers to reorganise their processes for the purpose of delivering the contracted goods, but it simultaneously provides some insight into the influence that government contracts had on the operations of its contractors. An even clearer example of the willingness of companies to introduce new technology for the sake of obtaining government contracts is reflected in communication received from John Bentley & Sons Ltd. of Melbourne:

This Company is prepared to treat any woven fabrics of its own or any other manufacturer's manufacture up to 56" in width and in any length desired to

make them 'water repellent' by the 'vulcanising' process lately introduced by Imperial Chemical Industries Ltd. Woven fabrics such as drills, Bedford Cords, canvas, linen, overcoatings and woollen worsted or cotton woven fabrics may be successfully treated by this process.<sup>22</sup>

Companies such as this one were evidently ready to invest heavily in new technology for the sake of obtaining Defence contracts which specified the use of certain technology, in this example the 'vulcanising' process to render garments water-repellent. The letter also underlines the links between the Defence Department and scientific experimentation: the Imperial Chemical Industries Ltd. (ICI) that had developed the 'vulcanising' process was in close collaboration with the Department and had also developed green dyes.

During times of war the pressure to produce large quantities of specified fabrics for the military uniform industry were at its highest and this sometimes meant that mills had to purchase new equipment to keep up with the Clothing Factory's orders. In the midst of the purchasing restrictions introduced by the government during the Second World War, the Ballarat Woollen and Worsted Company Ltd. applied for a permit for required plant to be manufactured in Britain. The permit was for two Gessner spinning frames and their spare parts for their new woollen spinning plant, on order from Messrs. Asa Lees & Co. Ltd. of the Soho Iron Works in Oldham, England, and for a double head Gill box plus two single head Gill boxes, and material to convert six Roving Frames and two Reducers with Eclipse Spindles and front rollers, on order from Messrs. Prince, Smith & Stells of Keighley, England, to be used in the mill's new worsted plant to produce khaki cloth. All equipment was

...very necessary to replace old plant of over fifty years service, and we must have such renewals in this section of our mill if we are to adequately cope with the increasing National needs of Khaki Cloths and Blankets.<sup>23</sup>

Just as John Bentley & Sons were prepared to invest in new technology, the spinning and weaving mills also updated their machinery to keep production capability up to date and in line with Defence contract requirements. The Defence Department thus had an influence on large sections of the economy and was driving it well into the future as far as the introduction of technology was concerned. But introducing new technology was one aspect, delivering product at acceptable price levels and at high quality was another.

Tenders, by their very competitive nature, compelled contractors to produce at the lowest possible cost, but the specification of military uniforms did not allow for any reduction in quality. The system of detailed specifications, sealed patterns and scrupulous inspection of the finished garments ensured high levels of operating efficiency in the industry and the Clothing Factory played a significant role in this development. By the Second World War, the Factory incorporated the office of the Chief Inspector of Stores and Clothing, which employed six men on a permanent basis who would calculate the cutting averages for each garment so that the exact amount of fabric required was known. Having these figures available facilitated the ordering of fabric from the mills, assessing tenders, planning of future requirements and preparing government budget estimates. The Chief Inspector's office also started to produce miniature lays—illustrations of the most efficient way of laying pattern pieces onto fabric with minimal wastage.<sup>24</sup> This had never been done before in this way. The combination of providing cutting averages and miniature lays not only removed wastage of fabric as a factor in tendering costs and thus led to further government savings, the system educated the industry in more efficient ways of planning and costing.

In addition to the prescribed methods of cutting, the cost of manufacturing and the price of the final garment was also calculated and henceforth used to determine the price of contracts with the private sector. The Contract Board's Cost Accountant used certain average wage rates, other manufacturing costs and applied 'reasonable' profit figures and was able to provide the board and thus the industry with fixed prices for each type of uniform garment. An example of the cost breakdown for a Service Dress Jacket as calculated by the cost accountant in 1943 is shown in Table 9.1.

In the example shown, the garment was a Service Jacket. The Inspector of Stores and Clothing provided the exact measurement of the material required to make the jacket and the cost of the cloth was already known, thanks to the government's Trust Fund system which financed the cloth. This cost amounted to £11 8s.11d. The contractor's cost of 3d. was not explained further, but may have been his cost for additional notions, such as thread, buttons, trim, etc. His total cloth cost therefore came to £11 9s.1d. To make up the garment, the Cost Accountant was using Federal Award wages in the clothing industry and estimates of hours of labour involved. The garment's labour costs were then calculated as £2 8s.1d. To this was added the factory's overhead costs (cost of running the machines and other equipment, electricity, gas, administration costs etc.) during the

**Table 9.1** Contract Board cost breakdown to determine fixed price of a jacket, S.D. (New Design), 1943

<i>Fixed price of jacket, S.D. (New Design), 1943</i>	
Material: Department	£11: 8:11.77
Contractor	3.00
<b>Total material</b>	£11: 9: 1.77
Direct labour	£2: 8: 1.80
Overhead	16: 1.60
<b>Manufactured cost</b>	£14:13: 4.17
Profit	8: 9.61
Payroll tax	1: 4.05
<b>Total</b>	<b>£15: 3: 5.83</b>

Source: NAA: B4601/5, 78,243 Part 1, *Department of Supply and Shipping, Contract Board, Fixation of Prices of Uniform Clothing—General Policy File*, Business Paper No. 2913

hours of making the garment, so that the total manufacturing costs then came to £14 13s.4d. In an effort to be as accurate as possible for a representation of costs and profits in a commercial enterprise, the cost accountant then calculated a ‘reasonable’ profit of 3 per cent, added the cost of payroll tax and accordingly arrived at the figure of £15 3s.5d. as the price payable by the Defence Department for a Service Jacket in 1943.

This same system of breaking down the manufacturing cost was applied to every garment, and these were presented in tables for use by the Contract Board to assess the private firms’ budgets in their tender applications. The cost figures were frequently updated in line with changes in wage rates and other determinants.<sup>25</sup> If a private firm had an interest in supplying garments under contract, it had to ensure it could produce these at the same (or lower) cost as required by the Department. The system drove the contractors to cut their own costs as far down as possible to make as much profit as possible, while selling the goods at the fixed prices determined by the Department. This had the potential for using low-cost labour where higher-paid, skilled labour should be used. It had the potential to let unnecessary repairs or purchases be delayed. Whether or not this really happened under the fixed price system may be a matter for future research. In any event, it was a system in which the Defence Department exerted full control over all aspects of military uniform production. It prescribed the manner in which the uniforms were to be produced, the technology to be used and even the costs and profits of the contractors.

Together, the Clothing Factory and the system that specified and controlled the making of military uniforms were instrumental in changing the production of certain raw materials, in particular cotton, and of the type and quality of the woollen fabrics used. There were instances when the clothing specifications instigated the application of new textile technology and efficient fabrication processes to produce military garments to predetermined prices. It can be said that by the late 1930s the making of military uniforms had become wholly government-controlled and that this had transformed the military clothing industry, in more than one sense, into a national industry.

The Clothing Factory was thus the originator and keeper of IP in the form of new uniform designs and a detailed system of specifications and sealed patterns. As the Clothing Factory subcontracted excess work to the private sector, it introduced quality control through strict inspection services, forced contractors to innovate by their purchasing of certain machines (such as button-sewing machines) and their adoption of more efficient work processes in order to comply with contract conditions, and it educated the industry by introducing miniature lays to minimise fabric wastage.

The Contract Board had an influence on methods of cost accounting in the industry. By preparing detailed schedules of material, labour and overhead costs for each garment and imposing a certain percentage of profit, it presented the industry with fixed prices to which contractors were required to produce. The cost accounting system could easily have been adopted to calculate the price of any garment by any firm or person in the clothing industry, thereby introducing a new level of certainty for profitability.

The specifications for military garments had wider implications in Australia. Requirements for certain types of fabrics propelled the Australian woollen and worsted mills into innovation of their machine park. Australian participation in the wars in the Asian and Pacific areas created heavy demand for locally produced cotton drill fabric and the Defence Department's requirements for cotton plant varieties of American origin formed a strong incentive for Australian cotton growers to introduce these varieties. As a result, the requirements for Australian Army uniforms provided many stimuli for innovation in the Australian economy, affecting not only the clothing industry and the textile mills but also extending back into the production of raw materials in the agricultural sector.

A feature of the introduction of innovation is the identification of IP, particularly where it provides a technological advantage in the marketplace. This usually involves appointing a patent attorney who, with the assistance of the inventor, writes a detailed description of the invention, which will then be lodged with the government's patent office. Once it has been established that the invention is unique and that it is of value to the inventor, it is sealed. The design of the Australian Army's combat uniform follows a similar principle: it needs to be protected from illegal copying. This chapter shows how, during the course of the twentieth century, the design of the Australian Army uniform was described in the form of detailed specifications, subsequently entered into a register and sealed. But that is where the similarities with the patent office end. Unlike inventions that are the property of a private inventor, the uniform is national intellectual property; that is, it belongs to the nation. The IP was thus not registered with the government's patent office; the Army, in collaboration with the Clothing Factory, maintained its own system. It was a fully independent intellectual property register, complete with specifications, seals and registration numbers.

The system of sealed patterns provided a basis for further innovations. Taking the specifications of the current garments, it was possible to improve on the design, the fabrics or the method of manufacturing. It has been shown that the sealed pattern system had wider economic implications. Some woollen mills reorganised their production processes and others bought new equipment to suit the Army's specifications. These improvements would also have benefits for the production of other goods. When softer cotton was specified for the Army's tropical outfits, it set in motion a research and development process in Australia that eventually resulted in the rapid development of Australia's highly successful cotton industry.

The Army's control extended to the clothing contracts signed with private firms. The sealed pattern system provided a framework for quality assurance, where the firms were required to produce exactly to specifications. In addition, the Army took control over the pricing of the contracts. Its cost accounting methods set the standard for the manufacturing costs of each item making up the Army's uniform and for the rate of profit to be made by the private sector. All of this equated to a high level of government control over the private clothing contracting sector's manufacturing standards, costs and profits.

## NOTES

1. For a detailed analysis of the uniform's sociological aspects, see Nathan Joseph and Nicholas Alex, 'The Uniform: A Sociological Perspective', *American Journal of Sociology*, 77, no. 4 (1972), pp. 719–730.
2. Barton C. Hacker and Margaret Vining, 'Cutting a New Pattern: Uniforms and Women's Mobilization for War 1854–1919', *Textile History and the Military*, 41, no. 1, Supplement, May 2010, pp. 109–110.
3. Nathan Joseph and Nicholas Alex, 'The Uniform: A Sociological Perspective', *American Journal of Sociology*, 77, no. 4 (1972), p. 725; Sean Kikkert, 'Military Uniforms: The Psychological Dimension', *Australian Army Journal*, 11, no. 2, p. 245.
4. What follows also applies to police uniforms and some other law enforcement uniforms. See Nathan Joseph and Nicholas Alex, 'The Uniform: A Sociological Perspective', *American Journal of Sociology*, 77, no. 4 (1972), pp. 719–730.
5. The services provided by IP Australia are explained on its website: [www.ipaustralia.gov.au](http://www.ipaustralia.gov.au)
6. Katherine Elliott, 'Clothing Soldiers; Development of a System of Production and Supply of Military Clothing in England from 1645 to 1708', *Arms & Armour*, 10, no. 1, Spring 2013, pp. 30–50.
7. NAA: A4940, C3567, *Report from Sir John Allison and Mr. L. Brewster on Commonwealth Government Clothing Factory Requested in Letter from Minister for Supply dated 13th January, 1964*, p. 1.
8. NAA: A816, 14/301/486, *Commonwealth Government Clothing Factory*, C.K. Davies (Chair), Interim Report, p. 1.
9. AWM27, 382/7, *Correspondence Concerning the Manufacture of Military Clothing for the AIF, 1916*.
10. NAA: MP84/1/0, 1990/2/35, *Letter from Lieut.Colonel Legge, Quartermaster General, to Commandant, C.M. Forces of All States except Victoria, 2 February, 1911*. The abbreviation D.A.Q.M.G. stands for Deputy Assistant Quartermaster-General.
11. This is evident from NAA: MP508/1, 61/707/39, *Department of Army [Cloth & Cord, vide 'Clothing & Materials']—Uniforms for volunteer defence Corps [131 pages] [Box 99]*.
12. NAA: MP222/1, 13 K, *Camouflage—Individual Concealment—Uniforms and Equipment, Letter from the Engineer-in-Chief*.
13. NAA: MP76/1, 18,315, *Inventor/Submitter -] J Burton—Improvement in Jungle Green Trousers*.
14. See ABS, *Year Book Australia*, No. 23, 1930, p. 410.
15. NAA: B1535, 733/1/31, *Memorandum from Chief Inspector, Munitions Supply Board to the Secretary, Contract Board, 28 April 1927*.

16. NAA: B1535, 733/1/31, *Memorandum from Secretary, Co-Ordination Committee, to Secretary, Military Board*, 26 September 1928.
17. NAA: MP508/1, 61/716/91, *Specifications for Military Clothing, 1937–1941*.
18. NAA: MP508/1, 61/716/91, *Correspondence between Ordnance Services and Chief Inspector, Munitions Supply Board*, various dates during 1938.
19. NAA: MP508/1, 61/716/91, *Memorandum from Director of Ordnance Services to Chief Inspector, Munitions Supply*, 28 August 1939.
20. Ted Henzell, *Australian Agriculture: Its History and Challenges*, Collingwood, VIC, 2007, p. 213, based on J.J. Basinsky, *Cotton Growing in Australia: An Agronomic Survey*, Canberra, CSIRO, 1963, pp. 27 and 103, and quoting W.H. Johnson, *Cotton and Its Production*, London, 1926, p. 329.
21. NAA: B1535, 733/1/251, *Letter from D.M. Davies, Managing Director of Davies Coop & Co. Ltd., to Secretary, Contracts Board*, 19 August 1938.
22. NAA: B1535, 733/1/251, *Memorandum from Secretary, Contract Board to Secretary, Military Board*, 1 December, 1938.
23. University of Melbourne Archives (UMA): *The Ballarat Woollen and Worsted Company Ltd., Correspondence—Commonwealth of Australia Department of Defence, Army, Air, Supply & Development, From 14 February, 1941 to 30 October 1941*, Letters from the Manager, The Ballarat Woollen and Worsted Company Ltd., to A.V. Smith, Contracts Branch, Department of Supply and Development, both dated 16 May 1941.
24. NAA: B4601/5, 78,243 Part 1, *Department of Supply and Shipping, Contract Board, Fixation of Prices of Uniform Clothing—General Policy File*, Business Paper No. 1355, p. 2.
25. To determine the appropriate wage rates, Leslie Brewster, Acting Deputy Director of Contracts, carried out negotiations with the Clothing & Allied Trades Union, whose General Secretary-Treasurer at this time (1943) was A.R. Wallis. NAA: B4601/5, 78,243, Part 1, *Department of Supply and Shipping, Contract Board, Fixation of Prices of Uniform Clothing—General Policy File, Correspondence between L. Brewster and A.R. Wallis*.



## The Government Relinquishes Control

The winds of change had been blowing softly throughout the Australian political landscape and, indeed the Western world, since the early 1980s when the first general debates about the value of, or need for, government ownership of assets and activities arose. There was public concern about the size of the public sector as a proportion of the total economy, some of which was due to the government's involvement in a wide variety of business activities. One of the options open to the government was to offer its businesses to the private sector by 'sale as a going concern'.<sup>1</sup> This was the route taken back in 1923, when the Woollen Cloth Factory in North Geelong was sold for £155,000 to a syndicate called the Federal Woollen Mills Pty. Ltd. This raised the possibility that the same method could be adopted for other government businesses, particularly the Clothing Factory.

### GOVERNMENT CONSIDERATIONS TO PRIVATISE THE CLOTHING FACTORY

In the 1980s there were numerous debates concerning the desirability or otherwise for the government to be actively involved in business activities. The Hawke Labor Government (1983–1991) was at first opposed to a reduction in the size of the public sector; as the budget deficit rose to alarming heights during the latter part of the Hawke reign (it was faced

with the prospect of a deficit of some \$6 billion in 1987–1988), however, it became clear that measures to reduce the debt should be taken urgently.<sup>2</sup> Overseas, in particular in the UK under Prime Minister Margaret Thatcher, governments had begun to distance themselves from direct involvement in infrastructure, communication, public utilities and many other activities by transferring public assets to the private sector, i.e., privatising, in a variety of ways. According to economist Madsen Pirie (the architect of Margaret Thatcher's privatisation policy), a range of privatisation techniques were adopted in the UK: selling a whole operation; selling complete parts of an operation; selling a proportion of an operation; selling the operation to the workforce; charging for the service; contracting services out to private business; diluting the public sector; repealing monopolies to encourage competition; curbing state powers; or divestment, liquidation and withdrawal from the activity.<sup>3</sup> By 1986, the UK Government had sold off a number of utilities: Associated British Ports, British Gas, British Telecom, Sealink, and the National Bus Company, as well as a number of businesses, including Cable & Wireless, Britoil, Enterprise Oil, British Aerospace, Jaguar, Inmos, Amersham International, International Aeradio, the British Sugar Corporation, British Rail Hotel, North Sea Oil licences, and various parcels of land and council houses.<sup>4</sup> Around this time, many other European countries, as well as the USA, Canada and Japan, were following suit.

In the wake of the overseas examples, privatisation in Australia was also taking off from the late 1980s and over the course of the following decade a long list of public enterprises either underwent a change in ownership or saw significant structural changes. Some public businesses were not quite ready for transfer to the private sector and required an interim stage before their ownership could be transferred. In this interim stage, the legal structure of the business was changed into a corporation (hence the introduction of the term 'corporatisation' to the business jargon of the day), a board of directors was appointed, certain tax advantages were removed that had prevailed when the business was run under government ownership, the activity was opened up to competition, the workforce was restructured, unwanted assets were removed, etc. Once a corporation was able to run consistently on a profitable basis, it could be sold or floated on the Australian Stock Exchange. Australian Government businesses corporatised in this fashion included the Australian Industries Development Corporation, National Rail Corporation Limited, Aerospace Technologies of Australia Pty. Ltd., Melbourne Water, State Bank of New South Wales, Hunter Water Board (NSW), NSW Grain Corporation Limited, Golden

Circle Cannery (Qld), Queensland Investment Corporation, Queensland Tourist and Travel Corporation, State Government Insurance Office (SGIO) (WA) and Rural & Industries (R & I) Bank (WA).<sup>5</sup>

It was under these winds of change that the government looked again at the business of the Clothing Factory. The making of military uniforms was a business for which there was only one client: the government itself. It was also one in which private firms produced the bulk of the goods, while the Clothing Factory only participated to the extent of 5 per cent of output, concentrating instead on the making of other uniforms (postal, railways, tramways and other uniforms). The Clothing Factory was profitable, but it also had characteristics more typical of a government department, in particular in the awards under which its workers were employed, many of whom had been taken on under public service awards. The supply of cloth for the uniforms, whether produced by the Clothing Factory or private firms, was paid for under a Treasury Trust Fund set up specifically for the purpose. As the cloth was funded from this Trust Fund no matter what the economic circumstances for its production were, the sale price of the cloth was not always representative of true market prices and was perhaps too high. In other words, before any thought could be given to privatising the Clothing Factory, its operations would require attention to render the Factory a 'lean and mean' manufacturing plant. The Factory needed to enter a phase similar to corporatisation, but it was really too small an operation to exist on its own in such a format.

A Committee on the Review of Commonwealth Functions was established in 1981 to investigate the disposal of the Ordnance Factory in Bendigo and the Clothing Factory. However, there were a number of obstacles to either option, as noted by John Blood, Managing Director of Sportscraft and Chair of the Textiles Council of Australia. The Clothing Factory's ongoing business, if privately owned, would be dependent upon success in an open tender system for government contracts for military clothing. The government would be unable to guarantee success and the Factory's future production would be on unstable ground. A better way would be to issue fixed-term contracts to the new owners, which would enable them to plan for longer periods of production in advance. However, Blood continued, because the Factory was now only producing a small fraction of the military's requirements, the buildings and plant should be sold (he valued the Factory's fixed assets at over \$2 million) and its production taken up by the private sector. Whichever method was selected,

the end result would be that the government would pay more for the uniforms, according to Blood.<sup>6</sup>

By way of remarkable foresight, the Department of Defence made the comment that a reliance on commercial sources for the supply of uniforms could ultimately make it more dependent upon overseas sources of supply.<sup>7</sup> As the future was to show, this concern was not unfounded.<sup>8</sup> Interestingly, it also highlighted the Factory's importance as a valuable link between garment design, garment development and production. This was not the first time that the Factory's role as a laboratory of innovation was put to the government: the Alison–Brewster Report of 1964 had already recognised the Factory's role in innovation.<sup>9</sup>

After a consideration of the issues, the Committee was unable to arrive at a firm solution and its report to Cabinet on 26 February 1981 provided two rather tentative recommendations: either sell the Clothing Factory as a going concern at some point in the future, or require the Defence Department to contract its clothing orders out to the private sector, whereupon the factory should be closed down and the building and plant sold off.<sup>10</sup> These recommendations failed to provide Cabinet with a rational and firm basis on which to act. However, Cabinet decided that the Clothing Factory should 'in principle' be either sold or leased as a going concern.<sup>11</sup> There was still disagreement within Cabinet concerning the Clothing and the Ordnance Factories' future, which, in August 1981, led Senator Siddons, seconded by Senator Button, to inquire into the latest Cabinet Decision. The matter was thereupon referred to the Senate Standing Committee on Finance and Government Operations. However, due to the Standing Committee's reported lack of time the Senate resolved that the issue should be investigated by a Select Committee on the Future of the Government Clothing and Ordnance Factories.<sup>12</sup>

Senator J.R. Martyr chaired the Select Committee and its members were Senator J.N. Button, Senator N.A. Crichton-Browne and Senator J.R. Siddons. In preparing its report, the Select Committee reviewed the Clothing Factory's history and previous reports, including the 1964 Allison–Brewster Report which had recommended the retention of the Clothing Factory as a government business, and a 1980 Industries Assistance Commission (IAC) report on the textiles, clothing and footwear (TCF) industry which pointed out that the advantages of the Clothing Factory,

... included an assured source of supply, a continuation of expertise in production and design in the one establishment and the ready availability of

that expertise to assist in the expansion of volume production by industry in a time of emergency.<sup>13</sup>

There were also serious obstacles to the sale of the Factory as a going concern, as an industry adviser to the Minister for Industry and Commerce pointed out in 1981. The Factory produced a wide range of uniform items, but much of this came in short production runs which lack economies of scale, are too costly or too labour-intensive and are thus unattractive to the private sector. If these lines were no longer produced by the Clothing Factory and were tendered out to private firms by the government, the tender system would need to be streamlined as it was far too cumbersome and time-consuming. There would need to be much improved forward planning in military requirements to give private firms time to adjust their production. It was also suggested that period contracts, that is, contracts given to firms over a longer period of time for the production of certain items, would solve the short-term tendering problems.<sup>14</sup>

The entire operations of the Clothing Factory now came under increased scrutiny. The Select Committee found that the Factory's employment had increased from 662 in June 1980, to approximately 720 in June 1982, as a result of the expansion of the Army Reserve. The Committee also confirmed that at this time the Factory produced more than 2000 different items. As R. Aitchison, Executive Director of the Australian Confederation of Apparel Manufacturers, stated, 'The Factory... is virtually an entire clothing industry in its own right under one roof.'<sup>15</sup> The Department of Defence repeated its claims that the Factory performed vitally necessary functions, especially where the design and development of uniforms was concerned, and it would be opposed to a closing down of the Factory. The Select Committee took all this on board, but was aware that a possible privatisation would also need to bring the Factory's accounting system in line with practices in the private sector. As a public body, the Factory paid no company or payroll tax. If this had been taken into consideration when producing the annual accounts, the Factory would have operated at a loss of \$1.3 million in 1980 and \$1.6 million in 1982. The entire pricing system was based on cost recovery plus a margin of between 3 and 5 per cent, rather than on making a profit to be used for future investment and for distribution to shareholders by way of dividends as would be the case if this was a private factory.

The Committee then discussed the three options available to the government: sell or lease the Factory as a going concern, retain the Factory as a government enterprise, or close the Factory down. Following an advertisement in the press, several expressions of interest had been received by private firms for the purchase of the Factory, which included a government guarantee for a certain amount of work from the Department of Defence. It was considered that leasing the Factory was not an option as it was making a loss in real terms and would need to be entirely restructured. A closure of the Factory would present problems in finding operators willing to produce many unprofitable, low-volume lines of military clothing. From an Australian textiles and clothing industry perspective, the closing down of yet another Australian clothing production unit would not be welcomed. In considering all options and breaking the issues down into several subjects (cost, quality control, supply, commercial considerations, pricing of Defence orders, discontinuation of short production runs, employment issues, and loss of industry capacity), the Select Committee also noted that the future custody and maintenance of patterns, currently held at the Factory, would have to be safeguarded. These patterns were, in essence, government-owned intellectual property and would be included in the assets of the Factory. The Committee was informed that the pattern records were being placed on computer files and that these and archival records were locked up in fire-proof cabinets. Any prospective purchaser would be required to safeguard the records.<sup>16</sup>

Unlike many other privatisations and corporatisations undertaken by the Australian Government during the 1980s and early 1990s, to sell or otherwise dispose of the Clothing Factory, which was the producer of the Australian Army (and other) uniforms, proved to be an act in which sentiments of national pride played a powerful role. It was so powerful that it split the Select Committee in two. The Chairman, Senator Martyr, and Senator Crichton-Browne had come to the view that the Clothing Factory should be sold and that Defence contract incentives should be provided to prospective purchasers. This was the view presented in the report. However, Senators Button and Siddons opposed the sale of the Factory. They drew on the original 1909 report, which had recommended the establishment of the Factory and on the Allison-Brewster Report which led to the building of the new Factory in Coburg, the IAC report, the recommendations by the industry adviser to the Minister of Industry and Commerce and the Defence Review Committee chaired by John W. Utz in 1982—all of which were in favour of government ownership of the

production of military and other public sector uniforms. Button and Siddons stated that it was important for our Defence strategies to have local and immediate recourse to a variety of uniforms which were suitable to a range of climates. The short production runs were not attractive to the private sector and previous reports had indicated that the cost of uniforms would increase if they were made by private firms. But what was really at the heart of their arguments came out in another page of their dissenting report. The two senators felt that there should be as few constraints on a country's defence forces as possible and that 'the greater the constraints, the smaller is our freedom of action'.<sup>17</sup> These types of sentiments can be heard still today, long after a large segment of the military uniform business is produced overseas, predominantly in China.

### FINAL MOVE TO PRIVATISATION<sup>18</sup>

Cabinet had to arrive at a final solution, but because of the division within the recent Committee's report, it was faced with yet another dilemma and had to tread carefully. Senator Button was generally well regarded, he was Leader of the Opposition in the Senate when the report was published and, later, as Minister for Industry and Commerce, he became the driving force behind government support for the Australian automobile industry as well as the TCF industry.<sup>19</sup> It was decided to take the matter of the sale of the Clothing Factory out of the public arena, no further committees were established and no public debates took place about the future of the Clothing Factory. But something was happening nevertheless. The government still owned a number of Defence industries which were administered by the Office of Defence Production and which the government was considering privatising. But none of these industries, which included ammunitions factories in various locations, were yet ripe for privatisation and some were even considered unsuitable to be run at a profit and would be best disposed of altogether. A transition phase to prepare suitable defence industries and to dispose of the others was an option available to the government. On 3 May 1989, a company named Australian Defence Industries Pty. Ltd. (ADI) was created to take over the former Office of Defence Production. Government-owned dockyards, naval engineering and the Clothing Factory were placed under the management of ADI and its Managing Director, Ken Harris. Harris was a corporate structuralist, who would take a hard look at a company's viability and either grow the company to profitable levels or prepare it for sale.<sup>20</sup> Under the umbrella of

ADI, four divisions were created, each representing a defence industry with its facilities. They were: the Naval Engineering Division (including the Garden Island dockyard and the electronics facility in St Marys, both in New South Wales); the Ammunition and Missiles Division (facilities in Footscray in Victoria, Mulwala and St Marys in New South Wales and Salisbury in South Australia); the Weapons and Engineering Division (facilities in Bendigo and Maribyrnong in Victoria and Lithgow in New South Wales); and the Military Clothing Division with its Coburg facility as well as facilities in Bendigo in Victoria and Leichhardt, a suburb of Sydney. The Australian Submarine Corporation was also placed under ADI, but was treated as a separate entity, which would be retained for the time being, streamlined and later privatised. Having all the defence facilities within a private company opened the way for a drastic rationalisation programme. Harris announced that ADI would open a new state-of-the-art ammunition facility at a new site, which would enable him to close down the Footscray, Maribyrnong and St Marys factories. The Bendigo plant would be upgraded as the major defence engineering factory. As factories were earmarked for closure, discussions with the relevant trade unions had to take place to arrive at retrenchment measures which were acceptable to ADI and the unions. The cost of the retrenchments and preparations for sale or closure were offset against ADI's profitable divisions. It was a turbulent time for the industries involved. Following the completion of the rationalisation programme, ADI itself was ready to be privatised. It underwent a change from a private company to a limited company and from January 1996, became known as ADI Limited.<sup>21</sup>

It is significant that both the naval engineering and clothing divisions were profitable operations which financed ADI's expenses and underpinned the cost involved in ADI's rationalisation programme. By the end of ADI's first financial year, 30 June 1990, the Clothing Division's turnover was \$48.8 million and ADI indicated that multi-year clothing contracts were ready to be signed with the Department of Defence which would sustain the operations into the coming years.<sup>22</sup> But things did not go so well. The Division's turnover slowly declined to \$44.5 million in 1991 and \$42 million in 1992 despite forays into the corporate clothing industry in an effort to diversify the Division's client base.<sup>23</sup> From 1993, the financial performance of the Clothing Division no longer appeared in ADI's Annual Reports and the business reports were kept vague and repetitive. In 1994 the Clothing Division was no longer a key division. Over a relatively short time, the operations had been moved from Coburg

to Bendigo and the factory building in Coburg was sold.<sup>24</sup> Responsibility for the Bendigo operations was moved to a general division entitled ‘ADI Services’ along with a host of other ADI operations. By 30 June 1995, all mention of military and corporate clothing had disappeared from the reports. In reality, the remnants of the Australian Government Clothing Factory were quietly being prepared for disposal and they were sold on 27 October 1995, to Melbourne uniform manufacturer Free ‘N’ Easy for an undisclosed sum.<sup>25</sup> ADI may not even have made a profit from the sale and it is quite possible that the amount of \$2.3 million shown in the accounts as ‘provision for loss on the disposal of a business segment’ relates to this sale.<sup>26</sup> The clothing operations then became known as Australian Defence Apparel Pty. Ltd. (ADA) under the baton of founder and CEO Brian Rush.

### THE FACTORY TODAY

For the next decade and a half ADA continued the pattern of innovation by research and development that marked the operations of the erstwhile Clothing Factory. The company successfully tendered for Australian Defence and other contracts. The character of the military uniforms took on a new style, emerging from the familiar basic fabric uniform as modern items of body armour using ‘high-tech’ materials. This trend continued under Rush’s successor as CEO, David Giles Kaye.<sup>27</sup> Body protection became the company’s mainstay, its manufacturing lines were expanded from defence garments to the production of protective garments for the police force, fire brigade and emergency personnel. But among these ‘high-tech’ lines one line of Army clothing remained and is produced to this day at the Bendigo facility: it is the DPCU (Disruptive Pattern Camouflage Uniform).

On 11 July 2011, a report in the *Bendigo Advertiser* announced that ADA had been sold to Parsons Logistik, a joint venture between well-known Australian textile wholesaler Charles Parsons in Sydney and Logistik Unicorn based in Canada.<sup>28</sup> While the manufacturing plant had earlier under ADI’s flagship been moved to Bendigo, the company’s headquarters had remained at 14 Gaffney Street, Coburg—the site of the factory since 1971. This site, measuring 2.5 hectares opposite the Batman railway station, was placed in the hands of Moreland City Council, the council responsible for Coburg North. In early 2013, as part of the *Melbourne 2030* planning strategy, Moreland City Council earmarked the site for



**Fig. 10.1** Australian Defence Apparel factory floor in Bendigo, Victoria. Source: Author's photo

redevelopment as a \$100 million-plus mixed-use village with retail and commercial space.<sup>29</sup> With this future redevelopment, the remnants of the building that was once the Australian Government Clothing Factory, first established in 1912 in South Melbourne and rebuilt in 1971 in Coburg, will be gone forever. Only a portion of the Australian military uniforms is today produced by ADA in Bendigo, now partly in foreign hands (see Fig. 10.1).

### ARMY UNIFORMS MANUFACTURING INTO THE TWENTY-FIRST CENTURY

The conditions that made it possible for the smooth implementation of innovation into the garments, in the manufacturing processes, the accounting techniques and other processes surrounding the military clothing industry had now either disappeared or been altered significantly. To lose

the ability, for example, to collaborate directly with scientists in relevant fields would signal the end of Australian production and experimentation with new clothing designs for the Australian Army. This contrasts sharply with the situation in the United States where dedicated defence research institutes work in close collaboration with the Defense Department and where significant developments in 'smart' military textiles and body protection are funded by an elaborate Defense budget. In Australia, by contrast, the research investment into defence clothing had become almost extinct by the end of the twentieth century. By 2000, the Australian scientific efforts that had played such an important role in innovation in the Australian Army's uniform during the twentieth century had almost disappeared. A remnant of the Army's collaboration with scientists in the field of combat clothing was still visible in a tiny research section of the Defence Science and Technology Organisation (DSTO), where, under the leadership of Graeme Egglestone, a new desert pattern combat uniform, one suitable for the Afghanistan environment, as well as a lightweight Chemical Biological Combat outfit were developed. Egglestone received a Science Award for these innovations in 2003. The clothing, it was stated by Senator Hill, Minister for Defence, 'is manufactured in Australian factories by an Australian workforce'.<sup>30</sup> It is quite likely he was referring to the factory operated by Australian Defence Apparel in Bendigo. No further indications of any collaboration between the Army and these DSTO scientists have come to light and this particular research may have come to a halt.

The issue of rebuilding production and the supply of military fabrics in Australia has become a contentious point for debate. The arguments in favour of keeping production in Australia did not fall on deaf ears and in May 2010, the Minister for Defence Materiel and Science, the Hon. Greg Combet, AM MP, was quick to point out that all combat uniforms were made in Australia as the result of new \$30 million clothing contracts having just been signed with Australian Defence Apparel (ADA) and CTE Pty. Ltd., using fabric produced by Bruck Textiles Pty. Ltd. in Wangaratta, Victoria.<sup>31</sup> ADA was to supply Disruptive Pattern Camouflage Uniforms (DPCU) and Disruptive Pattern Desert Uniforms (DPDU) and CTE Pty. Ltd. was to supply DPDU clothing from their plant in West Footscray, Victoria. The contracts covered more than 200,000 new camouflage uniforms.

But it is one thing to keep production in Australia, it is quite another to advance the technology behind the production and to keep up with international scientific developments to produce the Army uniform of the

future. This was possibly one of the rationales behind a government decision to effect a small-scale revival of government defence research support.<sup>32</sup> On 14 June 2011, it was announced that more than \$9 million would be contributed to improve ballistic, blast and flash protection, to improve head, face and eye protection, decrease weight and bulk of protective systems, reduce blunt trauma that can occur behind armour, reduce the risk of a soldier being detected and to improve protection from fire, chemical, biological and radiological threats.<sup>33</sup> The research would be carried out by the Defence Materials Technology Centre (DMTC) which had been created in 2008 for the development of improved protective combat wear in partnership with universities (likely to be the University of Wollongong and RMIT) and industry partners (expected to include Australian Defence Apparel, Ballistic and Mechanical Testing, Bruck Textiles, Tectonica, Pacific Engineering Systems International and the Victorian Centre for Advanced Materials Manufacturing). The amount of research spending for defence purposes is relatively small even by Australian standards and is minuscule when compared to similar spending by the United States Government, but it is aimed at continuing the general line of scientific inquiry that marked Australian defence research during the previous century, which so successfully introduced innovation into new fabrics for the Army's uniforms. None of this hints at any desire to reinstate the uniform making business as a government enterprise. It merely states the fact that new investment in the research has once more been taken up and that government support for technological advancement in the industry has not (yet) been lost.

In the decades following its establishment in 1912 the Australian Government Clothing Factory had been a busy manufacturing enterprise, leading the clothing sector in innovation. The Factory was regarded as a laboratory of design and held an extensive portfolio of sealed patterns for military uniforms. In 1995, however, it had been reduced to a mere collection of machines taken from the Coburg plant, reinstalled in Bendigo and sold to a private firm. This is the sad tale of the road travelled by the Australian Government Clothing Factory. It is a quiet reminder to all of us that a flourishing business showing almost \$50 million in annual turnover in 1990 can be reduced to ashes in less than five years when taken out of its established production structure to be disposed of as an accounting-style asset.

It is to the credit of Australian Defence Apparel's CEO, Brian Rush, and the company's subsequent owners that the remnants of the Clothing

Factory are heroically attempting to keep the manufacture of the Australian Army uniform within Australia. However, in order for ADA to remain at the forefront of technology it is vital that it maintains a close association with research scientists and for the Australian Government to reassess its investment in textile material research and other technologies that, when integrated into the design of Army combat clothing, will provide the maximum protection for the Australian soldiers in future years.

## NOTES

1. The term 'sale as a going concern' implies that the business is a viable one and is not on the verge of bankruptcy. The entire business, together with its management, employees, plant and equipment and inventories would be offered for sale. It would then be left to the purchaser to rationalise the business, if so desired. This route would be the easiest option open to the government to transfer the business to the private sector.
2. For a fuller analysis of the Hawke Government's dilemma, see Peter Abelson, 'Introduction', in Peter Abelson (ed.), *Privatisation: An Australian Perspective*, Sydney, 1987, pp. 1–9.
3. M. Pirie, *Privatisation: The British Experience and its Application to Australia*, London, 1985, quoted in Oon Chin and George Webb, 'Privatisation: A View from the Private Sector', in Peter Abelson (ed.), *Privatisation: An Australian Perspective*, Sydney, 1987, Table 2.1, p. 28.
4. Organisation for European Cooperation and Development (OECD), *Economic Outlook*, No. 40, December 1986, quoted in Peter Abelson, 'Introduction', in Peter Abelson (ed.), *Privatisation: An Australian Perspective*, Sydney, 1987, p. 3.
5. Sly and Weigall Lawyers, *Corporatisation & Privatisation in Australia*, 2nd edn, March, 1992, Appendix A.
6. NAA: A12930, 1210, *Memorandum 1210—Review of Commonwealth Functions—Disposal of Ordnance Factory Bendigo and Australian Government Clothing Factory—Related to Decision No. 16724 (RCF)*.
7. NAA: A12930, 1210, *Memorandum 1210—Review of Commonwealth Functions—Disposal of Ordnance Factory Bendigo and Australian Government Clothing Factory—Related to Decision No. 16724 (RCF)*, pp. 6–7.
8. In 2010 a Chinese company was given a contract to produce the fabric for the camouflage uniforms, as reported in a newspaper article, 'China Contract for Army Uniform Fabric Unpatriotic', *The Australian*, Canberra, 10 February 2010. It is believed that polyester shirts are also produced for the Army in China.

9. NAA: A4940/1, C3567, *Report from Sir John Allison and Mr. L. Brewster on Commonwealth Government Clothing Factory Requested in Letter from Minister for Supply dated 13th January, 1964*, p. 1.
10. NAA: A12930, 1210, *Memorandum 1210—Review of Commonwealth Functions—Disposal of Ordnance Factory Bendigo and Australian Government Clothing Factory—Related to Decision No. 16724 (RCF)*.
11. NAA: A10756/2, LC3298, Part 1, *Disposal of the Australian Government Clothing Factory [Submission No. 5677 refers]*, Decision No. 14635.
12. Senator P.E. Rae, Chairman of the Senate Standing Committee on Finance and Government Operations, reported on 22 September 1981, that the committee was unable to undertake the inquiry ‘because of the pressure of the work load with which we are already faced.’ *Senate Hansard*, 22 September 1981, p. 853, quoted in Senate Select Committee on the Government Clothing and Ordnance Factories, *The Future of the Government Clothing Factory at Coburg*, Canberra, 1982, p. 1.
13. Industries Assistance Commission, *Report on Textiles, Clothing and Footwear*, 28 April 1980, Part C: Clothing, Appendix H, pp. H233–H243, quoted in Senate Select Committee on the Government Clothing and Ordnance Factories, *The Future of the Government Clothing Factory at Coburg*, Canberra, 1982, p. 10.
14. Senate Select Committee on the Government Clothing and Ordnance Factories, *The Future of the Government Clothing Factory at Coburg*, Canberra, 1982, p. 11.
15. Senate Select Committee on the Government Clothing and Ordnance Factories, *The Future of the Government Clothing Factory at Coburg*, Canberra, 1982, p. 13 (referring to the Transcript of Evidence, p. 230; however, this transcript is not part of the published report).
16. This statement in the Select Committee’s report represents the only and final evidence of what has happened to the sealed patterns, registers and other records of the uniforms’ designs kept since the early years of Federation. Their current location, should they still exist, has so far eluded me.
17. Senate Select Committee on the Government Clothing and Ordnance Factories, *The Future of the Government Clothing Factory at Coburg*, Canberra, 1982, Part C—Dissenting Report by Senator John Button and Senator John Siddon, p. 55.
18. There is as yet no access to archival records for this section. The critical information on the Clothing Factory’s privatisation has been derived from parliamentary documents and ADI Annual Reports.
19. Senator Button attempted to rationalise the automotive industry in the ‘Passenger Motor Vehicle Plan’, commonly referred to as the ‘Button Car Plan’. A brief discussion of the plan may be found in Sara Falson, ‘Australian

- Manufacturing Boomed, then Busted in the 1980s', *Manufacturers' Monthly*, 6 April 2011 (accessed 30 November 2015).
20. Chris Coulthard-Clark quotes Dr. John Barclay to describe the personal style of Ken Harris: 'He doesn't take any prisoners, and he's got some fundamental points of view which we all know and love. He was convinced that as soon as we let ourselves get engaged in debate, we'd lost—the bureaucrats would win because they'd talk us to death. If we became involved in consultation, and set up committees or whatever, then nothing would ever happen because everybody's view would be taken into consideration.' Chris Coulthard-Clark, *Breaking Free: Transforming Australia's Defence Industry*, Melbourne, 1999, p. 98.
  21. Details of ADI's rationalisation programme are described in a Parliamentary Report, *The Sale of ADI Limited*, 16 February 2000, Ch. 2—The Sale Process.
  22. *ADI Annual Report 1990*, pp. 4 and 8.
  23. *ADI Annual Report 1991, 1992 and 1993*.
  24. *ADI Annual Report 1994*, pp. 26–27.
  25. The sale to Free 'N' Easy was the subject of a Question on Notice in Parliament by Mr. Bradford to the Minister for Defence and a reply on his behalf by Mr. Punch, *Hansard*, 1 December 1995, p. 4574. The final history of the Clothing Factory is briefly recorded on the website of Australian Defence Apparel, [www.ada.com.au/history](http://www.ada.com.au/history) (accessed 27 March 2015).
  26. *ADI Annual Report 1995*, p. 31.
  27. Speech by Steve Gibbons, ALP Member for Bendigo, in the House of Representatives, *Hansard*, 19 June 2013, p. 6327.
  28. Jamie Duncan, 'Defence Apparel Sold Off', *Bendigo Advertiser*, 11 July 2011.
  29. Marc Pallisco, 'Defence Site Reprises Melbourne 2030 Plan', *Sydney Morning Herald*, 23 February 2013.
  30. Defence Science and Technology Organisation (DSTO), 'Combat Clothing Expert Wins Science Award', <http://www.dsto.defence.gov.au/news/2014/07/09/combat-clothing-expert-wins-science-award>, (accessed 23 July 2015).
  31. The Hon. Greg Combet MP, Minister for Defence Personnel, Materiel and Science, 'Combat Uniforms Made in Australia', *Media Release*, 10 February 2010. <http://www.defence.gov.au/minister/94tpl.cfm?CurrentId=9954> (accessed 29 July 2015); The Hon. Greg Combet AM MP, Minister for Defence Materiel and Science, '200,000 New Aussie Made Uniforms to Hit the Shelves', *Media Release*, 30 May 2010. <http://www.docstoc.com/docs/68617752/Clothing-Contracts---DOC> (accessed 29 July 2015). It should be noted that there is no such assurance of Australia-based production for dress uniforms or walking out uniforms.

32. The other arguments in favour of renewing Australian defence research efforts are likely to be a politically driven desire to create or maintain Australian jobs and to yield to public opinion to manufacture uniforms in Australia.
33. Department of Defence, 'Government and Defence Industry Work Together on Soldier Protection', *Media Release*, 14 June 2011. <http://www.minister.defence.gov.au/2011/06/14/joint-media-release-minister-for-defence-and-minister-for-defence-materiel-government-and-defence-industry-work-together-on-soldier-protection/> (accessed 29 July 2015).



## Conclusions

In this book I have argued how innovations made by the Australian Government Clothing Factory, the sciences and other industries transformed the design of the Australian Army uniform. I have used the concept of ‘innovation’ as it was advanced by Joseph Schumpeter to describe the effects of innovative change on other participants in the clothing industry. Schumpeter’s ‘creative destruction’ can be discerned when the management of the newly established Clothing Factory introduced the latest equipment, hauled away seamstresses, machinists and other workers from the existing clothing industry and handed them a higher wage as an incentive to change jobs. This created a short-term ‘upset’ in the industry, mostly localised in the Melbourne area, as workers moved to new positions and unions began to push for wage rectifications in the industry, keeping a sharp eye on the lead taken by the Clothing Factory. The Factory’s influence and ability to change the wider clothing sector was further emphasised when it compelled other businesses to upgrade and invest in similar technologies and to introduce new methods of clothing construction. It is evident that these were instances in which the phenomenon of ‘creative destruction’ was applicable to the Clothing Factory’s activities. The Factory was a new player in the industry, it upset the status quo with its new approach to manufacturing. Later, during periods of subcontracting to private clothing businesses, the conditions of contracts often contained highly specified methods of production that were superior

to those applied up till then in the private sector. If private business owners wished to obtain such contracts, they needed to upgrade their manufacturing operations in line with the Clothing Factory's specifications. Old methods and systems had to be discarded ('destroyed') and modern methods and systems introduced ('created'). All of this closely resembled the Schumpeterian interpretation of the effects of innovation.

The Clothing Factory was in an advantageous position to enforce innovation as it was wholly owned by the government and provided market stability by exerting full control over demand for uniforms. In this unique position, the Factory was able to occupy the role of model producer and employer. The Factory had no competitors in Australia; production was driven by the vagaries of war and by the requirement to deliver functional garments to the highest standard possible suitable to the environments and climates where Australians fought. Its close relationship with the Australian Army worked in the Factory's favour as requests for improvements and the results derived from field tests formed a two-way communication line which provided an incentive to keep innovating. But most of the innovation came from the bowels of the Clothing Factory itself. Pattern makers were busy drafting better garments, manual sewing of buttonholes gave way to automated new equipment, the Factory's requirement for the very best wool fabrics for the garments even drove the wool spinning and weaving mills to better their output. Just as Schumpeter had stated, innovation was coming from the supply side, in this case from the Clothing Factory that supplied the uniforms.

The Clothing Factory was fortunate in the fact that very capable managers, notably Jensen and Slade, who had a thorough knowledge of the private clothing industry prior to their appointment, had been in charge for much of the period described. Both can be credited for their efficient approach to the Factory's manufacturing operations and with integrating technological and industrial change suitable for the Factory's systems. They were the true entrepreneurs in the Schumpeterian sense within this state-owned enterprise. Their energies were directed at making the Clothing Factory a model for other businesses in the sector to follow. Commencing with the acquisition of equipment based on the latest technologies, they gradually introduced efficient systems of manufacturing the uniforms and, after Jensen had studied accounting methods during a visit to the USA, a new bookkeeping system was adopted. Importantly, they kept communications with the Army and with scientific organisations open in order to improve on the Factory's product development. There

can be no doubt that the Clothing Factory benefited in no small amount from the initiatives and energies of these two managers.

The activities of the Government Clothing Factory and its managers resembled in many ways Schumpeter's key characteristics of innovation: (1) they continually introduced new or improved garments with better functionality and better fit for purpose; (2) they introduced new methods of production; (3) they instigated new sources of supply of raw materials by demanding softer cotton varieties and directed the suppliers of semi-manufactured goods, in this case the woollen mills that produced the fabric for uniforms and blankets, to improve the quality of their output; and (4) they established a new organisation within the existing clothing industry by the creation of a monopoly position.

Leaving Schumpeter's theory of innovation as a reference point for understanding the general theoretical framework, I have then focused on exploring the ways in which innovation came about in an environment where competition played no role. It was clear that the Clothing Factory and its managers, as observed above, were driven by the need to improve the Factory's products. Without competition, however, the question had to arise what other factors could have played a role. The key question I needed to answer was *why* innovation was taking place in this monopolised industry, not how it emerged, as had been the central focus of Schumpeter's descriptions. This resulted in an investigation of other sources of innovation, the driving forces behind innovation, and I have taken the Australian Army uniform and the Clothing Factory as my examples to expose them.

The study highlights a number of major changes in the history of the Australian Army's uniform. The First World War proved to be a first test of the functionality, body protection and comfort of the Army's uniform under different climatic conditions. Whilst the uniform was found to be satisfactory for some battle zones, it was entirely unsuitable in other environments. This led to a series of experiments undertaken by scientists and Army personnel during the 1930s, the outcome of which was the introduction of combat outfits that could blend in with jungle environments, were made of cotton and had a looser fit to allow the body to breathe. The trend towards producing better body protection using high-quality textiles in camouflage patterns resembling the battle environments continues to this day. There can be no dispute over the fact that the Australian soldier today wears combat clothing that offers much greater bodily protection and is more comfortable and practical for its purpose than the woollen ensemble worn at the beginning of the twentieth century. The visual

changes of the uniform are there for everyone to see, but much has gone on behind the scenes to bring about such changes. It involved the vision of the Army who interpreted a range of battle requirements, of the scientists and inventors who set out to find solutions for these requirements, and of the manufacturers who participated in (and sometimes originated) the trials and refined the product to their final design. Working together over time they created a long series of innovations in the making of the Army uniform.

The discussion of the transformation of the Army uniform would have been incomplete without a serious look at the military uniform-producing sector. It was found that this industry underwent significant structural change since 1900: a single government factory replaced a multitude of private tailors and small clothing firms. The production, too, was streamlined from a diversity of garments to one single design. Prior to Federation in 1901, there was no single, unifying set of Army clothing in the country. Instead, there were numerous colourful colonial uniforms, often directly copied from the designs of counterparts in Great Britain. Many of these uniforms were imported; others were made to measure by a vast number of small clothing firms or individual tailors. The first *Dress Regulations* promulgated in Australia in 1903 changed all that; overnight all soldiers and officers were to be dressed in the same uniform, to be made locally. It represented industry innovation of the first order and we have Major-General Hutton from Great Britain who was appointed to Australia for the purpose of creating Australia's Army, to thank for the initiative. The advent of the Clothing Factory in South Melbourne brought the entire uniform-manufacturing business under the umbrella of a government-owned monopoly, a major innovative development in the history of the uniform-making industry. The Clothing Factory became the key player and arguably the key manipulator of the dynamics of the uniform-producing industry. When this Factory was established in 1912, it changed the structure of the uniform-making business in Australia by taking control over what had previously been the realm of importers and small clothing establishments. The Factory operated with the latest technology in sewing machinery and was able to set the pace on a large manufacturing scale with employment of just over seven hundred during the height of the First World War and reaching levels of approximately nine hundred workers in the three decades following the Second World War.

That the Clothing Factory managed to produce Army uniforms in the required quantities from the outset is beyond doubt, despite some

criticisms received from soldiers in the battlefields. Clothing Factory documents have shown that the Factory was fully able to produce under its own steam all the uniforms needed during the First World War. This was quite an achievement, particularly when one considers that the Factory had only been operational for two years when the first troopships were leaving Australia's shores for the Middle East. This is not to deny that there are numerous First World War reports among the documents held by Australian archives detailing complaints of shortages of uniform jackets, breeches, socks and the like, but much of this deficiency was due to the fact that bales of finished garments were delayed on the docks in Melbourne as ships were otherwise deployed. These instances reflect logistical problems caused by the war, not by a lack of efficiency on the part of the Clothing Factory. It should also be noted that the Clothing Factory in association with private contracting firms was able to clothe almost three quarters of a million Army soldiers over the period of the Second World War. During the war in Vietnam logistical problems once more played havoc with supplies. This was a problem in part also caused by the fact that Australian-made green uniforms caused skin dermatitis in some soldiers and because Australia at that time did not possess the equipment or the dyes to colour the fabric in non-toxic dyes. From that moment, Australian troops based in Vietnam were issued with green uniforms supplied by the American Forces. These supply problems had been caused by a shortage of available funding and technology and lack of foresight in the planning and logistical processes.

A large number of hitherto unread archival documents has brought to light the effect of innovative change by the Clothing Factory on the private clothing sector and how it resulted in an entirely separate system of design management and intellectual property protection. The study has found that the introduction of new machinery and manufacturing techniques was not only restricted to the Australian Government Clothing Factory, but spilled over into the private clothing industry by means of strict clothing specifications and the intellectual protection of the designs by the use of sealed samples and their system of registration.

It has been shown that the Clothing Factory had important industry linkages, mostly backward linkages as defined by Hirschman. In the first half of the twentieth century, woollen fabrics were the dominant material in the production of Army uniforms and Army blankets. The Clothing Factory required large quantities of woollen fabrics, in specific thicknesses and specific widths. It was soon realised that the Factory's demand would

warrant the establishment of a government-owned woollen mill, but this mill could never supply all the Factory's needs and private mills were also relied upon. The Clothing Factory was then able to dictate its requirements for specified woollen fabrics, thereby creating strong backward linkages in the industry. The second half of the century was characterised by the additional issue of cotton uniforms as much of the Second World War and the wars following it were played out in warmer climates. A serendipitous find during my archival research was a memorandum from the Defence Secretary, Malcolm Shepherd, in which he made a case for the importation and local growing of the softer American cotton varieties. This recommendation followed in the wake of Army complaints about the harsh quality of the cotton fabrics used up till then. Shepherd's message, after a period of experimenting with American cotton varieties in Australian laboratories, spurred the Australian cotton industry into action, especially after water irrigation systems had been constructed. Cotton eventually became a major Australian export industry. Were it not for this 'official' call, the military clothing industry would have had some difficulty convincing the cotton producers to improve their output. In the book I have provided a discussion of the American varieties and showed how the Australian cotton industry grew using detailed production data. These findings are worthy of further investigation, but until we have exact details of variety imports and the outcome of local cotton research, there are clear indications that the birth of the Australian cotton industry came about by the need for softer material for the tropical uniform.

There were other significant industry linkages, some of which could loosely be described as forward linkages as they influenced product development in other industries. The need for concealment for Army personnel operating in varying combat environments led a range of scientists, zoologists, artists and textile experts to collaborate in the development of the early camouflage patterns. The knowledge flowing from these experiments also found an application in non-Army situations, such as wherever persons, buildings, infrastructure or other items had to be concealed in natural environments. One such example is in the observation of animals in the wild, with observers camouflaged to hide their presence. In other scientific fields, we have seen how chemists in multinational organisations such as ICI and in local dyeworks participated in the process of developing the most suitable 'jungle green', a first for Australia when employed in Papua New Guinea in 1942. The collaboration between the Army and other companies, such as Colgate-Palmolive and the Walter and Eliza Hall

Institute of Pathological Research, in the development of grease paints and ointments suitable to be worn on the skin and in developing dyes that would not cause dermatological problems, amounted to significant partnerships. The technologies developed for the safe ingredients of grease and ointments also had the potential to be used as ingredients in skin creams for cosmetic and medical use and thus expanded into other industries.

All of these incidences reflect the fact that the production of the Army uniform had a wider impact upon the Australian economy and the state of technology and that the Clothing Factory was an important linkage node throughout the period of its existence.

One of the key outcomes of this research is the reconstruction of an intricate system of intellectual property protection using sealed patterns governing the design and manufacturing specifications of the Army uniform. The system operated entirely within the Army and the Clothing Factory and was in fact an IP register that ran parallel to the Australian Government's Patent Office register. The sealed pattern system was not only an administrative tool, but also provided the basis on which further innovations could be built. Innovations identified in this research were widespread and included technological improvements in the machinery used in the manufacture of the uniforms, in new textile materials (such as cotton), camouflage patterns and dyes, body measurements, systems of layout of the pattern pieces onto fabric and even specific accounting methods. Some of the innovations were not confined to the military uniform industry, but spilled over into other sectors of the economy. The woollen and worsted mills were forced to invest in new equipment in order to produce fabric to the required specifications.

Throughout the twentieth century, the Clothing Factory retained its place of importance in the uniform-making business and as an innovator in the industry as a whole. Management continued to introduce new technology throughout the century. A major investment was made in 1971 when the government invested in the construction of a 'state of the art' new Clothing Factory complex in Coburg, Victoria. It was followed by the installation of a computer-driven cutting machine, the Gerber S90, a first in Australia. Once again, it raised the level for other firms to achieve. The 1970s also saw experimentation with various management techniques, firstly by the introduction of the 'Gerber movers', a system of moving partly finished garments from one group of workers to the next group of workers, each of whom would complete part of the manufacturing

process. This was later followed by the Just-in-Time (JIT) system, in which the volume and timing of production is directly linked to transport and delivery to the customer. The JIT system has been observed to be still in use at the (now privatised) Clothing Factory in 2013.

During the period of its existence, the Clothing Factory was at the forefront in redesigning elements of the Army's uniform, as can be seen from the many specifications issued over time. Although many changes were very small, each represented an improvement in the garment or resulted in labour-, time- or money-saving processes. In the Clothing Factory's 'laboratory', changes in the designs were drawn up and, in close liaison with the Army, experimented with in field trials run by the Army, whose feedback was then absorbed and incorporated into the final designs. The Clothing Factory and the Army worked together seamlessly as the Army's demands were quickly acted upon by the Clothing Factory. The Army, at the same time, took seriously any suggestions for improvement and the field trials were designed to hear the voices of the uniform wearers.

The Clothing Factory as a public enterprise benefited financially from government control. Treasury funds were available to purchase equipment and cloth from the Government Woollen Factory and private mills. In the first year of the Clothing Factory's operations an appropriation of £16,000 was made available and another £1708 2s.1d. had been invested in machinery. Further investments were made in the following year, ending 30 June 1913. The wages were paid by the government to the Factory's labour force, many of whom were on the public service payroll. In addition, overhead expenses such as the buildings and depreciation, power usage, etc. were not accounted for in the operational costs. This fact was often a bone of contention with the private clothing firms who viewed the Clothing Factory as having privileges they could not compete with. But this argument effectively became redundant when, from the First World War, and especially during the Second World War, numerous contracts were let to the private sector for the manufacture of Army uniforms. Instead of competing with the Clothing Factory, individual firms were now competing with each other to gain a slice of the uniform-making pie. The lines between costs in the government-owned Clothing Factory and the private sector were becoming increasingly blurred as all had to produce garments using the same materials and methods and having to comply with government cost and profit calculations. Government accountants calculated and regularly updated the input costs to make up each garment and the

contracts were based upon these costs and prices. The input costs were based on the Clothing Factory's performance. Contractors were given certain prices at which they would deliver the goods and were allowed a certain percentage of profit. It left much less opportunity for private firms to abuse the system, but there was always a risk that costs within the private firms could be cut further by employing less workers and forcing the remaining workers to work faster, or by employing workers at lower wages. Whether this did indeed happen at this time is not clear, but what is clear is that government control of the uniform business was no longer confined to the Clothing Factory, but had extended to the private clothing industry. A greater regularisation and monopolisation of an industry is hardly imaginable, but we can be certain that there was sufficient incentive for the contractors to still make a profit or the contracting system would have collapsed. The question whether the Clothing Factory produced uniforms at lower or higher cost compared with the private sector had become obsolete under conditions when the private clothing firms' costs and prices were predetermined on the basis of Clothing Factory costs and prices. The latter's performance had become the critical standard by which the performance of the private firms was measured. The removal of the Clothing Factory as a government enterprise in 1995 removed this benchmark of uniform production by which other producers were operating and measured.

The Australian defence industry during the twentieth century—and the military clothing industry in particular—experienced the full cycle from direct government intervention and regulation to a policy of *laissez faire* and privatisation; in other words, from public to private ownership. At the commencement of the period it was considered essential that the manufacture of arms and other defence goods should be controlled by the government, the more so as the government also served as the exclusive customer of these products. It was in line with the general view, not just in Australia but in many other parts of the world, that it was prudent for the defence sector and its associated businesses to be under direct government control and that the output of defence production belonged to the nation as its intellectual property. By the end of the century, however, this view was no longer adhered to and the bulk of defence production had been transferred into private hands. Moreover, the industry was no longer confined to national boundaries, but had taken on global characteristics. Some of the production of Australian non-combat Army uniforms came to be produced elsewhere, principally China, and only a small proportion of the

requirements was produced locally. The choice of producer of military clothing had from the beginning found its base in the tender system, but by the end of the century international tender bids became a common element. The opening up of tenders to international bidders provided no guarantees to local manufacturers, who found themselves competing against producers in low-cost countries. The slide offshore is not exclusive to the uniform business, it is characteristic of the Australian clothing and textile industry as a whole. The fact that military clothing is included in this development emphasises the dramatic changes in the political philosophy since the beginning of the century. It must be stressed, however, that these developments apply to a greater extent to dress uniforms than they do to combat uniforms. There are, of course, sound economic reasons for locating manufacturing facilities in the least costly settings and this clearly has been a feature of the transfer of the bulk of the Australian clothing industry from Australia to such countries as China, Bangladesh and other places. It may well be argued that the cost of Army uniforms would have been much higher had they been locally produced using 100 per cent locally produced input. It follows that this would have placed a higher financial burden on the Defence budget and, ultimately, on the Australian taxpayers. It may also be argued that Australia no longer offers the facilities, modern equipment and expertise for the production of uniforms, with the exception of a small plant operated in Bendigo by Australian Defence Apparel Pty. Ltd., the last remnant of the Clothing Factory.

Running throughout this study is a business history of the Australian Government Clothing Factory itself. This is the first time the operations of the Factory have been described from its establishment in 1912 until its privatisation in 1995. Until now only brief glimpses of its history had been visible in a few government reports. The important role played by the Factory in the manufacture and development of the Army's uniform is at the core of this research. It would be difficult to imagine how the innovations described in this research could have been implemented without the Clothing Factory driving the production internally and out to the private sector. The history of the Factory is also a reflection of the performance of government enterprises and the study has confirmed that public ownership of a business organisation has the capacity to be successful. The Factory was able to not only produce to requirement (with control over subcontractors in later years), but also able to move with the times and even lead the private sector into new ways of production. This was one success story waiting to be told. Sadly, as the political mood changed in

the 1980s from the public to the private ownership of enterprise, the fate of the Clothing Factory was sealed and its assets sold, probably below book value. An era of government involvement in uniform manufacturing had come to an end, and with it a system of collaboration between Defence, Army, scientists and inventors who played key roles in driving innovative change.



# Erratum to: The Australian Army Uniform and the Government Clothing Factory

Anneke van Mosseveld

## Erratum to:

**The Australian Army Uniform and the Government Clothing Factory**  
DOI [10.1007/978-3-319-71425-7](https://doi.org/10.1007/978-3-319-71425-7)

1. The source was updated for Fig. 8.1 (p162) in chapter 8. The text of the source reads:

Source: AWM25, 101/15, Plan for Alterations to Palmer's Laundry, September 1917. Reproduced with the permission of the Australian Army.

2. The below mentioned tables have been corrected in chapters 3, 7 and 8 so that the title is above each table and the table itself is centered on the page:

- Table 3.4 (p58)
- Table 3.5 (p59)
- Fig. 7.2 (p117)

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The updated online version of the original book can be found under DOI [10.1007/978-3-319-71425-7](https://doi.org/10.1007/978-3-319-71425-7)

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E1

- Table 8.1 (p164)

- Table 8.2 (p165)

3. The entire paragraph “The full range of items ... Defence, for 1917–1918:” was moved above the unnumbered table on page 61.



# Erratum to: Science Takes Command

## Erratum to:

Chapter 7 in: A. van Mosseveld, *The Australian Army Uniform and the Government Clothing Factory*

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The original version of the book was inadvertently published with the wrong graph. Figure 7.5 has now been updated.

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The updated online version of this chapter can be found at  
[https://doi.org/10.1007/978-3-319-71425-7\\_7](https://doi.org/10.1007/978-3-319-71425-7_7)

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## EPILOGUE

With the transfer of the business to private ownership comes the question of whether and how to protect the national intellectual property (IP) inherent in the design of the uniform. When the Clothing Factory carried out or supervised the manufacturing process, the control and inspection of samples and finished garments was centralised. This applied to the private clothing firms as much as to the garments produced by the Clothing Factory. But the question of how to retain control over the IP becomes a valid one when production of Army clothing moves offshore—and specifically to countries such as China, which seems to have trouble adhering to other countries' patent and design rights (as every patent attorney will tell us).<sup>1</sup> It is doubtful that any new Australian discoveries pertaining to and resulting in innovation in the Army's uniform would receive the protection in environments where IP rights are not observed. Inquiries into how and by whom the sealed pattern system is safeguarded following the privatisation of the Clothing Factory have yielded no results. It appears that since the privatisation of the Clothing Factory, the uniform patterns are made up by the various manufacturers on the basis of specifications supplied by the Defence Materiel Organisation (DMO).<sup>2</sup> The practice of preparing a sample from the specifications, having it inspected and, if approved, sealed and registered is no longer apparent. Neither is it clear in what way the designs of the modern uniforms are protected, if at all. It would be natural to expect that the technologies embedded in the uniforms

are patented separately and that this practice is the only way in which the garments receive some form of protection from illegal copying. These are issues that may be worthy of further investigation. The fact that such an elaborate protection system existed and was meticulously adhered to throughout the twentieth century is evidence of the importance placed upon the appearance and functionality of the Army uniform. It is also evidence of the way in which improvements were incorporated into the design and the production methods and it connects all of these with the innovations introduced by the Australian Government Clothing Factory, the many scientists and the participants in the Australian clothing industry.

Innovation is closely coupled with scientific discovery and in this industry research and advances into fibre and materials technology are of particular importance. As combat takes on increasingly high technological characteristics, protection of the soldier also is defined by technological advances. This is a growing field of research around the world, especially in the USA and Canada and parts of Europe. Australia has invested only a small amount into ballistic, flash and blast protection (only \$9 million was reportedly invested in 2011 in a specific programme). The future of Army uniform manufacturing in Australia—now in private hands—will depend upon the introduction of state-of-the-art protective materials and close collaboration between the uniform producers and scientists. This will have ramifications for the Australian Government which should consider its options for a carefully planned and funded protective materials research programme. This book has shown how innovation was a key to the transformation of the Australian Army uniform throughout the twentieth century. It deserves to be continued in the twenty-first century and beyond.

## NOTES

1. IP Australia, the Australian governing body for intellectual property, provides the warning, 'IP protection remains a challenge in China, where misappropriation of trade secrets and other forms of IP is commonplace'. See IP Australia's website: <http://www.ipaustralia.gov.au/understanding-intellectual-property/ip-for-business/doing-business-overseas/ip-protection-in-china/> (accessed 11 August 2015).
2. Information provided by the Communications Adviser, Integrated Soldier Systems Branch Headquarter, Department of Defence, 18 December 2013.

## APPENDIX A: THE UNIFORM OF THE AUSTRALIAN IMPERIAL FORCE IN THE FIRST WORLD WAR

The uniform of men of the Australian Imperial Force was first prescribed in the *1903 Dress Regulations* and in the *1906 Dress Regulations*. It consisted of a jacket, breeches, puttees, leggings (for the Mounted Services), boots, a greatcoat, slouch hat and a cap. The men wore a leather bandolier and later web equipment to hold their ammunition, tools and provisions. The following is a description of the garments worn (see Fig. A.1).

The jacket was made of a special drab mixture serge, single-breasted with five large buttons down the front, a yoke at the back, stand and fall collar, two cross-patch outside breast pockets with a 1½ inch pleat in the centre and an expanding pleat on both outer sides and covered by a three-pointed flap with buttonhole, two additional expanding pockets below the waist, also with pleats at the sides and fastened at the top with a small button and with a flap with buttonhole, shoulder straps, sleeves with round cuffs, badges of rank, gorget patches of regimental colours sewn on each side on the front of collar.<sup>1</sup>

The breeches were made of a strong Bedford cord, in the same colour as the Service Jacket. They were cut loose at the thigh, and tight at the knee and laced below the knee. The pockets were cut across the side-front. The breeches had a waist-strap and buckle.<sup>2</sup>

Puttees were wrapped around the lower leg and were made of a woollen material, three yards long, in a colour to match the Service Dress. They were fastened with two tapes of 1-inch braid in the same colour as the material.<sup>3</sup>



**Fig. A.1** Standard service dress—First World War. Source: Australian War Memorial PO7848.001. Coloured studio portrait of 1387 Private (Pte) James Edward Pavey, 13th Battalion, of Sydney, NSW, originally of Somerset, England. A painter before enlisting in Sydney in October 1914, Pte Pavey left Australia for Egypt with the 2nd Reinforcements in February 1915 aboard the *Seang Bee* and landed at Gallipoli on the afternoon of 25 April 1915. He was killed in action at Dead Man's Ridge on 4 May 1915, aged 25, and has no known grave. Reproduced with permission from the Australian War Memorial

The slouch hat which so characterises the Australian Army to the present day is made of khaki felt made from rabbit skins in the same colour as the jacket, and can be looped up on the left side with a hook and eye. The hat provided a socket for a plume or feathers and the regimental badge was to be attached to the outside of the looped-up rim. It had a leather chin strap with an adjusting buckle and was worn by all units except the Submarine Miners and Scottish Regiments.<sup>4</sup> Feathers worn on the hat were a remnant of the colonial uniforms and differed between regiments. Cocks', eagles' and ostrich feathers are no longer in use today, but the emu plumes, tufted in a bunch and shaped over the right of the hat, have remained a part of the outfit of those regiments of the Royal Australian Armoured Corps that trace their history back to the Australian Light Horse and other mounted regiments (see Fig. A.2).<sup>5</sup>



**Fig. A.2** Soldier wearing hat with emu plumes. Source: Author's photo taken at Bandiana Army Museum, Wodonga, VIC

However, while the feathers added ornamental and distinguishing touches to the uniforms, they did nothing for the uniform's function or protection in any geographic setting. Their inclusion in the 1905 *Dress Regulations* was not appreciated by the Commanding Officer, Seventh Australian Light Horse Regiment, but for a different reason:

I am strongly adverse to the wearing of a single feather, as it is found impossible to obtain uniformity in appearance owing to the difficulty in getting feathers fixed to remain at the same height and angle (see Fig. A.3).<sup>6</sup>

The slouch hat made it easy to identify a soldier as Australian, but all Services were also issued with a Cap, Field Service. This was a cloth cap, long and narrow from front to back, at a 45° angle from the top to the base. Officers were issued with the Cap, Forage. This was a cap topped with a circular cloth disc and to be worn straight on the head. Under the disc was a 'peak' covered in embroidery for Major-Generals, Brigadier-Generals and Field Officers, but plain for other Officers. It is sometimes referred to as 'peaked cap'.<sup>7</sup>

The greatcoat was a garment designed to provide warmth to almost the entire body and was so generous in width that it could also be used as a blanket.<sup>8</sup> Unlike the British equivalent, which reached just below the knee, the Australian greatcoat reached to within a foot of the ground. It had an inverted expanding pleat down the centre of the back and a horizontal back strap (see Fig. A.4).

The pattern for the greatcoat can still be found, essentially unchanged, in the *Standing Orders for Dress* of 1935.<sup>9</sup> The coat was made of a drab mixture cloth, waterproofed, with a deep collar with stand which could be fastened with a tab and button to fit snugly around the neck. The Mounted Officers' equivalent coat had a 16-inch lap to cover the thighs at front and was split in the back for riding.<sup>10</sup> Although the coat is described as 'double-breasted' in both the 1903 and 1935 regulations, this would have referred to the Officers' pattern coat. Rank-and-file soldiers wore the single-breasted version as is also seen on most photographs. The Australian greatcoat was a valuable garment for the troops sent to France during the First World War where they had to endure cold and wet winters in muddy fields and trenches.



**Fig. A.3** Field service cap and forage cap. Source: Australian War Memorial DA09725. The dog is wearing a Field Service Cap, the Staff Sergeant Major (probably Gabriel Albert Morgan) is wearing the Forage (or peaked) Cap. This studio photo was taken circa July 1915. Reproduced with permission from the Australian War Memorial



**Fig. A.4** The greatcoat. Source: Australian War Memorial, DA10881. Soldiers wearing greatcoats. Studio photo taken circa September 1915. Reproduced with permission from the Australian War Memorial

## NOTES

1. *Dress Regulations for Officers of the Military Forces of the Commonwealth, 1903*, Melbourne, 1903, p. 11, para. 18.
2. *Dress Regulations for Officers of the Military Forces of the Commonwealth, 1903*, Melbourne, 1903, p. 6, para. 3.
3. *Dress Regulations for Officers of the Military Forces of the Commonwealth, 1903*, Melbourne, 1903, p. 22, para. 40.
4. *Dress Regulations for Officers of the Military Forces of the Commonwealth, 1903*, Melbourne, 1903, p. 10, para. 16.
5. The emu feathers of the Queensland Light Horse Regiment are well known, but perhaps a lesser-known fact is that they were also prescribed for the South Australian and Tasmanian Light Horse. In contrast, the New South Wales Light Horse wore black cock's feathers, the Victorian Light Horse featured a single eagle feather and the Western Australian Light Horse wore ostrich feathers on their hat. Field Artillery wore the same feathers as their State's Light Horse counterparts. Other units were also distinguished by their different feathers: the Staff units wore red and white cock's feathers drooping on the left side and the Medical Corps outdid everyone with their 'chocolate ostrich feathers, banded at the base with chocolate vulture feathers, bottom in a metal corded ball socket, plain pattern, with embossed Geneva cross on side...' *Dress Regulations for Officers of the Military Forces of the Commonwealth, 1903*, Melbourne, 1903, p. 9 para 10.).
6. NAA: B168, 1905/10010, Item 1 of 7, *Clothing and Dress Regulations*, Letter from Lt.-Col. D. McLeish to Deputy Assistant Quartermaster General, 19 December 1905.
7. There exists confusion between these types of caps, with many mistakenly referring to the Field Service Cap as a Forage Cap. An explanation is provided in AWM27, 382/10, *Notes on different types of caps, in particular the forage cap*. See also Australian Military Forces, *Standing Orders for Dress and Clothing, 1912 (Citizen Forces)*, p. 7.
8. The *Dress Regulations* and *Standing Orders for Dress and Clothing* up to 1924 referred to this item as a 'Great coat'. From 1924 the reference was to a 'Greatcoat'. I have used the latter version throughout with 'G' in lower case except when it occurs at the commencement of a sentence or as part of a title or subtitle.
9. *Dress Regulations for Officers of the Military Forces of the Commonwealth, 1903*, Melbourne, 1903, p. 10, para. 14; Australian Military Forces and Senior Cadets, *Standing Orders for Dress, 1935*, p. 18, paras. 50 and 51.
10. *Dress Regulations for Officers of the Military Forces of the Commonwealth, 1903*, Melbourne, 1903, p. 10, para. 14.

APPENDIX B: CONTRACTS WITH PRIVATE  
CLOTHING FIRMS ACCEPTED  
BY THE GOVERNMENT—1911–1913

<i>Serial no.</i>	<i>Description</i>	<i>Quantity</i>	<i>Contractor</i>
844	Shirts, Military, C.P., woollen, 11 oz., without shoulder straps	8,900	A. Bowley & Coy., Melbourne
245–259	Buttons, C.P., G.S., lines 39, 32, 26, 18, 26 (screw)	739,000	A.J. Parkes, Brisbane
1157	Pantaloons, khaki, cord		Adelaide Clothing Mfg. Co. Ltd., Adelaide
1031–1071	Jackets, blue cloth		Adelaide Clothing Mfg. Co. Ltd., Adelaide
1049–1059	Tunics, blue cloth		Adelaide Clothing Mfg. Co. Ltd., Adelaide
233	Greatcoats, khaki cloth, waterproof, 25 oz., dismantled pattern	4,773	Adelaide Clothing Mfg. Co. Ltd., Adelaide
824	Greatcoats, khaki cloth, waterproof, 18 oz., dismantled pattern, with shoulder straps, complete		Adelaide Clothing Mfg. Co. Ltd., Adelaide
844	Shirts, Military, C.P., woollen, 11 oz., without shoulder straps	9,750	Adelaide Clothing Mfg. Co. Ltd., Adelaide
	Shirts, Military, C.P., woollen, 11 oz., without shoulder straps	1,802	Adelaide Clothing Mfg. Co. Ltd., Adelaide
845	Shirts, Military, C.P., woollen, 11 oz., with shoulder straps	20,775	Adelaide Clothing Mfg. Co. Ltd., Adelaide
1516–1523	Hats, khaki, felt, wool, with green cloth band, side hooks, and brown leather chin strap	5,600	Austral Hat Mills Ltd.

*continued*

<i>Serial no.</i>	<i>Description</i>	<i>Quantity</i>	<i>Contractor</i>
1524-1525	Hats, khaki, felt, fur, with brown leather chin strap and side hooks	2,400	Austral Hat Mills Ltd.
586-591	Hats, khaki, felt, wool with green bands, without chin straps	9,250	Austral Hat Mills Ltd.
1156	Trousers, khaki, drill		C. Anderson, Sydney
1166	Hats, khaki, felt, without puggaree, badge or chin strap		C. Anderson, Sydney
437	Jacket, white, canvas		C. Anderson, Sydney
439	Hats, white, with black silk band		C. Anderson, Sydney
1031-1071	Jackets, blue cloth		C. Anderson, Sydney
1049-1059	Tunics, blue cloth		C. Anderson, Sydney
1115-1119	Puggarees for hats		C. Anderson, Sydney
1166	Hats, khaki, felt, without puggaree, badge or chin strap		Denton Hat mills, Melbourne
1516-1523	Hats, khaki, felt, wool, with green cloth band, side hooks, and brown leather chin strap	6,000	Denton Hat Mills, Melbourne
586-591	Hats, khaki, felt, wool with green bands, without chin straps	9,250	Denton Hat mills, Melbourne
592-596	Hats, khaki, felt, fur, without bands and chin straps	1,500	Denton Hat Mills, Melbourne
1628-1629	Hats, felt, wool, with green cloth band, but without chin strap	12,000	Denton Hat Mills, Melbourne
1630-1631	Hats, felt, fur, without band or chin strap	2,000	Denton Hat Mills, Melbourne
586-591	Hats, khaki, felt, wool with green bands, without chin straps	27,000	Dunkerley Hat Mills Ltd., Sydney
1031-1071	Jackets, blue cloth		J. Bidencope and Son, Hobart
1049-1059	Tunics, blue cloth		J. Bidencope and Son, Hobart
1716-1723	Caps, Field Service, khaki, with hooks (Sealed Pattern No. 686), and chin strap (Sealed Pattern No. 687)	1,000	J.D. Quaid, trading as B. Mountcastle and Sons, Brisbane
822	Greatcoats, khaki cloth, waterproof, 25 oz., dismounted pattern, with shoulder straps, complete		J.J. Lipahut, Melbourne
1974	Shirts, military, khaki, woollen, 11oz. cloth		Jackson and Eckersall, Melbourne
592-596	Hats, khaki, felt, fur, without bands and chin straps	5,000	John Bardsley & Sons Ltd., Sydney

*continued*

<i>Serial no.</i>	<i>Description</i>	<i>Quantity</i>	<i>Contractor</i>
86	Puttees, stockinette, 3 yards long by 4½ inches wide, with ½-in. tape and 1½ yards long, per pair	20,000	John Vickars and Co., Sydney
440	Collar, white uniform		Kitchener Ltd., Sydney
1972-1973	Jackets, blue serge		Lincoln, Stuart and Co., Pty. Ltd., Melbourne
1049-1059	Tunics, blue cloth		Lincoln, Stuart and Co., Pty. Ltd., Melbourne
762	Shirts, Military, khaki, woollen	3,213	Lincoln, Stuart and Co., Pty. Ltd., Melbourne
1031-1071	Jackets, blue cloth		M. Gerson and Co., Brisbane
844	Shirts, Military, C.P., woollen, 11 oz., without shoulder straps	1,098	National Clothing Manufacturing Co. Ltd., Adelaide
845	Shirts, Military, C.P., woollen, 11 oz., with shoulder straps	4,720	National Clothing Manufacturing Co. Ltd., Adelaide
542	Breeches, khaki, cord, woollen, dismantled pattern		O'Brien and Down, Melbourne
1716-1723	Caps, Field Service, khaki, with hooks (Sealed Pattern No. 686), and chin strap (Sealed Pattern No. 687)	16,200	O'Brien and Down, Melbourne
1031-1071	Jackets, blue cloth		O'Brien and Down, Melbourne
1049-1059	Tunics, blue cloth		O'Brien and Down, Melbourne
821	Greatcoats, khaki cloth, waterproof, 25 oz., mounted pattern, with shoulder straps, complete		O'Brien and Down, Melbourne
1115-1119	Puggarees for hats		Phoenix Clothing Co., Melbourne
432	Tunic, khaki, cloth		Prichard Bros, North Melbourne
433	Jacket, khaki, cloth		Prichard Bros, North Melbourne
434	Jacket, blue serge		Prichard Bros, North Melbourne
435	Trousers, khaki, cloth		Prichard Bros, North Melbourne
436	Trousers, blue serge		Prichard Bros, North Melbourne

*continued*

<i>Serial no.</i>	<i>Description</i>	<i>Quantity</i>	<i>Contractor</i>
1049-1059	Tunics, blue cloth		R. Davies, Perth
1157	Pantaloons, khaki, cord		S. Bartlett, Brisbane
1031-1071	Jackets, blue cloth		S. Bartlett, Brisbane
1076	Trousers, blue cloth, with stripe and foot straps for mounted men		S. Bartlett, Brisbane
1049-1059	Tunics, blue cloth		S. Bartlett, Brisbane
1127-1139	Jackets, khaki, drill, with gorget patches and two sets of shoulder straps		S. Bartlett, Brisbane
234	Greatcoats, khaki cloth, waterproof, 18 oz., dismantled pattern	70	S. Bartlett, Brisbane
1524-1525	Hats, khaki, felt, fur, with brown leather chin strap and side hooks	200	Shelmerdine Bros. Pty. Ltd.
592-596	Hats, khaki, felt, fur, without bands and chin straps	1,500	Shelmerdine Bros. Pty. Ltd.
1630-1631	Hats, felt, fur, without band or chin strap	3,000	Shelmerdine Bros. Pty. Ltd.
1049-1059	Tunics, blue cloth		Shierlaw and Co., Adelaide
1156	Trousers, khaki, drill		Steedman Bros, Melbourne
1157	Pantaloons, khaki, cord		Steedman Bros, Melbourne
1636	Greatcoats, khaki, cloth, waterproof, 25 oz., dismantled services, with shoulder straps, complete		Steedman Bros, Melbourne
1637	Greatcoats, khaki, cloth, waterproof, 18 oz., dismantled services, with shoulder straps, complete		Steedman Bros, Melbourne
n/a	Breeches, khaki, cord, woollen, dismantled pattern	1,290	Steedman Bros, Melbourne
1075	Trousers, blue cloth, with stripe for W.O.		Steedman Bros, Melbourne
1076	Trousers, blue cloth, with stripe and foot straps for mounted men		Steedman Bros, Melbourne
1127-1139	Jackets, khaki, drill, with gorget patches and two sets of shoulder straps		Steedman Bros, Melbourne
586-591	Hats, khaki, felt, wool with green bands, without chin straps	9,250	Stockport Hat Co. Ltd., Melbourne
1628-1629	Hats, felt, wool, with green cloth band, but without chin strap	10,500	Stockport Hat Co. Ltd., Melbourne
366	Breeches, khaki, cord, woollen, dismantled pattern	9,000	T.J. and A. Steedman, Brunswick, Melbourne

*continued*

<i>Serial no.</i>	<i>Description</i>	<i>Quantity</i>	<i>Contractor</i>
367	Breeches, khaki, cord, woollen, dismounted pattern	9,000	T.J. and A. Steedman, Brunswick, Melbourne
1716-1723	Caps, Field Service, khaki, with hooks (Sealed Pattern No. 686), and chin strap (Sealed Pattern No. 687)	2,800	The Austral Knitting and Hat and Cap Factory Ltd., Sydney
586-591	Hats, khaki, felt, wool with green bands, without chin straps	18,500	Union Hat Mills Ltd., Sydney
592-596	Hats, khaki, felt, fur, without bands and chin straps	27,000	Union Hat Mills Ltd., Sydney
1031-1071	Jackets, blue cloth		Union Label Co-operative Tailors, Sydney
1972-1973	Jackets, blue serge		Union Label Co-operative Tailors, Sydney
1049-1059	Tunics, blue cloth		Union Label Co-operative Tailors, Sydney
823	Greatcoats, khaki cloth, waterproof, 18 oz., mounted pattern, with shoulder straps, complete		Union Label Co-operative Tailors, Sydney
364	Shirts, military, khaki, woollen, with shoulder straps, sizes 7-54	25,815	V. Kaufman and Co., Melbourne
365	Shirts, military, khaki, woollen, without shoulder straps, sizes 000-30	24,650	V. Kaufman and Co., Melbourne
364	Shirts, military, khaki, woollen, with shoulder straps, sizes 7-54	25,463	V. Kaufman and Co., Melbourne
365	Shirts, military, khaki, woollen, without shoulder straps, sizes 000-30	18,985	V. Kaufman and Co., Melbourne
376	Caps, Field Service, with hooks, but without chin strap	15,750	W. Hodgson and Co., Melbourne
1093	Jackets, blue cloth		W. Monckton and Co., Melbourne
1516-1523	Hats, khaki, felt, wool, with green cloth band, side hooks, and brown leather chin strap	2,400	William Dixon, Stockport Hat Co.

Source: *Commonwealth of Australia Gazette*, various issues 1911-1919

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