Forestry Training in theUnited Kingdom and its relevance to Australia

DENNIS CORBETT

1994 Gottstein Fellowship Report

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Bill Gottstein was an outstanding forest products research scientist working with the Division of Forest Products of the Commonwealth Scientific Industrial Research Organization (CSIRO) when tragically he was killed in 1971 photographing a tree-felling operation in New Guinea. He was held in such high esteem by the industry that he had assisted for many years that substantial financial support to establish an Educational Trust Fund to perpetuate his name was promptly forthcoming.

The Trust's major forms of activity are,

1. Fellowships - each year applications are invited from eligible candidates to submit a study programme in an area considered to be of benefit to the Australian forestry and forest industries. Study tours undertaken by Fellows have usually been to overseas countries but several have been within Australia. Fellows are obliged to submit reports on completion of their programme. These are then distributed to industry if appropriate.

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4. Study Tours - industry group study tours are arranged periodically and have been well supported.

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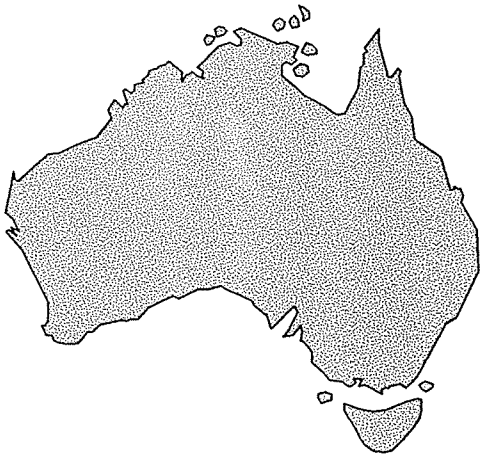
FORESTRY TRAINING IN THE UNITED KINGDOM, AND ITS RELEVANCE TO AUSTRALIA

A Gottstein Trust Fund Report

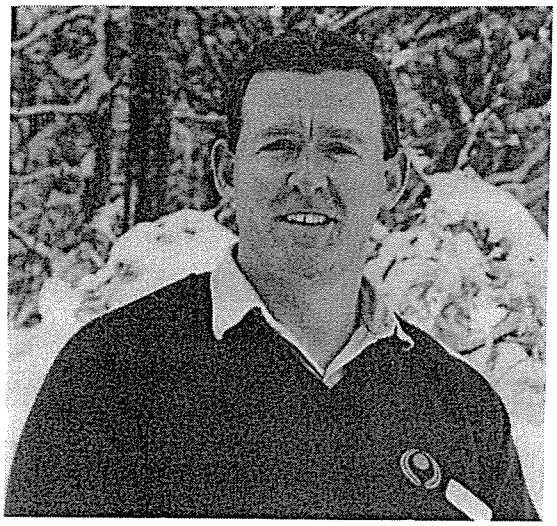


by

Dennis Corbett

1994 Gottstein Fellow

Dennis Corbett was the Training Co-ordinator for the Forests Service in the Victorian Department of Conservation and Natural Resources from 1993 to 1995. One of his principal duties during this time was to support the development of Competency Based Training programs throughout the Forests Service. His Gottstein Fellowship enabled him to meet with forestry training organisations in the United Kingdom and Ireland to assess the relevance of their training approach, both Competency Based and otherwise, to the Australian forest industry. Dennis has a Bachelor of Forest Science degree from the University of Melbourne and a Masters Degree in Environmental Science from Monash University. In late 1995, Dennis left the Forests Service to work in natural resource management at the local government level in Victoria.



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I would also like to thank the Forests Service of the Department of Conservation and Natural Resources for the provision of study leave to undertake the trip, and I would especially thank my then supervisor, Mr. Don Thomson, for his assistance and encouragement. I received a large amount of very genuine hospitality and friendship from a number of people in the forest industry in the United Kingdom and Ireland, and a few special efforts deserve acknowledgment:

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CONTENTS

GLOSSARY

BTEC	Business and Technician Education Council
CBT	Competency Based Training
CPD	Continuing Professional Development
DEET	Department of Employment, Education and Training
FASTCO	Forestry and Arboriculture Safety and Training Council
GCSE	General Certificate of Secondary Education
GNVQ	General National Vocational Qualification
HNC	Higher National Certificate
HND	Higher National Diploma
ICF	Institute of Chartered Foresters
ILB	Industry Lead Body
ITO	Industry Training Organisation
NCVQ	National Council for Vocational Qualifications
NDF	National Diploma in Forestry
NFITC	National Forest Industry Training Council
NIFS	Northern Ireland Forests Service
NVQ	National Vocational Qualification
NROVA	National Record of Vocational Achievement
OFI	Oxford Forestry Institute
SCOTVEC	Scottish Vocational Educational Council
SSF	Scottish School of Forestry
SVQ	Scottish Vocational Qualification
TDLB	Training and Development Lead Body
VQ	Vocational Qualification

1.0 SUMMARY

As a Gottstein Fellow, the author undertook a five week study tour of the major forestry training organisations in the United Kingdom in March and April 1995 [1]. The aim of this tour was to examine the recent developments in forestry training in the United Kingdom, including the introduction of Competency Based Training (CBT) [2]. These programs are of great interest to the Australian forest industry, given the recent proposals to introduce similar programs here.

In the United Kingdom, the Forestry Commission has taken a lead role in implementing CBT, through its formation and support of the Forestry and Arboriculture Safety and Training Council. CBT programs have been developed and implemented at a number of levels. Professional bodies such as the Institute of Chartered Foresters have also devised assessment and accreditation programs.

Having been introduced without additional resources, CBT programs have not always been able to produce a quality product, ie. a competent employee. However, following recent criticisms, more attention is now being given to the quality of CBT.

There is currently a wide variety of qualifications and awards for forestry training in Britain. It is expected that these will become streamlined over time as CBT becomes more known and accepted, and as CBT units are embedded into existing courses.

The Institute of Chartered Foresters have established themselves as the major accreditation body for British forestry. Employers are increasingly expecting their staff to obtain an ICF accreditation, irrespective of what forestry training courses they have completed. In a situation of an increasing number of College and University forestry courses, both competency based and otherwise, employers are increasingly looking to the ICF assessment system as the training standard that their staff must meet.

2.0 INTRODUCTION

One of the main activities occurring in the Australian forest industry over the next few years will be the reform of its entire training system. This will reflect both the move to sustainable forest management and the need to have a more effective and efficient training system in place. This reform will include the implementation of Competency Based Training, and will be very similar to the reforms of the British forestry training system that have occurred over recent years.

1: The United Kingdom consists of England, Scotland, Wales and Northern Ireland. Britain, officially called Great Britain, consists of England, Scotland and Wales. The study trip on which this report is based consisted of visits to England, Scotland, Wales, Northern Ireland and the Republic of Ireland. Because the information I obtained from the Republic of Ireland was of less relevance to my topic than the information I obtained from the United Kingdom, this report focuses on the situation in the United Kingdom, primarily in Great Britain.

2: Competency Based Training is an approach to vocational training and development that is more flexible than previous approaches. Its emphasis is not on the training inputs - formal courses, their level, type and length; but on the training outcomes from the point of view of the clients of training - the employer and the individual learner. It does this by identifying the sets of knowledge, skills and attitudes - the competencies - needed to perform a given job, assessing whether an employee holds the necessary competencies, and then providing a variety of opportunities for development or training in those competencies.

There has been a number of recent developments in forestry training in Britain that are of relevance to the Australian situation. The two broad areas of development are the introduction of CBT and the development of systems for experienced forestry staff to have their skills formally recognised through professional organisations such as the Institute of Chartered Foresters.

A CBT system was introduced to Britain in 1989, and this has resulted in substantial changes in forestry training. Professional standards of competence required in forestry have been developed and translated into training courses. Many existing courses have been transferred to a competency based format, allowing access to them by a wide range of forestry employees. To quote the British Forestry Commission: *"The structure of forestry education and training has been designed and developed to meet the Industry's needs, to provide formal recognition of technical and managerial competence, and to encourage upward mobility for those with exceptional ability"* (Forestry Commission 1993). Britain offers an opportunity to see CBT systems in forestry in action and also to study what "teething" problems the system experienced.

This report presents an update on the recent relevant developments that forestry training has undergone in Britain and what the advantages and disadvantages have been for the forest industry.

3.0 CHALLENGES FOR FORESTRY TRAINING IN AUSTRALIA

In examining the relevance of the British forestry training systems to Australia, it is important to understand the broad and long-term role that training may play in helping to ensure the future of Australia's forest industry.

Like all Australian industries, the forest industry in Australia is currently undergoing some restructuring in an attempt to meet the challenges of the 1990s and beyond. And, like all other industries, forestry needs to be supported by a relevant and cost-effective training system. A number of recent reports on the forest industry in Australia have highlighted the need for additional and better training [3].

The Federal Government has committed itself to the broadscale introduction of CBT programs in Australian industry [4]. In this regard, the emergence of the CBT movement in Australia has followed closely the developments in Britain (Nelson and Trevitt 1993). The forest industry in Australia has recently embraced the concept of CBT and the need for national competency based

3: Examples of reports calling for improved forest training include the Industry Commission (1993), and the National Forest Policy Statement by the Commonwealth of Australia (1992). Most recently the National Forest Industries Training Council, under their new name of the Forest and Forest Products Employment Skills Company, released a National Training Plan, 1995-1999, for the Forest and Forest Products Industry. This report stated, *inter alia*, that the Australian forest industry has a work force *"characterised by low levels of formal education and training"* (p.23), and that *"the majority often receive little or no formal training and have negligible opportunities for career path progression under current work organisation arrangements"* (p.43). The Report concluded that *"a large part of the solution to unsystematic career paths lay in a training system supporting the skills based career structure with good human resource management practices, a system of assessment of nationally recognised competencies, accessible training and the recognition of prior learning for the purpose of credentials"* (p.43).

4: In Australia, reform of the training system was urged by a number of Commonwealth and State enquiries during the 1980s, which formed part of a more pervasive push for microeconomic reform, as commented by Nelson and Trevitt (1993). Urgent pursuit of a CBT system was recommended at a Special Ministerial Conference on Training held in 1989 between the Commonwealth and State Ministers responsible for vocational education, employment and training. This Conference led to the establishment in 1989 of the National Training Board to oversee the development of a national CBT system for non-professional occupations in Australia.

standards (Forest and Forest Products Employment Skills Company 1994).

However, before examining the merits of the forestry training systems in Britain, both competency based and otherwise, it is important to understand that the challenges facing the forest industry and forestry training in Australia are perhaps more fundamental to the future of the industry than many would realise.

The forestry profession in Australia has come under considerable criticism from much of the community over its forest management practices. As the forest researcher Dr Ross Squire has stated: *"In Australia, there is deep community concern over whether logging should continue in native forests and even whether the forestry profession should be entrusted with the management of those forests. Mistrust of the forestry profession appears to be based on the assertion, by some, that foresters are driven, essentially, by a desire to satisfy the wood production requirements of a timber industry which has scant regard for long term conservation of the environment. Consequently the forestry profession is under siege"* (Squire 1993).

In examining the possible solutions to these problems, Dr Squire has highlighted the importance of forestry education and training : *"The first and most urgent need is to ensure that effective use is made of existing knowledge from research and practical experience in developing a nationally accredited curriculum which meets the needs of forest industries throughout Australia, both public and private sectors, for the competencies associated with the work functions of growing, maintaining and managing forests for wood production"* (Squire 1993).

In a similar assessment of the challenges facing the forestry profession internationally, and the importance of training and education, a British forestry researcher, Laurence Roche, has similarly concluded that: *"The consequences of this upsurge in world interest in forestry have been profound and unsettling for the forestry profession. The path ahead is cluttered with conflicting signposts and the profession of forestry begins to show at best a retreating defensiveness and at worst a loss of confidence. Therefore, great challenges and great opportunities now confront the profession generally and particularly those institutions responsible for education and training in the subject"* (Roche 1992).

The Australian forest industry should gain considerably from the improving of its public image that CBT will bring. In an article entitled "Competency based education and training: a model for the Australian forestry profession ?", Nelson and Trevitt (1993) state that *"Competency Based Education and Training could contribute to restoring the public image of the forestry profession by explicitly defining competent professional performance, and providing a basis for raising the profession's level of accountability."* This is also the view of the Department of Employment, Education and Training (DEET) who recently concluded that: *"An additional general benefit of National Competency Standards for professions is that they provide a description of professional practice, which reflects the unique roles and contexts within with the profession operates. This benefits the public image of a profession and its relations with clients"* (DEET 1992).

The introduction of CBT to the Australian forest industry will also provide a number of other important benefits including: i) a more cost effective and efficient means of providing education and training; ii) employees with nationally recognised competencies affording maximum portability of qualifications; and iii) a forest industry with the more highly skilled, knowledgeable adaptable and motivated workforce required for Australia's forest industry to be internationally competitive (NFITC 1994).

The current situation for forestry training in Australia is that the forest industry, through the National Forest Industry Training Council (NFITC), has expressed a strong desire to develop a training system that more closely reflects the needs of the industry: *"It is the vision of industry to develop a technical forestry training curriculum which ensures that there is national consistency in developing competencies (ie. knowledge and skill and application of that knowledge and skill) to the standard required by industry"* (NFITC 1994).

It is therefore an appropriate time to examine the forestry training systems in Great Britain, both competency based and other wise, and see what relevance they have for the Australian forest industry.

4.0 THE IMPORTANCE OF FORESTRY IN BRITAIN

Before discussing the forestry training systems in Britain, it is appropriate to briefly examine the current status of forestry in Britain, as this will provide the context for the discussion on British forestry training systems. This will show that British forestry has for some years been going through a period of expansion.

Britain's forest cover currently amounts to about 10% of its land surface: a forested area of 2.2 million hectares. This is more than twice the area recorded at the beginning of this century when the forest cover reached historically its lowest proportion, just under 5% (Evans 1992). Britain is one of only a few European countries to have had steady expansion in its forest area during the present century. The initiative leading to this record of steady expansion of British forestry was the decision in 1919 to establish the Forestry Commission, both to encourage private investment and to create new forests on behalf of the state. Since 1919, successive British governments have pursued policies of forest expansion and restoration (Forestry Industry Committee of Great Britain 1994) [5].

Today Britain's forests and woodlands supply about 12% of its total wood and timber requirements (Forestry Commission 1994). When the recently established forests come into full production this percentage is expected to rise to over 20%. Current policy is aimed at *"continued expansion of the forestry estate carried out sensitively and in association with all the multiplicity of demands on land in our small, heavily populated island."* (Evans 1992). At the present time the expansion of tree planting on to good quality farmland, often with broad-leaved trees, represents the first major departure from concentration of effort on relatively poor upland areas.

Currently, approximately 91% of Britain's forests are conifers and 9% are broad-leaved species. The main species and their percentage of the total forest area, are: Sitka spruce [6] (*Picea sitchensis*)

5: The forest estate of Great Britain consists of plantations owned by either the Forestry Commission or private industry. The Forestry Commission currently has 820,000 hectares of conifers and 50,000 hectares of broad-leaved species. There is also 1,500,000 hectares of private forest and woodland, of which 850,000 hectares are conifers and 650,000 hectares are broadleaved species (Forestry Commission 1994). Currently, the Forestry Commission has two distinct roles to play. Firstly, as the Forest Enterprise it is a government business responsible for the management of forests and land under its control. As such, it employs 3,500 staff and produced 4.1 million cubic metres of timber in 1993. Secondly it is the Forest Authority, with a role to ensure the best use of Britain's forest resources, to undertake relevant forestry research, to assist with forestry training and to ensure good forestry practice on private woodlands. It currently employs 1,000 staff.

6: Sitka Spruce, by far the most widely planted tree in both the United Kingdom and Ireland, is a native of North America. Britain is naturally deficient in indigenous conifers - approximately 15,000 years ago when the ice/land bridge to the European continent was broken, only two conifers had re-established in Britain: Scots Pine and

28%; Scots pine (*Pinus sylvestris*) 13%; Lodgepole pine (*Pinus contorta*) 7%; Norway spruce (*Picea abies*) 6%; and Japanese larch(*Larix kaempferi*) 6%. The main broad-leaved species is English Oak (*Quercus robur*), with 9% of the forest area. Other species, none accounting for more than 4% of the forest area, include: Birch (*Betula veruccosa*), Beech (*Fagus sylvatica*), Sycamore (*Acer pseudoplatanus*), Ash (*Fraxinus excelsior*), Corsican Pine (*Pinus nigra var. maritima*) and Douglas Fir (*Pseudotsuga menziesii*).

Forestry in Britain is entering a new and challenging phase. New initiatives include urban and community forests, farm woodlands, the planting of derelict areas and an increasing amount of agricultural land becoming available for forestry[7]. There is increased emphasis on design, landscaping and conservation, plus restructuring of forests as they enter their second rotation.

5.0 RECENT CHANGES IN BRITISH FORESTRY TRAINING

In Britain, employment as a forestry supervisor and manager has traditionally been dependent upon having achieved one of the following qualifications:
- a Higher National Diploma or National Diploma in Forestry;
- a Bachelor of Science degree in Forestry; or
- a City and Guilds of London Certificate in Forestry or Scottish equivalent.

In terms of university courses, foresters either obtain a degree from the University of Aberdeen, the University of Edinburgh, or the University of Wales at Bangor. In all these degree courses, provision is made for an additional sandwich year during the course to gain practical forestry experience. Higher degrees in forestry are available at these three Universities and at the University of Oxford.

There are also Diploma level courses are available at several colleges in the UK, where students undergo a three year "sandwich" course leading to a National or Higher National Diploma in Forestry awarded by BTEC.

With the recent introduction of CBT in forestry in the UK, some of the traditional College based courses have now transferred to competency based assessment. There is now a range of competency based training courses in forestry, often running in tandem with the traditional non-competency based courses.

CBT in forestry in Britain is developed and coordinated by the Forestry and Arboriculture Safety and Training Council (FASTCO). FASTCO is recognised by the British Government as the Industry Lead Body (ILB) for forestry and, as such, it is responsible for setting the standards of

6 (cont.): Juniper, with only Scots Pine being a timber producer. Sitka Spruce is just one of only 500 coniferous introductions since then, but is by far the most successful (Ogilvy 1994). The timber productivity, site for site, of Sitka Spruce, is at least 50% more than that of Scots Pine. The financial returns from Sitka spruce can be three to four times that of Pine (Gill 1994). As a construction timber in Britain, Spruce is of an equivalent value to Pine, and it is much preferred for paper manufacture.

7: There is an increasing amount of farm land both in the United Kingdom and Ireland being set aside from agricultural production and on which forestry is becoming a popular alternative land use. This has arisen from a recent change in the European Union's agricultural policy which has allowed European farmers to be paid to stop growing food crops on some of their land. British farmers have already entered 650,000 hectares of fields into these "set aside" areas. The Department of Land Economy at the University of Cambridge estimates that by 2010, there could be 5.5 million hectares of spare agricultural land in Britain, all potentially available for forestry (Pearce 1995).

competence for forestry. FASTCO also maintains a Register of Instructors and Assessors and can offer nationally recognised certification of competence.

There is also now the provision for experienced forestry staff to obtain upward mobility to positions previously reserved for university graduates by passing the requirements of the Institute of Chartered Foresters and the Central Forestry Examination Board.

All the recent developments in forestry training in the UK, as mentioned above, will now be examined in some detail, and in particular the competency based movement, the forestry courses offered by colleges and universities and the role of professional bodies such as the Institute of Chartered Foresters.

6.0 THE ROLE OF THE NATIONAL COUNCIL FOR VOCATIONAL QUALIFICATIONS

In order to understand the recent developments in forestry training in Britain, it is necessary to firstly examine the changes made to all vocational training and development in Britain, and then to assess how these have impacted on forestry. This involves examining the role of the National Council for Vocational Qualifications.

The National Council for Vocational Qualifications (NCVQ) was set up in 1986 to develop a national framework of qualifications covering workers in all occupations and professions. The NCVQ aims to provide clear cut qualifications and routes of progression, with people in all types of work being able to build on their skills and adapt to new opportunities. The main role of the NCVQ is to develop National Vocational Qualifications (NVQs). In Scotland, similar responsibility has been given to the Scottish Vocational Educational System (SCOTVEC), where the equivalent to NVQs are Scottish Vocational Qualifications (SVQs). In Northern Ireland, the Department of Education and Department of Economic Development have jointly established a Vocational Qualifications Unit to liaise with NCVQ and promote NVQs.

To date, the NCVQ's work has not been an easy undertaking. Part of the problem comes from the fact that the NCVQ is trying to push through wholesale change in the way the qualification system works. In some cases its reforms have seemed too bureaucratic.

The origins of the NCVQ go back to the mid 1980s when there was a general acknowledgment that the United Kingdom's qualifications system needed reform. In 1986 a major British government review concluded that the "jungle" of awards needed to be simplified. A more coherent and comprehensive system of vocational qualifications was required which would encourage more people to become qualified. Moreover, it was felt to be vital that those qualifications should have credibility by being based on real life employment standards. The NCVQ was set up in the wake of this government review to serve as a champion of change, endorsing those qualifications of which it approved and helping to foster the creation of qualifications in those industries which lacked them.

Now, nine years on from its launch, the NCVQ compares its role to that of an assay office. It does not award qualifications itself but it acts as the measure for those who do. It "assays" the qualifications devised by industry in conjunction with awarding bodies such as the Royal Society of Arts, City and Guilds, and, in the case of forestry, FASTCO, to decide whether they meet the NCVQ's rigorous criteria.

If the criteria are met then the qualification becomes approved - or "accredited" as the NCVQ jargon puts it, as a National Vocational Qualification. To satisfy the NCVQ, qualifications must reflect the needs of industry and be based on competence. In the words of the NCVQ, qualifications should *"bear testimony to the effective performance of an individual and not merely on an academic understanding of what is required"* (NCVQ 1995a).

The NCVQ's approach is that, in general, NVQ candidates will be assessed in the work place and the assessments should be made in a flexible way. Candidates, who may be any age and have achieved their skills through any route, will be assessed when they are thought to have reached the standard required by the NCVQ.

The importance of the NCVQ is that through its "assaying" activity it is significantly changing the shape and quality of Britain's vocational qualifications. So while the full benefits have yet to be seen, radical improvements have already been laid down.

There are also many industrial sectors which have seen the emergence of new awards in the past nine years, primarily because of the impetus provided by NVQs. In short, within the past few years in Britain, more people are qualified than before in a wider range of occupations.

The NCVQ's long term vision is that qualifications should increasingly become the currency upon which the employment market is based. Employers should be able to recruit and train, and workers find jobs and acquire new skills, through the use of NVQs.

The NCVQ believe that *"if NVQs are the currency, then it is important that people be assured of the value of that currency and are confident that value is maintained. That is what the NCVQ is here to do"* (NCVQ 1995b).

The NCVQ admit that such an open and flexible system needs to be policed thoroughly if it is to maintain credibility. The NCVQ is absolutely determined that there should be no compromise on standards and that the quality of NVQs is maintained through the rigorous way in which assessments are undertaken.

7.0 VOCATIONAL QUALIFICATIONS AND TRAINING IN BRITAIN

Following the introduction of CBT in the UK, progression within much of the forest industry is now based on merit as there are no longer artificial barriers for those with no qualifications. The implementation of National Vocational Qualifications (NVQs) and the Scottish equivalent, Scottish Vocational Qualifications, (SVQs) reflect the recent move towards CBT in the forest industry.

In NVQs, the NCVQ is creating a coherent and comprehensive system of awards which are qualifications for work. At the heart of NVQs is the concept of occupational competence - the ability to perform to the standards required in employment across a range of circumstances and to meet changing demands. NVQs are first and foremost about what people can do.

NVQs are based on national standards, which define the skills, knowledge and understanding that employers need. The performance of trainees is assessed in workplace conditions and the NVQ is a guarantee of competence to do the job. NVQs can be gained by study at work, in school or college, or in spare time.

NVQs are workbased qualifications, and much of the evidence required for assessment arises from workplace performance. NVQs are intended to improve the value of vocational qualifications to employers and to encourage individuals to develop their vocational competence (NCVQ 1995a).

The NVQs obtained by any individual do not always have to come together to form a qualification. If a trainee completes a number of different units from different qualifications, these form what is known as the individual's National Record of Vocational Achievement (NROVA). This enables the range of units completed by the individual to be recorded and presented to an employer in a consistent form.

The NCVQ believes that whilst NVQs should be relevant to the trainee's current work, it should also show that they can transfer their competence to new jobs and different organisations. *The competence is occupational.*

NVQs are classed into five levels:

VQ Level 1: Introductory worker skills, with ability to work under direction. Competence in a range of routine and predictable work activities.

VQ Level 2: Skilled worker skills, with ability to work without direction. Competence in a variety of work activities, some complex and non-routine, ability to work both along and in collaboration with others in different situations.

VQ Level 3: Supervisory competencies. Competence in a variety of mainly complex and non-routine work activities in differing situations, often while controlling or guiding others. Any supervisors or foreman will be working at level 3 some of the time. Many, though not all, Level 3 qualifications will require some responsibility for other people.

VQ Level 4: Managerial competencies. Competence in a wide range of complex, technical or professional work activities in differing situations, often with responsibility for both other staff and allocation of resources. Almost all level 4 qualifications will mean some management or supervision of others. They will also include other forms of management such as budgeting.

VQ Level 5: Professional competencies. Competence involving the application of fundamental principles and complex techniques in a wide and often unpredictable range of work situations, together with responsibility for other people's work and the allocation of substantial resources.

The NCVQ are also responsible for the new General National Vocational Qualification (GNVQ) [8]. While NVQs are based on competence in meeting the standard of performance required for employment in a particular occupation, GNVQs are more broadly based. They establish national standards for vocational education, allowing progression into academic or vocational routes for individuals who require an alternative to an occupationally specific award.

The advent of GNVQs means that there are now three pathways for school students and other

8: There are three levels of GNVQ - Basic, Intermediate and Advanced. Advanced, in theory, have "parity of esteem" with A levels and therefore give access to HND and/or degree courses. GNVQs are delivered through schools and colleges but with access to a relevant work environment. The British Government has recently announced a review of both A levels and GNVQs with a view to *"examine ways of fulfilling the Prime Minister's aim of securing parity of esteem for vocational and educational courses"* (Judd 1995).

trainees to choose from as they contemplate their education and training futures. The three pathways, or qualifications options, around which education and training are structured, are :
- the traditional pathway of attending school and obtaining A levels or the General Certificate of Secondary Education and progressing on to a degree course at a university or college;
- the NVQ pathway of vocational training, and;
- the more broadly based GNVQ pathway.

GNVQs are broadly based vocational qualifications, designed to provide a basis for occupational training, employment or progression into higher education. They are initially available at three levels corresponding approximately to levels 1-3 of the NVQ framework. Each of these three qualifications pathways is focused to meet different needs. The NCVQ's belief is that individuals will move within and between pathways as their careers develop, and build up a portfolio of qualifications to match their aspirations.

8.0 THE FORESTRY AND ARBORICULTURE SAFETY AND TRAINING COUNCIL

The development and delivery of all aspects of competency based training for the forest industry in the United Kingdom is the responsibility of the Forestry and Arboriculture Safety and Training Council (FASTCO) [9]. FASTCO was formed in 1992 and incorporates the former Forestry Training Council, which was set up in 1971. It is responsible for providing training courses for personnel both in the Forestry Commission and in the private sector. It co-ordinates all requests for forests training and certifies approved forestry instructors.

FASTCO's terms of reference include the requirement:
"- *To provide advice to the Forestry Commissioners on health, safety and training and education to meet the relevant requirements of the forestry industries; and*
- *To assess the quantitative training needs of the relevant authorities in relation to the skills and competencies required of individuals at the various levels within the forest industries, and to encourage co-operation between the education authorities, institutions, training agencies, employers and the employees' representatives on matters relating to safety and training*" (FASTCO 1994).

The competency standards developed by FASTCO are the basis from which Vocational Qualifications for the forest industry are drawn up. These are then accredited by the NCVQ. To meet this end, FASTCO's Qualifications and Standards Committee commissions detailed analysis of the forestry profession to identify the range of roles and occupations relevant to forestry practice.

FASTCO also conducts Training Needs Analysis for the forest industry to ensure that training requirements are known and met by FASTCO's network of approved instructors.

9: FASTCO's members are appointed by the Forestry Commission and consist of representatives from the following organisations: The Arboricultural Association - (2 representatives); The Association of District Councils; The Association of Metropolitan Authorities; Three providers of diploma and craft level courses (one from Scotland representing both industries, and two from England and Wales- one representing arboriculture and one representing forestry); Provider of degree level courses; Forest Enterprise; Association of Professional Foresters; Institute of Chartered Foresters; Royal Forestry Society of England, Wales and Northern Ireland; Royal Scottish Forestry Society; The Timber Growers Association; The Local Government Management Board; General Municipal Boilermakers and Allied Trades Union; National Union of Civil and Public Servants; Transport and General Workers Union; British Timber Merchants Association; United Kingdom Softwood Sawmillers Association; United Kingdom Wood Processors Association. The Forestry Authority's Chief Education, Safety and Training Officer is an ex-officio member of FASTCO.

FASTCO is recognised by the Government as the Industry Lead Body (ILB) responsible for setting standards of competence for forestry. The standards are the base from which Vocational Qualifications (VQs) are drawn up. These are accredited by the NCVQ and SCOTVEC. As mentioned previously, FASTCO, and particularly its Qualifications and Standards Committee commissions Functional Mapping and Occupational Analysis of forestry to identify the range of roles and occupations relevant to forestry practice. Its current objectives include the following:

"The Council will vigorously pursue the development and accreditation of Forestry Vocational Qualifications (VQs) at levels 1 to 4. This will be done within a framework which represents the perceived needs of the industry whilst at the same time meeting the criteria laid down by the accrediting bodies; i.e. NCVQ and SCOTVEC. The target rate for achievement for Levels 1 to 4 is September 1995. This work will be underpinned by the relevant Functional Analysis and Occupational Mapping."

An updated Functional Map and Occupational Analysis was completed in March 1995. This will now provide the essential framework from which to revise existing VQ standards at Levels 1 and 2 and develop standards for Levels 3 and 4 to secure accreditation from NCVQ and SCOTVEC by May 1996.

The VQ units and elements are designed to cover a full range of activities necessary for effective forestry practice. They allow for individual achievement of competence in the workplace to be recognised from a combination of witness performance and demonstration of underpinning knowledge from which a recognised assessor can reliably infer competence and authorise certification.

FASTCO is conscious of the need to raise the levels of awareness and understanding of the relatively new VQ system, both within the industries it represents and potential entrants to it (Radford, pers. comm.). The Register of Instructors is one means of achieving this as is the wide circulation of FASTCO's Development Plan.

FASTCO have also stated that *"In these endeavours the Council will bear in mind that VQs are neither prejudicial nor a substitute for existing designated qualifications obtained at college, university or through professional bodies. The Council will accordingly seek the co-operation of the awarding and professional bodies with a view to setting out assessment criteria for the measurement of occupational competence at higher and advanced levels. In this context the continuous professional development program recently adopted by the Institute of Chartered Foresters may provide useful pointers about difficulties and pitfalls"* (FASTCO 1994).

The VQs for forestry at Level 1 and 2 have been in place since 1991 and were adapted from the existing Forestry Commission training courses (Radford, pers. comm.). So Forestry Instructors currently only have VQs at Level 1 and 2.

Currently the standards for Forestry VQ Levels 2-4 are on exhibition, as Level 2 has been revised and Levels 3 and 4 just completed in draft form. An example is given in Appendix Five. The responsibility for field testing these standards lies with the ILB, i.e. with FASTCO.

There is enormous pressure from the Government for ILBs to achieve certain targets e.g. to train 70 % of the people in an industry to VQ Level 2 by the end of 1994. However the rush to do this has meant that there has been very little quality control. However the emphasis is slowly shifting

to quality of training as well as quantity (Radford, pers. comm.). This emphasis from the British Government on achieving certain levels of training by a certain date, and the problems this causes in relation to quality control, is also discussed in Section 10 of this report.

8.1 Industry Training Organisation (ITO) Role: Like many Lead Bodies, FASTCO is also an ITO in which role it seeks to promote training and education, particularly the take-up of Vocational Qualifications. The ITO is the training arm responsible for the delivery and implementing of VQs. This is a difficult task to accomplish in a diffuse and rurally based industry like forestry in which many operators are self employed contractors, but it is being tackled in a variety of ways. In addition to the wide circulation of its Register and Development Plan, FASTCO publishes a Career Information leaflet which is updated annually.

FASTCO undertakes Labour Market Information surveys of forestry in order to be able to identify employment numbers and the pattern of employment. This information is used as a base from which to conduct Training Needs Analysis to ensure that training requirements are known and met by FASTCO's network of approved instructors whose occupational and instructional competence have been endorsed by FASTCO.

8.2 Register of Approved Instructors: Through its Register of Instructors, FASTCO provides a Great Britain wide network of approved instructors all of whom are qualified to give training which meets the required standards. Some registered instructors are college based or only undertake training within their own organisation. The majority are self employed professionals who offer training in a wide range of forestry skills arranging on site training tailored to meet the specific needs of their customers. Most instructors are also recognised assessors who can authorise the issue of nationally recognised certificates of competence and/or VQ unit certification. Registered instructors are prepared to develop courses to meet training needs in skills areas not covered by existing VQs or competence tests.

By April 1996, to ensure instructional competence, all registered instructors will be required to hold the appropriate Training and Development Lead Body (TDLB) qualification.

FASTCO has commented *"It has frequently been alleged that the criteria adopted for inclusion in the Register of Approved Instructors is inconsistent and essentially subjective. The time is now right for these criteria to be reviewed and the correlation between FASTCO's standards for assessing trainer competence and the standards defined by the Training and Development Lead Body (TDLB) should be examined. If a divergence is apparent then FASTCO should adopt TDLB standards for continued admittance to the Register, albeit within a reasonable timescale."*

"The current inclusion in the Register of so-called unassessed skills is a potential Achilles heel in the maintenance of occupational competency and FASTCO should investigate whether such inclusion has sufficient merit as to justify its continuance" (FASTCO 1994).

There is now a FASTCO Code of Practice governing the conduct of Instructors. This is seen as very important by FASTCO as it bolsters the credibility of the VQ system (Radford, pers. comm.).

8.3 Role of Verifiers: The Verifiers are FASTCO's senior instructors who act on behalf of FASTCO as internal Verifiers to support the instructor network by:

1. Confirming the occupational and instructional competence of new applicants for registration;
2. Verifying the continuing competence of existing registered instructors;
3. Investigating adverse reports from customers;
4. Ensuring standards of training are of a consistently high level and relevant by regular meetings to determine standards;
5. Supporting and mentoring registered instructors.

The Regional Verifiers are in turn monitored by a National Verifier who ensures verification standards are rigorous and consistent. All Verifiers will be required to have the relevant TDLB qualifications in assessment and verification by the end of 1995.

FASTCO is concerned about the proliferation of College based forestry courses and the huge increase in degree level provision of forestry training [10], e.g. the Scottish School of Forestry upgrading their course to degree level and tying in with the University of Stirling; Newton Rigg College upgrading their Diploma course to a degree with the University of Central Lancashire. The prevailing British Government approach is that the market place will rule and therefore courses of a substandard nature will fail. FASTCO's concern is that *"yes these courses may fail but they won't die. Where is the Quality Assurance here ?"* (Radford, pers. comm.).

9.0 THE ROLE OF THE BRITISH FORESTRY COMMISSION: The Forestry Commission play a very major role in the development and delivery of forestry training for the entire forest industry in Great Britain. They play two particular roles:

9.1 FASTCO role: FASTCO arose from the Forestry Commission's own Training Council [11] and the Forestry Commission still provide the majority of FASTCO's operating budget including the provision of office space and the secondment of an experienced Forestry Commission training officer to act as FASTCO's Technical Secretary.

There is no doubt that it is the considerable financial support that the Forestry Commission has given to FASTCO, together with the commitment of the staff working on FASTCO, that has enabled FASTCO to achieve the progress it has.

9.2 Training role: The Forestry Commission is the main provider of forestry training to both public and private forestry interests in Great Britain. The Commission's Training and Safety Branch provides a very large number of training courses for its own staff and most of these are available to the private sector: of the 122 different courses currently provided by the Training Branch, 99 are available for delivery to the private sector on a full cost recovery basis. The Forestry Commission is a approved centre for the award of both VQs and SVQs in forestry. As well as providing training courses for private industry, the Forestry Commission will act as a consultant and carry out Training Needs Analysis and the design and delivery of subsequent training solutions.

10: At a recent forestry exhibition in England, 14 Colleges offered various forms of forestry training courses (Radford, pers. comm.).

11: As mentioned in the previous section, FASTCO was formed in 1992 as a fundamental outcome of the merger between the Forestry Safety Council and the Forestry Training Council. These Councils had been formed in 1974 and 1971 respectively. The Forestry Training Council had been significantly reorganised in 1986 when its role as a trading company and a direct training provider were discontinued. This decision reinforced the primary role of the Forestry Training Council as an advisory body to the Forestry Commissioners on all matters relevant to vocational training in the growing and harvesting sectors of the forest industry (Radford, pers. comm.).

So through its leading role in FASTCO and in the large range of training services it offers both its own staff and also private industry, the Forestry Commission continues to be by far the most important organisation in forestry training in Great Britain[12].

10.0 IMPLEMENTATION OF COMPETENCY BASED TRAINING COURSES IN FORESTRY COLLEGES AND UNIVERSITIES

Most people involved in CBT in the UK agree that VQs and SVQs should (ideally) be gained through workplace assessment, or at least a simulation of workplace assessment. The British Government, in particular, is strongly advocating a workplace based training system for VQs, and they are doing this for two main reasons - to ensure that the training is relevant to the workplace and to ensure that the employer and not the government pays for the cost of training. In particular, SVQs are geared towards the workplace and SCOTVEC tends to frown on any college based system unless the college can show that their system is not classroom based and in fact imitates the workplace.

However the government is now realising that it is a big commitment for workplaces to implement a CBT program, and the take up of workplace based systems has been poor because of the complexities and time involved in setting up these systems. It is the vocational colleges that are the main deliverers of CBT in Britain.

10.1 College level training: There is currently only two Colleges in Great Britain that offer a wide range of forestry training courses; the Scottish School of Forestry (SSF) in Inverness and Newton Rigg College in northern England. Both these colleges offer Diploma courses in Forestry and also revision courses for both the National Diploma in Forestry and the Institute of Chartered Foresters exams.

The forestry courses offered by both the SSF and Newton Rigg courses offer an insight into the "teething problems" experienced by CBT programs. Because they are at different levels of implementation of CBT, they show the problems at different stages. When colleges in Scotland were recently required to align their existing CBT based courses into SVQs, it did not pose much of a problem (Ross, pers. comm.). This is in contrast to England, where the existing courses were not competency based.

10.1.1 Scottish School of Forestry, Inverness [13]: In 1985 the assessment for all non-advanced courses (i.e. roughly equivalent to SVQ levels 1, 2 and 3) in Scotland changed to competency

12: The 122 courses are in four categories: Interpersonal Skills (22 courses); Computer Skills (29 courses); Machine Training (20 courses), and Technical Training (51 courses). The numbers of each category available to the private sector are 18, 22, 8 and 51 respectively (Black, pers. comm.).

13: SSF is part of Inverness College, a large college catering for the technical education and vocational training needs of the Highland Region of northern Scotland. The SSF has its own 10 hectare site at Balloch, six miles from the town centre. It is adjacent to Forestry Commission plantations, in which the forestry students are permitted to use for their training. There are 10 full time lecturers based at the school, all with forestry qualifications, the majority of which are experienced skills instructors, registered with FASTCO. The SSF also draws on the services of lecturers from other college schools, particularly in the areas of business studies, communication, engineering and computing. The total number of students attending the SSF at any one time is around 75, with an annual throughput of 300 students. In addition, over 100 students would be out on work placement and being monitored by SSF. The SSF has recently become more autonomous, with more emphasis placed on the college generating its own income from commercial courses and student fees. Inverness College has signed an agreement with Stirling University whereby certain HNDs offered at Inverness (including Forestry) would be expanded in to B.Sc.'s.

based assessment; in training jargon they changed from being norm referenced to being criterion referenced. Thus all the syllabuses had to be rewritten to express these standards, in terms of competencies to be achieved by the student.

That is, the assessments were to be no longer based on obtaining a percentage in an examination (with a range of passes possible), but were to be based on an individual attaining a set standard: a pass/fail situation. The great benefit of a criterion referenced system is that the assessments and therefore the teaching is very much work related. All new courses, and the individual teaching units, are designed taking work functions into account.

The great difference between the two systems is that in CBT, each competence is assessed in depth; unlike the norm referenced syllabus based system in which the student had to know a little about a lot. Thus there is the potential of overworking and overassessing the student in the CBT system. It must be emphasised that CBT is not an easy option, students must maintain a high work rate throughout the courses, and failure is shown by a difficulty in keeping up. Indeed, in the early days of CBT at SSF, it was felt that the students were overloaded with too much emphasis on assessment (Ward, pers. comm.).

It should be emphasised again that CBT is not an easy option - it is a far more demanding path for both trainers and trainees.

In the new system, a competence is identified and this forms the basis of a teaching unit. For non-advanced courses these teaching units are called National Certificate Modules, for advanced courses they are called Higher National Units. Each general competence is then broken down into a number of discrete elements, called outcomes, each of which will be assessed. Although discrete, the format for the assessment can and ideally should be integrated.

An example of a descriptor for a National Certificate Module is given in Appendix Four.

With the success of this system, SCOTVEC, who control its operation by the Colleges, have since 1990 been converting all college based advanced courses (i.e. HNDs and HNCs) to the same assessment method. A summary of this new method, and a comparison to the old method, is given in Figure One.

TRADITIONAL SYSTEM

1. Syllabus: What has to be learned.

2. Set Course assignments and examinations.

3. Match answers to anticipated responses (Marking).

4. Make judgement on level of learning which has taken place (Allocate percentage mark).

5. Compare to specified levels for pass, credit, distinction.

COMPETENCY BASED SYSTEM

1. Specify Outcomes : What the candidate has to be able to do.

2. Specify Performance Criteria: the standard to which the candidate must perform the activity.

3. Collect evidence of candidate's ability to do the specified activity.

4. Judge evidence in relation to performance criteria.

5. Allocate competent or not yet competent rating.

6. Plan development program for those not yet competent.

Figure One: Summary of the main differences in assessing a course using the traditional assessment system or using a competency based assessment.

The Courses offered at SSF are:

1. Scottish National Certificate in Forestry: This one year full time course designed to meet three objectives: to provide an entry into forestry for those with no experience; to turn out competent foremen and harvesting operators who can function as self employed contractors; and to provide an entry route into the HND course for those without the qualifications for direct entry. SVQ forestry competencies at levels 1 and 2 are covered; some additional modules are at national SVQ 3 level.

2. Higher National Certificate in Forestry: A one year full time course, also available by block release. Its aim is to turn out Forest Supervisors and self-employed contractors.

3. Higher National Diploma in Forestry: Its aim is to train technical managers for the forest and related industries; personnel with a good technical education and knowledge of forestry, who have the supervisory and managerial skills to function effectively within an organisation. It covers SVQ levels 3 and 4 in Forestry. It is a three year full time sandwich course (i.e. a three year College program which incorporates an industrial sandwich year).

All the above three courses run are competency based with the competencies being grouped into accreditation units which have to be obtained by the student. Such accreditation units may be proficiency certificates issued by FASTCO, SVQs issued by SCOTVEC; National Certificate Modules or Higher National Units, both also issued by SCOTVEC.

4. Bachelor of Science in Forestry and Conservation Management: A four full time sandwich course. Applicants with a Higher National Diploma from Inverness College may proceed directly to the final year. It aims to produce managers with forestry, conservation and management expertise.

In terms of the CBT courses at SSF, the Scottish National Certificate in Forestry, as described above, offers a good example of some of the initial problems these CBT courses have faced. The

SNC is completed in three blocks of 13 weeks each. Each module in the course is notionally 40 hours long, i.e. in line with CBT orthodoxy the actual course time can vary as trainees meet the defined standard over different time spans. The reality is that this is impossible for a College to administer as regards timetabling and, as a result, the nominal 40 hours has become an actual 40 hours (Ward, pers. comm.).

The big problem is that the pressure is on Colleges to get people to a certain standard, e.g. SVQ2 in a defined time period, and inevitably this leads to a lowering of standards in order to get trainees through. The payment system to the Colleges also mitigates against quality - the Government says if the Colleges take longer than 40 hours per module to get the trainees to SVQ2 then the Colleges are inefficient and their funding may be threatened. So again, the pressure is on to lower the standard and get trainees through.

The marking system is also not totally competency based. CBT theory says that the assessment system should simply be "Competent" or "Not Yet Competent", however the Scottish National Certificate currently has an assessment system of "Merit, Pass or Fail". The Merit mark in particular can make no claim to being competency based and the SSF freely admits this (Ross, pers. comm.).

10.1.2 Newton Rigg, College of Agriculture and Forestry, Penrith: The School of Forestry and Woodland Management at Newton Rigg, runs a similar range of forestry training programs as the SSF. The School was established in 1970 as the National Centre for Forestry Education and Training and in 1993 changed its name to become the National School of Forestry and Woodland Management.

The courses offered are:

1. BTEC First Diploma in Forestry: A one year full-time course leading to the BTEC First Diploma in Forestry qualification. The course is designed to prepare students for further course of study or to go to work directly in the forest industry. Applicants need to be at least 16 years of age.

2. Business and Technician Education Council (BTEC) National Diploma in Forestry: This full-time, two year course is designed to equip students for the wide range of careers currently available in forestry, basic woodland management, timber utilisation and tree care in the UK. There is also a BTEC National Diploma in Forestry (Contracting) available.

3. Higher National Diploma in Forestry: This is the premier course offered at the School of Forestry with an intake of 24 per year (Ward, pers. comm.) This is a full-time course of three years with 34 weeks in year one, 12 months forestry work experience placement in year two and 34 weeks in year three.

4. Bachelor of Science (Honours) in Forestry/International Forestry: This is a one-year "top-up" course for students and foresters from all over the world who already have a Higher National Diploma, Forestry Technician or other relevant vocational qualification. There is also "Accreditation of Prior Learning" available for selected candidates. The duration of the course is 31 weeks. The first semester is normally run at the university of Central Lancashire and in the second semester there is the opportunity to study at the Kuru College of Forestry in Finland for the B.Sc. in International Forestry.

Mention has already been made of the conversion of College training courses in Scotland to a competency based format in 1985, and the relative ease in which these CBT courses then subsequently incorporated SVQs. However in England, where College courses were not competency based, the uptake of NVQs by Colleges has been minimal.

Whilst NVQs have been fully developed for forestry at levels 1 and 2, no Colleges have as yet embedded these units into existing curriculum. Newton Rigg College believe that embedding will happen over time and they have at least considered embedding NVQs 1 and 2 into the National Diploma of Forestry (Watson, pers. comm.).

Newton Rigg foresees the same problems with the introduction of CBT as experienced by the Scottish School of Forestry - a deterioration in quality as the extra workloads for staff and students that CBT causes, are not accompanied by extra resources. The reality is that the British Government is advocating the introduction of CBT and NVQs at a time when there is enormous funding pressure on Colleges to increase their student numbers but not increase their budgets.

Colleges in England receive their funding partly based on their students' results - the final government payment to the College (called the exit payment) is not given to the College if the student fails. If CBT is introduced without additional financial resources, the percentage of students meeting the required standard in the available time, may well decrease. The College's funding would therefore also similarly fall. This is one of the Colleges' major concerns with CBT/NVQs, and is based on their belief that the CBT system requires extra resources to implement (Watson, pers. comm.).

10.2 University level training: As previously mentioned, forestry undergraduate courses have traditionally only been available in Britain at three universities - Edinburgh, Aberdeen and Bangor. Postgraduate degree courses are available at these universities and also at Oxford University.

To date in the United Kingdom, forestry competency standards have not been developed for NVQ/SVQ levels 4 and 5, i.e. the levels that are "equivalent" to degree courses in CBT parlance (although, as previously mentioned, draft level 4 standards are currently on exhibition).

Universities in the United Kingdom, like those in Australia, have traditionally resisted any suggestion that they move their courses to a CBT format. The higher education sector in both countries has traditionally viewed competency as a necessary but not sufficient outcome of a university education.

The British government is currently addressing the issue of NVQs and their relationship to both university courses and accreditation offered by professional bodies such as the Institute of Chartered Foresters. The NCVQ has recently stated that *"this vision involves a clarification of the relationships between NVQs/SVQs, awards offered by Statutory and Professional Bodies and Higher Education. No single qualification pattern will satisfy the needs of the many and varied higher level sectors of employment. In most areas it is likely that different kinds of qualification (vocational and academic) would co-exist, each setting its own particular purpose"* (NCVQ 1995b).

However, despite this admission from the NCVQ that different pathways can exist, they are still hoping to achieve a consensus on the nature of qualifications appropriate for the different sectors and on the relationships between the different qualification pathways.

In advocating this consensus approach to developing higher level NVQs/SVQs, the NCVQ believes that there are benefits for all key players (i.e. employers, trainees, professional bodies and Higher Education) in establishing a complete NVQ/SVQ framework, i.e. from levels 1 to 5. In terms of Higher Education, the NCVQ believes that the development of higher level vocational qualifications would help to enhance the role of Higher Education in learning, and to strengthen the link between academia and employment. However, whether the Higher Education sector agrees, remains to be seen.

11.0 THE ROLE OF WORK EXPERIENCE

In an attempt to further develop the competencies of their forestry students, an increasing number of colleges and universities are suggesting, and in many cases insisting, that their students complete a year or more of work experience as part of their course. Employers are also beginning to see the advantages of this system.

Students undertaking the Higher National Diploma in Forestry at either the Scottish School of Forestry or at Newton Rigg College are required to undertake a year's work experience before they complete their final year of the Diploma. This is known as the Industrial Sandwich Year. They also have to complete a similar year of work experience before they commence their Diploma. This is known as the Pre-college work year.

The main forestry universities in Britain, i.e. Aberdeen, Bangor and Edinburgh, are all also now strongly recommending that their students undertake an Industrial Sandwich Year with a suitable forest employer (Blyth, pers. comm.). At the university level, the Industrial Year is normally taken at the end of the penultimate year of study, i.e. before commencing final year.

There is no doubt that the universities started encouraging their students to undertake a year of work experience when they realised that diploma holders with both a year's pre-college work and an industrial year of work behind them were being very highly regarded by employers, sometimes over and above degree holders [14].

One reason why this system of work experience has come to be so popular with graduate employers, both public and private, is that many students gain both their pre-college and sandwich years with forest employers who ensure that the students get exposed to a variety of forest management tasks. It is the government forestry agencies, i.e. the Forestry Commission in Great Britain and the Northern Ireland Forests Service (NIFS) [15], that have been the mainstay of

14: The competition for forestry jobs between diploma holders and degree holders has only recently surfaced due to a decision by the major employer (the Forestry Commission) to alter its hiring practices. Until recently, degree holders were recruited at the Forest Officer 3 level and diploma holders were recruited at the Forest Officer 1 level (i.e. diploma holders were recruited at a lower level). Now, all recruiting is done at the Forest Officer 3 level and these jobs are competed for by both diploma and degree holders (Oakley, pers. comm.). A similar system operates in Northern Ireland and, for example, the Northern Ireland Forests Service 1994 graduate recruitment scheme of seven graduate forester positions resulted in the appointment of four degree holders and three diploma holders - the extra work placement experience obtained by diploma holders enables them to more than hold their own against degree holders with less work placement experience (O'Boyle, pers. comm.).

15: Northern Ireland consists of six Counties in the north east of the land mass of Ireland - Counties Antrim, Armagh, Derry, Down, Fermanagh and Tyrone. The Northern Ireland Forests Service currently has a forest estate of 75,454 hectares and a staff of 470. There is also an estimated 17,000 hectares of privately owned forest and woodland in Northern Ireland (NIFS 1994). In terms of forestry training, although FASTCO has no official role in Northern Ireland, NIFS does ensure that its training courses meet FASTCO's standards (O'Boyle, pers. comm.).

providing this varied and valuable work experience for forestry students [16].

Subject to availability, work experience placements are also available with non-government forest employers e.g. private forest owners. Industrial sandwich year placements are arranged by the Colleges in consultation with the students, and the aim is to complement the student's pre-College experience. Students are expected to carry out a number of projects during the sandwich year placement, and are visited twice by a College staff member to assess their progress, and ensure that the sandwich employer is providing the necessary work experience.

The government forest agencies believe that there are long-term benefits for them in providing a considerable amount of work placements every year. Given that many of those undertaking placements are potential future recruits, the Forestry Commission and NIFS believe that the work placement year gives them an opportunity to thoroughly check out these students.

As an example of the importance that employers give to the work placement years, NIFS will not even interview anyone with a forestry diploma for a permanent position unless they have had TWO years' pre-college work placement (as opposed to the one year the Colleges insist they do). Degree graduates must have at least one year's work placement experience to qualify for an interview.

From the students' perspective, the work placement years (both pre-College and industrial sandwich) can be very beneficial in increasing their competencies if they are with an employer who gives them a varied work program, some on the job training and an exposure to forest management issues, rather than a year of merely working as a forest worker. The students know that one of the main determining features in getting a graduate position will be the references they are able to obtain from their work placement employer (Kernaghan, pers. comm.).

12.0 THE CENTRAL FORESTRY EXAMINATION BOARD

The Central Forestry Examination Board (CFEB) [17] holds exams every year and awards the National Diploma in Forestry (NDF). The NDF is considered to be equivalent of an ordinary forestry degree qualification (Osborne, pers. comm.).

The NDF came about in the 1950s when the only forestry training available was universities and the Forestry Commission's own training schools; there was no sub-university level training available for private applicants. The CFEB devised written and oral exams and work projects, all of which had to be passed by the candidate in order to obtain a NDF. The CFEB claimed that the NDF was equivalent to a pass degree in forestry from a university.

During the 1970s fewer and fewer candidates presented for NDF examinations and colleges such as Newton Rigg and the Scottish School of Forestry started offering a range of forestry courses. When the ICF received its Royal Charter in 1982 and the Colleges offered an even wider range of courses including Higher National Diplomas in Forestry, the NDF continued to decline in terms

16: Despite decreasing budgets, both the Forestry Commission of Great Britain and the Northern Ireland Forests Service have managed to maintain a reasonable budget for work experience placements - NIFS had 12 full time work placements available for students in 1994/95 and the Forestry Commission had 30.

17: The Central Forestry Examination Board consists of representatives from the: Forestry Commission, Institute of Chartered Foresters, Society of Irish Foresters, Royal Scottish Forestry Society, and the Royal Forestry Society of England, Wales and Northern Ireland.

of numbers of candidates. Recently the ICF have removed the exemption to Part I of their exam that NDF graduates previously enjoyed.

The future of the NDF and the CFEB is very much up in the air. The general feeling amongst many forestry professionals in the United Kingdom is that whilst the CFEB continues to function at a very high level of quality, it may be difficult for it to survive given the very small number of candidates (in some years none at all) presenting for the NDF. There is no doubt that the NDF has served British forestry extremely well over the past 40 years, but it may not survive beyond the 1990s (Radford, pers. comm.).

It may be possible for the NDF exam to be included in a revised Part I ICF exam, if the ICF agree (which is probably doubtful).

Advocates of the NDF system point out that the NDF is a qualification whereas the ICF is a membership. And memberships can cease e.g. if you do not meet the organisation's yearly requirements for membership.

13.0 THE INSTITUTE OF CHARTERED FORESTERS

In Britain, upward mobility to posts previously reserved for university graduates has been facilitated by the professional qualifications obtainable through the Institute of Chartered Foresters; no similar facilities appear to be available elsewhere in Europe (Hummel 1991).

The ICF is the representative body of the forestry profession in the United Kingdom, and currently has a membership of 1450. It was founded at Aberdeen in 1925 as the Society of Foresters of Great Britain, became the Institute of Foresters in 1973 and was incorporated by Royal Charter [18] in 1982. Under United Kingdom and European Commission law, the ICF is the regulatory body for the United Kingdom forestry profession.

ICF is charged under its Charter with safeguarding the public interest in all forestry matters, and it does so by *"advising the Government on all matters of policy, maintaining the standards regulating entry to the profession and by ensuring that the members continue to develop the knowledge, skills and attitudes which are necessary throughout the practitioner's working life"* (ICF 1995).

The ICF see their prime objective as maintaining and improving the standards of practice of forestry in the United Kingdom (Dick, pers. comm.). The only route to full ICF membership is through its examination system. The examination is in two parts: exemption may be obtained from some or all of Part I by possession of forestry or allied qualifications [19], while Part II is

18: In the United Kingdom, Chartered Status is bestowed by the monarch, and organisations obtain Chartered Status by petitioning the monarch through the Privy Council. All Chartered organisations exist for the benefit of society, not the organisation's members. On any issue to do with forestry in the United Kingdom, the Government is bound to consult with the ICF. Whilst the ICF's Royal Charter prevents it from being a lobby group in the Australian sense, the ICF can offer comments to the Government along the lines of *"It would be better for society if....."*

19: The issue of which forestry courses gain exemption form some or all of the ICF Part I exam is a contentious one. Forestry graduates from the universities of Aberdeen, Edinburgh and Bangor currently gain exemption from all of Part I; however graduates from Newton Rigg's Bachelor of Science in Forestry or their Higher National Diploma in Forestry, or the similar courses from the Scottish School of Forestry, do not gain exemption. Many in the forestry training industry see this as a glaring anomaly in the ICF system (Radford, pers. comm.).

taken by all candidates, irrespective of how much experience or training they have at the time of their application, and confirms professional competence.

The ICF has now become an extremely important and powerful organisation in relation to forestry training standards in the United Kingdom. Whilst ICF membership is not required to be a practising forester, it is very highly regarded by employers (Blyth, pers. comm.) who believe it acts as a quality control system (Mayhead, pers. comm.). This is reflected in job advertisements which typically read: *"the successful applicant will be a professionally qualified forester with a degree or a diploma in forestry or a chartered member of the Institute of Chartered Foresters with a minimum of three years experience"* (Radford, pers. comm.).

The ICF see themselves as focusing on professionalism and quality in forestry competence. The ICF believe that they are *"trying to enable people to become knowledgeable in forestry, not hinder them. But standards must be met"* (Dick, pers. comm.).

Part I of the ICF exam (which the ICF believe is equivalent to a forestry degree in content and breadth of knowledge required) is in three parts. The syllabus for this exam is included in Appendix Three. It should be noted that Part I of the ICF exam is only a point in time, it has no meaning in itself, and Part II is required before you can claim ICF membership.

Part II is designed to be a demonstration of professional competence. It comprises a Project Report [20] (usually a forest or woodland management report), followed by an oral exam which covers both the project Report and the wider aspects of forestry. Part II of the ICF exam, in requiring the candidates to produce a working plan and then to have an oral exam on this plan, is in many ways a from of competency based assessment (Mayhead, pers. comm.).

Given that the working plan is a complex document, some candidates are never going to successfully pass the exam. However, this reality that some candidates will never be competent enough, is politically unacceptable to the Competency Based Training orthodoxy, which believes that, eventually, all candidates will make the grade.

As mentioned previously, a number of forestry colleges offer revision courses for the ICF exams. Both the Scottish School of Forestry and Newton Rigg College offer a six week course aimed at preparing applicants for the ICF examinations.

Two recent developments in the ICF that are also of interest are their program of Continuing Professional Development and the impact on them of the moves towards European Union. Both these will now be briefly discussed.

13.1 Continuing Professional Development (CPD): The ICF have recently introduced a program of CPD where, to retain membership, members have to complete a certain amount of professional development. The current minimum is 100 hours of professional development over three years. The ICF believe that CPD formalises the need for all ICF members to *"keep abreast of developments, especially in their forestry specialism"* (Patch 1994). Members are required to keep a record of the professional development that they have undertaken and the ICF reviews 10% of

20: The Report must be no more than 35 A4 pages and candidates are given from May to September to prepare the Report. This is followed by the oral exam in November, conducted by two ICF Examiners and an independent chairperson.

these records every year to ensure compliance. The ICF believes that CPD is important for all its members, especially for those foresters in business by themselves.

Currently a wide range of development activities can be claimed - not just the obvious ones such as conferences, study tours, professional association meetings - but also relatively unstructured learning such as reading journals and other relevant publications and even video watching (Dick, pers. comm.) [21].

13.2 European Union: The ICF currently operates throughout the United Kingdom, i.e. it includes Northern Ireland. The ICF fully supports the objective of mutual co-operation between European professionals [22], and are currently looking at establishing links with other parts of Europe, commencing with the Republic of Ireland, and they are currently having discussions with the Society of Irish Foresters [23]

14.0 THE OXFORD FORESTRY INSTITUTE

No assessment of forestry training in the United Kingdom would be complete without mention of the Oxford Forestry Institute. Whilst focusing on postgraduate university training, and therefore quite different to most of the training organisations discussed so far, it is relevant to this report as it is regarded as one of the pre-eminent forestry training organisations in the world.

Formed in 1924, the Oxford Forestry Institute (OFI) houses: the forestry lecturers of the Department of Plant Sciences, the Commonwealth and Tropical Forestry Unit which provides

21: The ICF define CPD as *"the structured maintenance, improvement and broadening of knowledge and skill and the development of personal qualities necessary for the execution of professional and technical duties throughout then practitioner's working life"* (ICF 1991). The ICF believes that CPD activities embrace the wider aspects of the work of a Chartered Forester, however the CPD activities are also expected to be relevant to the work and career objectives of the individual Chartered Forester. CPD activities come under the following official categories:
A: ICF national and regional meetings, tours etc;
B: ICF sponsored meetings, tours, etc;
C: Meetings, conferences and discussion groups and seminars organised by other bodies;
D: Short courses run by universities, colleges, business schools and employers of Chartered Foresters;
E: Authorship of published and technical work, or preparation and delivery of lectures;
F: Membership of ICF committees, Examination Board and Examination Panels;
G: Unstructured learning e.g. reading professional, technical and financial material.
For the 100 hours of CPD required over any consecutive three year period, at least 75 hours must come from Categories A to F, and not more than 25 hours from Category G.

22: One of the many objectives of the European Commission is the mutual co-operation between professionals in the member states. The European Commission Directive (89/48/EEC) came into force in the United Kingdom in 1991 and, under these regulations, the ICF is a designated authority and as such is the regulatory body for the forestry profession in the United Kingdom. Chartered Foresters therefore have the right to have their professional qualifications (i.e. their ICF membership) recognised and accepted in other European Commission States where forestry is a regulated profession. Without such recognition, the professional may have to requalify in his or her own host country.

23: The Society of Irish Foresters was formed in 1942 to advance and spread all aspects of the knowledge of forestry. In 1991 the additional objective of promoting professional standards in forestry and promoting the regulation of the forestry profession was added. Amongst its activities, the Society publishes *"Irish Forestry"* and organises annual study tours and field days for members, exhibitions for the public on forestry related topics, and an annual symposium on technical forestry and policy issues. It also hold examinations in forestry leading to the award of the Foresters Certificate, the only generally recognised Irish qualification in forestry apart from the degree in forestry awarded at the University College of Dublin.

training, research and advisory services in tropical forestry, and the Institute's library which is regarded as the Western world's library of deposit for forestry and related literature [24].

In addition to its educational role, the OFI acts as a coordinating agent for, and undertakes, many of Britain's international forestry research and development activities; it also provides advisory, consulting and specialist training services.

The OFI has two missions, described as an internal and an external mission (OFI 1994), and seen as complementary and mutually supportive:

i) the internal mission is to contribute significantly to the academic activities and reputation of the Department of Plant Sciences and the University. The OFI believe that they achieved this in 1993 by *"continuing to provide the internationally reputed Master of Science course, by contributions to undergraduate courses, by supervision of graduate students research, and by attracting and successfully completing a large number of high quality research projects"* (OFI 1994).

ii) the external mission is to maintain and enhance the OFI's capability and reputation in academic-related training, research, information and advisory services.

The Institute's one-year taught Master of Science degree, now in its 22nd year, continues to be highly regarded. Demand for admission from well qualified applicants remains high, at around four times the number of places available; 25 students were admitted to the 1994/95 class [25]. In addition to its Masters program, the OFI has for many years run annual specialist forestry courses of three months duration. The content of these courses have been steadily updated to meet the changing requirements of those involved in the wide variety of roles and specialisations that modern forestry now requires, particularly in the tropics (OFI 1994). Two courses were run in 1994 : "Research Methods in Forestry" and "Biodiversity - Exploration, Evaluation, Conservation and Monitoring"

15.0 CONCLUSIONS

The recent developments in forestry training in the United Kingdom offer a number of lessons to Australia, and these include my observations that:

24: The OFI has developed from a small beginning in 1905 when a School of Forestry was established in Oxford University to train foresters for the Indian Empire. The crisis in timber supplies during and after the First World War led to the decision of the Empire Forestry Conferences of 1920 and 1923 to found an Imperial Forestry Institute at Oxford to undertake research and teaching in forestry for countries of the British Empire. The Imperial Forestry Institute opened in 1924. In 1961 the name changed to Commonwealth Forestry Institute. In 1985 this Institute was incorporated into the Oxford Department of Plant Sciences. Today the Institute is concerned with land use and forestry in many tropical countries and works with numerous development agencies. Owing to this broader international coverage, and to emphasise the University's recognition of the academic importance of the Institute, the name was modified to become the Oxford Forestry Institute. The Institute is headed by a Director who is advised by an Advisory Committee that comprises representatives of Oxford University, the British Government and the forestry profession. In 1994, research was carried out in five broad areas: forest policy and socio-economics, silviculture and agroforestry, forest genetics and tree breeding, tropical forest ecology, and wood structure and properties. Some 35 projects were in place during 1994 financed by four different agencies (European Community, Food and Agriculture Organisation, the International Tropical Timber Organisation and the British Government's Overseas Development Administration) and one commercial company.

25: Including an Australian forester, Mr. Andrew Lugg, of the State Forest Service of New South Wales, recipient of the 1994 Russell Grimwade Scholarship.

i) The development and implementation of CBT will not be easy and will require substantial additional resources. Despite its workplace orientation, delivery of CBT is probably most efficiently done by vocational colleges;
ii) substantial government commitment is required to develop the competency standards for any industry, and a relevant national body (such as the Forestry Commission of Great Britain) is required to be the driving force behind competency development. The aim of this body should be to involve forest employers as much as possible in the development of the required training standards;
iii) employers can not be expected to embrace CBT until they are convinced of its merits - this will take a few years and will involve the "old" and "new" training systems running in parallel for some time;
iv) at the university level, it is doubtful whether competency is a sufficient outcome of degree level courses. However the CBT approach of seeking a greater input from employers regarding course design and content is very worthwhile;
v) employers are increasingly looking to professional bodies such as the Institute of Chartered Foresters to set training and accreditation standards and undertake assessments of employees and potential employees. With the increasing number of college and university courses in natural resource management, the role of the ICF as an assessment authority can only increase;
vi) both CBT and the ICF can contribute to raising the public image of forestry, although it is too early to assess the impact of CBT in this regard as it is not yet fully implemented. In the case of the ICF, its high public profile (and Royal Charter) are contributing substantially to the public image of the forestry profession.

So, given the above findings, how should the forestry profession in Australia now commence the process of further assessing the benefits of CBT and then implementing these into the current training system ? What organisations should be involved and who should fund the project ?

One problem in Australia is that the government forest management agencies are all State based, unlike Great Britain where the Forestry Commission is a national body. Not surprisingly, the State Governments in Australia take an inherently parochial perspective on forestry training and the need for it to be accredited.

In order to rationalise and improve the forestry training systems operating throughout Australia, there will clearly need to be a national perspective taken. It would seem appropriate for the Federal Government authority in charge of training coordination (currently the Australian National Training Authority (ANTA), replacing the former National Training Board) to play a major role here, given the benefits nationally of a coordinated and competency based system. ANTA has the required national perspective and expertise in coordinating the development and documentation of the required competency standards for industries and professions.

I believe that a suitable approach would be for ANTA to convene a Working Party with the Australian forest industry to more fully document forestry competency standards and review existing forestry curriculum. This would be a preliminary step towards the subsequent development and implementation of a nationally accredited and articulated forestry training system that would be predominantly competency based. State Government forest management agencies, the Institute of Foresters of Australia (IFA) and the National Association of Forest Industries (NAFI) should all be members of this Working Party. The question of at what level the traditional training providers (Colleges and Universities) should be involved will also need to be addressed.

The NFITC's 1994 report "Technical Forest Training Curriculum Evaluation" should serve as the basis for the Working Party. This document began the process of defining the competencies required by the Australian forest industry. However since it was submitted to the NTB in 1994, it seems to have disappeared without a trace.

The British experience in developing CBT courses for forestry has shown that it is a long and arduous process. The British have achieved significant progress in a fairly short time by a combination of encouragement and enforcement. The enforcement has been the British Government's timetable of forcing industries to develop competency based training programs, and the encouragement has been the Forestry Commission's dedication and commitment to the project.

The Australian forest industry now needs to realise both the imperative of developing an Australian wide forestry training system (to be largely competency based), and at the same time understanding the magnitude of this project, with its concomitant need for Federal Government assistance. Whilst it is clearly in the interests of the forest industry to advance this training project, the industry should not be expected to fund the entire project. As in Great Britain where the appropriate training body (in their case the NCVQ), provided funding to the Forestry Commission, it would appropriate in Australia for ANTA to provide assistance to enable the forest industry to develop a project that has considerable national benefits.

It would also be appropriate for the IFA to examine the role of the Institute of Chartered Foresters in Great Britain and to assess what aspects of their training and accreditation programs would be relevant in Australia. It is clearly in the interests of Australian forestry in general (and particularly from a training and public image perspective) to have a high profile professional organisation closely involved in these aspects of the profession. In Great Britain, the ICF has achieved this high profile and position and it has clearly benefited the forest industry there.

In summary, the benefits to the Australian forest industry of developing a nationally accredited and coordinated training system, based on the industry's defined competencies, will be considerable. Whilst the scope and scale of this project may seem daunting, it is in the interests of all aspects of the Australian forest industry to be involved in this project. At the same time the forest industry should be ensuring the commitment of the Federal Government to this project, given the national benefits that will flow from the project.

Whilst the IFA should be involved in this project, it should also examine elements of the ICF system and in particular their achievements in the areas of training accreditation and raising the public image and profile of the Institute. In Australia, as in Great Britain, it is the "rank and file" foresters, through their professional associations and employers, that need to be the most closely involved in ensuring the appropriate training standards are in place. In this regard, and in light of the criticism the forestry profession has received in Australia, the future is in our hands.

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17.0 APPENDICES

APPENDIX ONE: LIST OF PLACES VISITED

A full itinerary is given in Appendix Two.

Places are listed in the order they were visited.

Forest Enterprise Office, York, England

Forest Authority Office, Wheldrake, England

University of Edinburgh, Scotland

Institute of Chartered Foresters, Edinburgh, Scotland

Forestry Commission Head Office, Edinburgh, Scotland

Forestry and Arboriculture Safety and Training Council, Edinburgh, Scotland

Scottish School of Forestry, Inverness, Scotland

Forest Authority Training Centre, Inverness, Scotland

Oxford Forestry Institute, Oxford, England

School of Forestry, Newton Rigg College, Penrith, England

School of Agriculture and Forest Science, University of Wales, Bangor, Wales

Irish Forestry Board Training Centre, Portlaoise, Republic of Ireland

Irish Forestry Board Head Office, Dublin, Republic of Ireland

Pomeroy Forestry School, Northern Ireland Forests Service, Northern Ireland

National Centre for Vocational Qualifications, London, England

Forest Industry Committee of Great Britain, London, England

APPENDIX TWO: ITINERARY

Sat. 18/3	Departed Melbourne at 5.40 p.m. on flight QF 9.
Sun. 19/3	Arrived Heathrow, London at 5.30 a.m.
Mon. 20/3	Rest day in London.
Tue. 21/3	Travelled to York by train.
Wed. 22/3 Thu. 23/3	Wed. morning: Met with British Forestry Commission's field staff at their North England regional office in York. Met with Mr John Oakley, Harvesting and Marketing Manager, and Mr. Rob Guest, Silvicultural Manager, and inspected forest operations in the North York Moors Forest. Thu. morning, continued inspection of forest operations with Mr. Graham Haddock, Forestry Commission, Wheldrake, near York. Travelled by train to Edinburgh Thu p.m..
Fri. 24/3 Sat. 25/3 Sun. 26/3 Mon. 27/3	In Edinburgh, had meetings with: Thu. 23: Mr. Michael Osborne, Central Forestry Examination Board; Fri. 24: Dr. John Blyth, School of Forestry at the University of Edinburgh; Sat. 25: Ms. Margaret Dick, Institute of Chartered Foresters; Mon. 27: Mr. Ted Radford, Forestry Safety and Training Council. Travelled by train from Edinburgh to Inverness Monday p.m..
Tue. 28/3 Wed. 29/3 Thu. 30/3	In Inverness, had meetings with: Tue. 28: Scottish School of Forestry. Met with Mr. David Ward (Head, School of Forestry), Mr. Ian Ross (Senior Lecturer) and other staff and students; Wed. 29: Forest Authority's Safety and Training Branch, Mill Yard, Inverness. Met with Mr. Keith Black, Senior Training Officer. Thu. travelled by train to London (8 hours).
Fri. 31/3	Visited the Oxford Forestry Institute. Met with Mr. Everett Sharp and other staff. Visited the Oxford Forestry Library.
Sat. 1/4 Sun. 2/4	Weekend in London.
Mon. 3/4 Tue. 4/4	Travelled by train from London to Penrith via Carlisle. Visited the Newton Rigg College of Agriculture and Forestry at Penrith. Mon. p.m. and Tue a.m., met with Mr. Bob Watson, Head of the Forestry School, and other staff and students. Tue. p.m. travelled by train from Carlisle to Bangor.
Wed. 5/4 Thu. 6/4	a.m.: Met with Dr. Graham Mayhead (Senior lecturer) and Prof. Bartholemew Banks (Professor of Forestry), School of Agriculture and Forest Science, University College of North Wales, Bangor. Inspected the facilities of the forestry school; p.m.: met with Mr. Francis Gwyn Jones, School of Agriculture and Forest Science, and inspected Nursery, Woodland and Research facilities, followed by a tour of the forests of North Wales. Thu. travelled by train from Bangor to Holyhead and by ferry to Dublin in the Republic of Ireland.
Fri. 7/4	Travelled by train from Dublin to Portlaoise and met with the Irish Forestry Board's Training Branch. Met with Mr. Pacelli Breathnach, Senior Training Officer, and inspected forestry operations in County Laois. Travelled back to Dublin by train in the evening.
Sat. 8/4 Sun. 9/4	Weekend in Dublin.
Mon. 10/4	Visited the Head Office of the Irish Forestry Board in Dublin. Travelled by train to Belfast in the afternoon.

Tue. 11/4 Wed. 12/4	Tue: Travelled by bus from Belfast to Pomeroy in County Tyrone. Met with the Northern Ireland Forests Service at their Forestry School. Met with Mr. Johnjo O'Boyle, Training Officer, and other staff. Wed: Met with Northern Ireland Forests Service employees (recent forestry graduates and industrial year workers) at Limavady in County Derry. Inspected forestry harvesting operations near Limavady.
Thu.13/4to Mon. 17/4	EASTER. Spent in Ireland.
Tue. 18/4 Wed. 19/4 Thu. 20/4 Fri. 21/4	Tue: Travelled by train, ferry and bus from Dublin to London. Wed. and Thu.: Visited the National Centre for Vocational Qualifications in London and the Forest Industry Committee of Great Britain in London. Fri.: Rest day in London.
Sat. 22/4	Departed Heathrow at 10.30 p.m. on Flight QF 10.
Mon. 22/4	Arrived Melbourne at 4.55 am.

APPENDIX THREE: INSTITUTE OF CHARTERED FORESTERS PART ONE SYLLABUS

As explained in Section 13, the syllabus has three parts.

Paper One: Scientific principles and practice of growing trees

Syllabus section 1 - Principles of silviculture and arboriculture: *This section is designed to test candidates' knowledge and understanding of the classification, characteristics and ecology of trees and forests. Candidates should be able to:*

1. Identify and classify the major commercial and amenity tree species used in British forestry.
2. Know the natural distribution of native and exotic species and understand the range of provenance variation and its importance.
3. Discuss major differences between species in terms of morphological, phenological and physiological characteristics which affect their silvicultural and arboricultural application.
4. Understand the principles of plant ecology particularly related to shrub and tree ecosystems.
5. Outline, with reference to particular examples, patterns of forest succession, climax communities, nutrition and nutrient cycles, and tolerance to external influences.

Syllabus section 2 - The influence of site factors: *The interaction processes between the forest and its environment must be clearly understood. Candidates should be able to:*

1. State the effect of regional and local climatic factors on tree growth.
2. Describe the features of an effective shelterbelt and recognise the relationship between shelterbelt design and reduction of wind speed.
3. Appreciate microclimatic influences on forest and individual trees - water relations, solar radiation effects including soil and air temperature.
4. Demonstrate a knowledge of forest soil types, their classification, physical and chemical properties.
5. Describe methods of site classification in common use in forestry and their value to the forester.

Syllabus section 3 - Hydrological processes: *Water supply is often a major associated land use with upland forestry and a forester must have a knowledge of hydrological processes. Candidates should be able to:*

1. Describe the effects of different types of catchment vegetation cover on water yield and quality.
2. Outline the main features contributing to the hydrological cycle in a plantation forest.
3. Understand the value of trees and forests in ameliorating soil erosion and stabilising sites.
4. Demonstrate an appreciation of the ways in which forests can affect water quality and quantity and describe techniques for ameliorating such effects where they are harmful.

Syllabus section 4 - Agents of damage and disease: *Knowledge of the major living and non-living agencies of damage and disease is an important requirement for the forester. A full understanding of this section of the syllabus is an essential prerequisite to the study of forest protection (Syllabus section 7). Candidates should be able to:*

1. Describe the influence of non-living damaging agencies on the growth of forest trees - soils and air temperature, precipitation, atmospheric pollution (acid rain), wind, drought, fire, lightning and salt spray.
2. Relate variation in the above agencies to local factors of land form and elevation, soil, geology and vegetation.
3. Outline the main living agencies that cause damage or disease to trees and timber - bacteria and viruses, fungi and higher plants, insects, birds and higher animals including man.
4. Show detailed knowledge of the major forest pests and diseases of the British Isles including a) a general understanding of the organism's life history;
b) awareness of site and crop conditions favouring the organism, and
c) ability to recognise the organism and its damage.
5. Evaluate the status of pests and diseases present overseas which could pose a major threat to British forests.
6. Describe the basic concepts of the ecology of pests and diseases - population dynamics, lag phase phenomena, spread and transmission.
7. Relate the risks of pest and disease damage to forest and crop types - exotic species, mixtures or monoculture, clonal plantations.

Syllabus section 5 - Practice of silviculture and arboriculture: *This is a core section of the syllabus and covers the essential techniques for growing trees to meet a wide range of management objectives. Candidates are expected to have a wide understanding of current practices in this area and should be able to:*

1. Select correct species in accordance with site factors and objects of management.
2. Prepare and justify plans for mixtures of broadleaved and coniferous species to achieve a desired final crop.
3. Describe standard techniques for the collection and storage of seed.
4. Describe modern nursery practice for the production of planting stack, both bare rooted and in containers.
5. Appreciate the characteristics of quality nursery stock and specify stock appropriate for particular applications.
6. Compare the roles of provenance, hybridisation and selective breeding in the improvement of forest trees.
7. Outline methods of vegetative propagation in broadleaves and conifers and assess the place of clonal plantations in British forestry.
8. Describe current methods of ground preparation for afforestation and replanting including scrub clearance, brash and stump treatments, drainage, ploughing and fencing.
9. Compare ground preparation methods and select appropriate techniques for different situations.
10. Describe the different methods of establishing trees and crops, including natural regeneration and the use of tree shelter techniques.
11. Select the most appropriate silvicultural system for given site conditions and objects of management.
12. Show detailed knowledge of tending and crop improvement operations including a) Weeding by hand, chemical and mechanical means; b) Plant spacing in relation to specified objectives and re-spacing techniques where required;
c) Brashing and pruning methods and objectives; d) Thinning as a silvicultural operation - selective and non-selective, type, intensity, cycle, weight;
e) Determination of rotation length related to silvicultural factors and management objectives.

13. Prescribe necessary fertiliser applications to new plantations and established crops related to forest soil types, using foliar analysis as a diagnostic aid where appropriate.
14. Evaluate the effect of silvicultural practice on wood properties and end-product characteristics.
15. Describe the special techniques required for the establishment and amenity of trees and woodlands in urban areas.
16. Outline the principles of tree surgery including safe climbing techniques, methods of pruning, crown reduction, bracing and cavity work.
17. Describe the special problems of establishing trees and woodlands on reclaimed industrial land and other disturbed sites.

Syllabus section 6 - Environmental factors influencing forestry practice: *The candidate must show an awareness of the effects of environmental issues and organisations on forestry policy and management practices and should be able to:*

1. Show an appreciation of the principles and practice of forest landscape design.
2. Understand how forest flora and fauna respond and adapt to habitat changes over the rotation.
3. Describe the management practices that can be employed to maintain and enhance the wildlife interests of forests.
4. Appreciate the need to identify and protect sites of archaeological interest and public rights of way.

Syllabus section 7 - Rural land use: *The complex and inter-related demand on rural land make it essential for foresters to have a broad understanding both of other land use interests and of the wider role of forests and woodlands in the national interest. Candidates should be able to:*

1. Show an appreciation of major rural land uses other than forestry, including hill and upland farming, mineral extraction, watershed management, tourism, game, wildlife conservation and protection of the environment.
2. Compare the relative merits and claims of alternate forms of land use on particular sites.
3. Describe the national, regional and local structures for coordination of land use planning.
4. Prepare management plans to optimise benefits by the integration of forestry with other forms of land use.
5. Define the terms "multiple land use" and "agroforestry".
6. Evaluate the effect of recreation on a forest enterprise and identify the factors which influence the need for provision of formal recreation facilities.
7. Plan the location and construction of recreational facilities to meet the demands of both day and long-stay visitors to the forest.

Syllabus section 8 - Protection: *The recognition of damaging agencies is covered in Syllabus section 4. This section is concerned with the practical measures necessary to protect the forest and its environs. Candidates should be able to:*

1. Determine which pre-disposing factors are likely to induce forest damage.
2. Monitor population levels of pests and diseases and decide when control measures are necessary.
3. State the main legislation concerned with plant health and the movement of plant material between countries and within the UK.
4. Explain the principles of good forest hygiene in silviculture and forest management.

5. Describe current methods of chemical control for specific damaging agencies; bacteria, fungi and insects.
6. Outline particular aspects of chemical control of damaging agencies on individual and specimen trees.
7. Give examples of biological control against damaging agencies in British forest and evaluate their effectiveness.
8. Outline the potential for breeding trees with increased resistance to specific damaging agencies.
9. Determine damage acceptance levels for deer and prepare a management plan for their control and conservation.
10. Describe standard methods of control for small mammals including rabbits, grey squirrels, hares and voles.
11. Prepare a windthrow hazard classification map for an area of forest.
12. Determine the appropriate silvicultural and management options required to minimise the risk of windthrow damage.
13. Appraise the fire risk and fire hazard for an area of forest and evaluate the need for protective measures against fire.
14. Prepare a fire plan for a forest.
15. State the statutory obligations of the local fire service in respect of forest fires.
16. Describe the current methods of fire control including access, equipment (ground and helicopter), water supply, methods and training.

<u>Paper 2: Policy, Economics and Management</u>

Syllabus section 9 - Forestry Policy: *This section is designed to test the candidate's knowledge and understanding of national policy, its historical perspective and the legal and administrative framework to which it operates. Candidates should be able to:*

1. Describe the historical background to national forest policy and land use.
2. Explain the development of current UK forest policy since 1919.
3. Describe and explain current forestry policy in the EEC.
4. Analyse the role of the Forestry Commission as authority and enterprise.
5. Evaluate the effect of forestry policy in terms of current and proposed legislation on different types of woodland management and ownership; traditional ownership, farmers, co-operatives, syndicates and institutional investors, management companies, local authorities.
6. Evaluate the effect on the industry of current and proposed state aid to private forestry.
7. Understand the influence of the Nature Conservation Council, the Countryside Commissions, National Park Authorities and other local and national environmental agencies on the development of forestry policy and practice.
8. Evaluate the effect of land use designations such as SSSI, AONB, ESA etc on afforestation and forest management.

Syllabus section 10 - Law: *The legal framework within which the forest industry operates must be understood by candidates who should be able* to:

1. Explain the historical development of forest law in the UK.
2. Explain the significance of current and any proposed legislation which has an influence on forest management or the management of woodlands and trees; including, for example, Tree Preservation Orders and felling licence procedures.
3. Describe the landowner's responsibilities and liabilities for trees near boundaries, buildings, highways and for nuisance.

4. Explain those aspects of common law which affect the landowner and discuss their implications.
5. Explain the law of Contract as it applies to forestry.
6. Show an understanding of the law on contracts of employment and its implications.
7. Show an awareness of current and proposed social legislation as it affects forestry such as that relating to health and safety at work, pesticides etc.

Syllabus section 11 - Economics and Planning: *The candidate must show a clear grasp of the economic principles on which forest investment is based and its relationship to management planning in forestry. Candidates should be able to:*

1. Explain the economic principles on which forest investment is based, in particular the following: a) supply and demand curves; b) the reasons for compounding and discounting of investment costs and revenues; c) the concept of opportunity cost.
2. Use the techniques of financial appraisal and explain their significance and limitations: a) net discounted revenue (discounted cash flow); b) land expectation value; c) internal rate of return; d) price size curves.
3. Explain how risk and uncertainty are allowed for in economic appraisal calculations and the value of sensitivity analysis.
4. Explain how cost benefit analysis is used and explain its benefits and limitations.
5. Explain how management objectives and policies are formulated and describe the changes which have occurred since 1945.
6. Discuss the effect of management objectives on forest management and silviculture.
7. Discuss the concepts of hierarchical, functional and territorial administrative structures and comment on their advantages and disadvantages.
8. Explain the concepts of strategic, tactical and operational planning.
9. Describe the use, benefits and limitations of management plans. Explain how forest management working plans are compiled and maintained including the formulation, implementation, modification and control of targets.

Syllabus section 12 - General Management Techniques: *As practising managers, candidates must show familiarity with current management techniques and particularly those most relevant to the forest manager. Candidates should be able to:*

1. Show an appreciation of how labour requirements, the use of machinery and changes in productivity affect forest management.
2. Discuss the need for a coherent program of training and education and methods of ensuring good industrial relations.
3. Describe the techniques and application of work and method study to forestry.
4. Explain the use of work study in machine evaluation and costing and the use of output guides and standard time tables.
5. Show an appreciation of the use of the computers in forest management. Explain the principles of spread sheets and databases.
6. Comment on the application of operational research techniques and geographic information systems to forestry.

Syllabus section 13 - Measuring the forest resource: *The forester must demonstrate a thorough knowledge and understanding of the principles and practice of forest measurement and be able to:*

1. Describe and explain the principal methods used to measure trees and crops, particularly the appropriate use of full and abbreviated tariffing and angle count sampling, and the importance of basic parameters such as top height, basal area, form and taper.
2. Describe the measurement of felled timber and its basis.
3. Discuss the measurement of felled timber by weight, its advantages and disadvantages.
4. Describe and explain the statistical basis of forest inventory design and data analysis.
5. Show an understanding of the principles and practice of remote sensing and aerial photography.
6. Describe with examples the valuation of standing crops, trees and felled timber for stated purposes.

Syllabus section 14 - Managing the forest resource: *Candidates must show a clear understanding of the principles on which the management of the forest resource is based and the techniques of forecasting and regulating yield. Particularly they should be able to:*

1. Explain the differences between stand management and forest management and their relationship.
2. Show an understanding of the concepts of the Normal Forest, sustained yield and irregular yield and their application to forest management.
3. Identify the data needed to produce a production forecast.
4. Describe and explain the process of production forecasting, the models on which it is based and the use which is made of it in planning.

Syllabus section 15 - Accounting: *Accounting systems form the basis for the control of the forest enterprise and other types of forestry business. The forester must be capable of using current business accounting techniques. Candidates should be able to:*

1. Explain the principles of accounting and the need for accounts.
2. Prepare a profit and loss account, balance sheet and projected cash flow statement. Analyse a balance sheet and profit and loss account.
3. Describe and discuss the significance of the basic elements of direct and overhead costs, marginal, variable and fixed costs.
4. Explain the meaning of budgetary control, management accounting and depreciation.
5. Describe how the cost of forest operations and forest machinery can be calculated.

Syllabus section 16 - Taxation: *Foresters must understand the implications of taxation for forest management in the private sector and have a thorough knowledge of the current legislation. Candidates should be able to:*

1. Explain the basis of Capital Taxation in the UK with particular regard to Capital Gains Tax and Inheritance Tax. Explain the special conditions for Capital Gains Tax, Capital Transfer Tax and Inheritance Tax which apply to forestry.
2. Discuss the requirement for insurance: general, employer's liability, insurance for crops against fire, wind and other accidental damage, public liability and professional indemnity.

Paper 3A: Harvesting, Marketing and Utilisation

For the third Paper, candidates have a choice between this paper 3A or an alternative Paper 3B entitled "Arboriculture and Urban Forestry". For reasons of space, Paper 3B is not included here.

Syllabus section 17 - Harvesting systems: *The candidate is expected to understand the factors affecting choice of harvesting system, display a knowledge of current systems and techniques and be able to:*

1. Classify terrain and describe the harvesting systems and machinery which are appropriate to different terrain types.
2. Appreciate the effect of species, tree size, Windthrow Hazard Class, product mix, thinning regime and product specification on choice of harvesting system and machinery.
3. Describe the essential features of, and the advantages and disadvantages of,
a) Pole length working systems; b) Shortwood working systems, and c) Whole tree extraction.
4. Show familiarity with the tools and techniques associated with harvesting with chainsaws.
5. Describe the capabilities, outputs and limitations of harvesting machinery, including forwarders, processors, harvesters, winch systems and loaders.
6. Explain the principles of forest road planning in relation to road density, choice of route and environment constraints.
7. Outline the principles of forest road design and construction.

Syllabus section 18 - Management of harvesting operations: *Candidates must show a detailed knowledge of the operational management of harvesting operations and should be able to:*

1. Describe methods of costing mechanised operations in both public and private sector forestry with particular reference to the calculation of an hourly machine charge.
2. Understand the calculation of direct and indirect labour costs and evaluate the use of direct labour or contractors in harvesting operations.
3. Understand the health and safety implications of harvesting operations with particular reference to the statutory duties of employer and employee and the status of contract labour. Explain the status of the Forestry Safety Council Guides and the duties and powers of the Health and Safety Inspectorate.
4. Prepare, for a given set of circumstances, a detailed schedule of a harvesting operation including machine and labour requirements, timing, outputs, unit costs and overall profitability.

Syllabus section 19 - Marketing: *Candidates must show an understanding of the international framework within which marketing of British timber operates and should be fully conversant with current marketing procedure. They should be able to:*

1. Describe the structure of the British and imported timber trade, the value, volume and categories of goods traded, and the timber trade institutions. Outline the economic factors which influence the trade.
2. State past and projected supplies of British timber products relative to the total consumption.
3. Identify national and local markets for round timber and outline specifications and current prices.
4. Compare the relative merits of sale by a) negotiation, tender and auction;
b) standing, roadside or delivered, and c) volume or weight.
5. Draw up a timber sales contract for both standing and felled timber to include all necessary restrictive and protective clauses.
6. Evaluate the usefulness of sawlog grading as a marketing tool.
7. Consider possible short and longer term changes in markets and relative prices.

Syllabus section 20 - Wood structure and properties: *Candidates are required to show an understanding of the nature and properties of wood as a raw material and should be able to:*

1. Identify and describe the main temperate commercial timbers with main reference to a) Gross features - colour, grain, figure, sapwood, heartwood, knot characteristics, and b) Microscopic structure of softwoods and hardwoods.
2. Outline the main characteristics of British timber in relation to its density and strength and describe the properties which most influence these characteristics.
3. Describe the principal ways in which silviculture and stand management can affect properties.
4. Recognise biological hazards facing wood in service (fungi, insects and others) and select appropriate species and treatment to give required service life.
5. Compare the major types of wood preservatives and their method of application.
6. Outline appropriate air and kiln drying methods and schedules for British timber.
7. Describe visual and mechanical grading systems for sawn timber and appraise their value in marketing British timber.
8. Compare the properties of British grown timber with those of its main imported competitors.
9. Outline some alternative uses of wood, e.g. energy, charcoal and chemicals.

Syllabus section 21 - Forest Products Industries: *Candidates are expected to be familiar with the principles of production methods in the major wood using industries and should be able to:*

1. Describe the layout of a modern sawmill and the main processes and equipment used to convert round timber into sawn timber.
2. Outline the main factors determining sawmill size and profitability.
3. Describe the range of sawn products and residues produced by sawmills and the relative value of each.
4. Describe the production of veneers from the solid log by slicing and rotary peeling.
5. Describe the main processes used in the production of the different forms of particle and fibre board and give examples of the end uses of such material.
6. Describe the main methods of producing pulp from round timber and sate the relative merits of each. Outline the process of paper making.
7. Evaluate the usefulness of the major home grown timber species to the pulp and particle board manufacturers.
8. Evaluate the prospects for the harvesting and marketing of residues such as tops, branchwood and stumps.
9. Explain the particular problems relating to the successful establishment of major wood using industries in the UK (raw material, energy, labour, transport etc) and indicate areas for research and development relating to the establishment of new wood using industries.

APPENDIX FOUR: An example of a National Certificate Module descriptor

Statement of Standards

Unit Title **Forest Produce 1**

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SCOTVEC.

OUTCOME

1. INVESTIGATE THE MAJOR USES FOR BRITISH FOREST PRODUCE

PERFORMANCE CRITERIA

a) The description of the uses of the main commercial timber species is accurate for both sawlogs and small roundwood.
b) The identification of the major industries within Britain dependent on commercial timber species is accurate.
c) The analysis of the importance of home-grown commercial timber species to these industries is accurate.
d) The definitions of the quality requirements of these industries are accurate in terms of species, grading and specification.
e) The statements on the types of minor forest produce and the species used are accurate.

RANGE STATEMENT

The range for this outcome is fully expressed within the performance criteria.

EVIDENCE REQUIREMENTS

Written and/or oral evidence of the candidate's ability to produce the descriptions, identifications, analysis and definitions detailed in Performance Criteria a) to d) for eight commercial timber species.

Written and/or oral evidence of the candidate's ability to state three types of minor forest produce used in Britain and two species used for each purpose.

2. DETERMINE THE QUALITY AND QUANTITY OF LOGS

PERFORMANCE CRITERIA

a) The identification of sawlogs is accurate in terms of species, grade and potential use.
b) The identification of the quality of small roundwood is accurate as regards presentation and compliance with the specification.
c) The identification of degrade in logs is accurate as regards causal agent and effect.
d) The statements on the ways in which degrade can be controlled are accurate and appropriate to the species and the causal factor.

e) The calculations of the volumes and weights of felled timber are accurate and in accord with industry practice.

RANGE STATEMENT

The range for this outcome is fully expressed within the Performance Criteria.

EVIDENCE REQUIREMENTS

Written and/or oral evidence of the candidate's ability to identify six sawlogs, four samples of small roundwood and four signs of degrade in logs.
Written and/or oral evidence of the candidate's ability to state the ways in which degrade can be controlled.
Written and/or oral evidence of the candidate's ability to calculate the volumes of three conifer (whole tree length) poles, three conifer sawlogs and three hardwood logs, and to calculate the weight of one stack of conifer sawlogs.

ASSESSMENT RECORDS

In order to achieve this unit, candidates are required to present sufficient evidence that they have met all the performance criteria for each outcome within the range specified. Details of these requirements are given for each outcome. The assessment instruments used should follow the general guidance offered by the SCOTVEC assessment model and a integrative approach to assessment is encouraged.

Accurate records should be made of assessment instruments used showing how evidence is generated for each outcome and giving marking schemes and/or checklists etc. Records of candidates achievements should be kept. These records will be available for external verification.

SUPPORT NOTES: This part of the unit is offered as guidance. None of the sections of the support notes is mandatory.

NOTIONAL DESIGN LENGTH: SCOTVEC allocates a notional design length to a unit on the basis of time estimated for achievement of the stated standards by a candidate whose starting point is as described in the access statement. The notional design length for this unit is 40 hours. The use of notional design length for program design and timetabling is advisory only.

PURPOSE: This module is designed to give candidates within the land based sector knowledge and understanding of the uses for home grown timber and other forest produce, and the ability to recognise the species and quality of sawlogs.

The summary statement for this unit is as follows: On completion of this module, the candidate will be able to appreciate the major uses of British forest produce and be able to determine the quality and quantity of sawlogs.

CONTENT/CONTEXT: Corresponding to Outcomes 1 and 2

1. Species to be covered include Sitka and Norway Spruce, Scots Pine, European and Japanese Larch (and Hybrid Larch), Douglas Fir, Western Hemlock, Western Red Cedar, Oak, Beech, Ash, Sycamore, Birch and Poplar.

Industries (and potential end use) include:
Sawmills: hardwood;
conifer - construction and pallet.
Veneer mills: Plywood etc.
Pulp mills: Newsprint, Coated Paper; Cardboard, Toilet tissues.
Board mills Chipboard; Oriented Strand Board; Fibreboard; Hardboard.
Telegraph (and others) pole producers.
Residues: Bark (horticulture and amenity); Chips (Chipboard mills); Sawdust .

Minor forest produce includes firewood, foliage, Christmas trees.

2. Grading for conifers refers to the red and green grades now adopted by the Forestry Commission. Other specifications and gradings are as stated by individual industries. Presentation refers to the quality of the individual pieces as well as to the way the cutter lays out the parcels.

Degrade includes fungal attack, insect attack, site related damage such as shake, mechanical and man-made damage.

Log measurement to be in accordance with Forestry Commission Booklet No. 39.

APPROACHES TO GENERATING EVIDENCE: Candidates will need to study a wide range of material both in the laboratory and in the forest. They should make visits to end users to understand their requirements. Practice will need to be given in log measurement.

ASSESSMENT PROCEDURES: Centres may use the instrument of assessment which is considered by tutors/trainers to be the most appropriate. Examples of instruments of assessment which could be used are as follows:

1. The candidate could be set an assignment from which they produce a report covering Performance Criteria b) to d), in which they identify the major industries, analyse the importance of home grown timber to these industries and define their timber requirements for at least five industries.

The candidate could be set eight questions for Performance Criterion a) on the uses of the sawlogs and the small roundwood from eight commercial timber species.

The candidate could be set three restricted response questions for performance Criterion e) on the types of minor forest produce and the species used.

Satisfactory achievement of this outcome will be based on the candidate producing a satisfactory report covering a minimum of five industries for Performance Criteria b) to d); producing six correct responses for Performance Criterion a) and producing two correct responses for Performance Criterion e).

2. The candidate could be set eight short answer questions for performance Criterion a) on the identification of sawlogs; the candidate could be set six short answer questions for Performance Criterion b) on the identification of small roundwood; and the candidate could be set six short answer questions for Performance Criterion c) on the identification of degrade in logs.

The candidate could be set a restricted response question for Performance Criterion d) in which he/she states the way degrade could be controlled.

The candidate could be set an assignment for Performance Criterion e), during which he/she takes the necessary measurements and calculated the required volumes and weights.

Satisfactory achievement of this outcome will be based on the candidate producing six correct answers for Performance Criterion a), four correct answers for each of Performance Criterion b) and c), a correct response for Performance Criterion d) and on Performance Criterion e) being met.

PROGRESSION: This unit could continue to the level III general SVQ land based Industries qualification. Satisfactory completion of this unit could lead into HN units dealing with the wood using industries.

RECOGNITION: Many SCOTVEC HN units are recognised for entry/recruitment purposes. For up to date information, see the SCOTVEC guide *"Recognised and Recommended Groupings"*.

REFERENCES:

1. Guidelines for Module Writers.
2. SCOTVEC's National Standards for Assessment and Verification.
3. For a fuller discussion on assessment issues, please refer to SCOTVEC's guide to Assessment.

In addition, reference could be made to the following publications:

4. *"The classification and presentation of softwood sawlogs"*, Forestry Commission field book No. 9, 1990.
5. *"Forest Mensuration Handbook"*, Forestry Commission Handbook No. 39, 1985.
6. *"Timber Measurement"*, Forestry Commission Booklet No. 49, 1992.

APPENDIX FIVE: An example of a forestry competency standard

The unit *"Extract wood production by forwarder"* consists of three elements:
1. Load forwarder;
2. Extract timber by forwarder, and
3. Unload forwarder. This unit was prepared by FASTCO in March 1995.

The Element "Load Forwarder" is presented here as an example.

Unit C3.1 Extract wood products by forwarder

Element C3.1.1 Load Forwarder

Performance criteria

1. All hazards are identified and appropriate action is taken.
2. The forwarder is positioned and loaded efficiently and effectively.
3. Damage to the remaining crop is within acceptable limits.
4. Machinery and equipment is maintained as per manufacturers' recommendations.
5. Accurate and up to date records are kept as required by legislation and the organisation.
6. The health, safety and well being of self and others is safeguarded and maintained.
7. The security of plant and equipment is maintained.
8. Specified legislative and organisational environmental and conservation requirements are met.
9. Appropriate action is taken when unexpected circumstances arise.

Range

Type of harvesting operation: clear fell, thinning, windblow.
Loading forwarder with small roundwood; logs.

Performance evidence

Positioning and loading forwarder on a number of occasions.
Loading forwarder to the optimum capability of the machine in the circumstances at the time of assessment.
The use of crane and headboard to flush produce.
Performance evidence as for that required for the relevant machinery Certificates of Competence.

Underpinning knowledge

Knowledge of hazard identification risk assessment training requirement, requisite safety guides and monitoring procedures.
Capabilities and limitations of the forwarder used by the operator.
Operator daily and weekly maintenance of the forwarder used.
Identification of terrain features relevant to loading forwarders.
The implication of terrain classification for loading the forwarder.

Slope limitations on the forwarder loading operation.
The maximum safe working load of the loader.
The implications of maximum length on the forwarder loading operation.
When produce should and should not be selected into product categories during loading.
Driving of forwarder.
Species identification.
Product specification.
Safety procedures for loading the forwarder, including overhead cables.
Legislative and organisational environmental and conservation requirements including water guidelines, the prevention of ground compaction and ground rutting, the use and transport of slump treatment materials.
Contingency plans for oil and petrol spillage.
Recognition of specified load profiles.

Assessment guidance

The performance evidence should be gathered by direct or indirect work based assessment, supplemented as described above.
Supplementary evidence may be provided by written or oral questioning.
This unit may be assessed on flat or sloping ground, and using any forest forwarding machine; the operator's Certificates of Competence will provide detail of the machine used.
The operator should demonstrate relevant decision making as to the loading of different products, and also the maintenance of the balance of the load to enhance or maintain the stability of the forwarder.
Operator maintenance includes machine pre-start checks.
Safety also includes the adequate provision of warning signs.
The correct load profile should be maintained during the operation.

Notes for trainers

Safe loading methods to be used at all times.
The carrying capacity of the machine must not be exceeded.
The machine should be positioned in relation to the stack, to maximise efficiency of loading.
The headboard should be in the relevant position for the produce carried, to maintain stability.