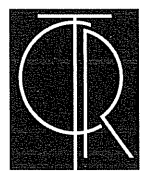
# ANCIENT TEXTILES

## Production, Craft and Society

*Proceedings of the First International Conference on Ancient Textiles, held at Lund, Sweden, and Copenhagen, Denmark, on March 19–23, 2003*

edited by

*Carole Gillis and Marie-Louise B. Nosch*



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# Introduction

## *by Carole Gillis and Marie-Louise B. Nosch*

### *The Background*

In past societies, textiles played a very important part in many spheres: social, economic, technological and aesthetic. An understanding of textiles and its role in older cultures is important not only for everyone interested in the past but also as a link in the chain from past to present. Textiles served – and still serve – various functions of a practical and symbolic nature. They have left quite diverse remains for modern researchers to find and attempt to weave together.

If one compares modern textile research in Southern Europe with that in Northern Europe, it is clear that there are two quite different traditions. In Southern Europe, the historical-philological tradition has had a major role as finds of ancient textiles are rare in the extreme but a wide range of written sources and well preserved contexts has permitted studies of the textile craft. These include its place in the various societies and the social position (or lack of) of the textile craftsmen and craftswomen. Pictorial sources such as vase painting and frescoes have provided evidence of fashion, production methods and tools, and art-historical considerations. Archaeological finds include finds like spindle-whorls and loom-weights

In Northern Europe, on the other hand, there is an abundance of preserved textiles, clothing, and related objects, but little written or iconographic evidence. Thus, the textiles themselves have been the focus of study, providing the basis for a large fund of knowledge about different textile techniques, materials and costume. Scientific analyses have also added to the fund of knowledge. Furthermore there is a 30-year tradition of experimental archaeology in textile production.

The realization of the differences in approach and of the mutual benefits gained through the exchange of experience and knowledge led to a truly international and interdisciplinary collaboration between two prehistoric archaeologists, Eva Andersson (Lund University, Department of Archaeology and Ancient History, Sweden) and Ulla Mannering (University of Copenhagen, Department of Archaeology and Ethnology, Denmark), two classical archaeologists, Brendan Burke (University of Victoria, Department of Greek and Roman Studies, Canada) and Carole Gillis (Lund University, Department of Archaeology and Ancient History, Sweden), and one historian, Marie-Louise Nosch (University of Copenhagen, The Saxo Institute, Department of History, Denmark).

Together they formed the research group *Ancient Textiles* in 2000, aimed at breaching the gaps. This collaboration led to a conference presentation and publication.[1]

Realizing how fruitful this first collaboration was, they wanted to continue such cooperation and dialogues on a larger scale. Dialogue is especially necessary in this area because very few textile specialists are trained exclusively in textile studies. On the contrary, most of us come to textile research via various disciplines: archaeology, history, epigraphy, conservation, art history, and ethnology. The cross-disciplinary exchange between all these traditions was a major issue. Second, the gap between the North European research, with its studies of textiles and tools, and the South European research, with its historical, pictorial and epigraphic approach, has been a clear problem in the field. Third, the conservators, the craftsmen, and the archaeologists all have different frames of reference. There is a definite need for these groups of people, all dealing with textiles but through their own disciplines, to create a common ground for discussion. Thus, the idea of an international conference was conceived.

The international conference *Ancient Textiles. Production, Crafts and Society* took place in Sweden and Denmark in March 2003. Generous funding was received from the European Science Foundation, the Elisabeth Munksgaards Foundation, Denmark, the Institute of Aegean Prehistory, USA, the Department of Archaeology and Ancient History, Lund University, Sweden, The Humanistic Research Council, Denmark, and The Swedish Research Council, that enabled 52 textile specialists from 18 different countries to attend the conference.

The conference was the first of its type, and as a builder of bridges it was a great success. It enabled different categories of people involved in textiles to meet, talk and learn from each other, often for the first time. People studying textiles and their contexts experienced spinning and weaving first hand, while textile craftsmen learned more about the contexts of their craft in ancient societies.

## *The Publication*

This conference volume contains a variety of individual and specialized areas, which reflects the current state of textile studies. But even more importantly, the volume synthesizes the larger issues and understandings which emerged during the course of the conference. Our combined expertise as textile researchers, scholars and craftsmen, with related interests from different disciplines and areas covering a wide range of time periods, geographical focal points, approaches and social structures, created and increased an understanding of textiles in a regional and global perspective.

In keeping with our interdisciplinary aims, the emphasis was not on specific geographical areas or fixed chronological frames. Instead, the articles in this volume are divided into four major thematic areas:

* *Methods and Background Studies*
* *Production and Organization*
* *Craft and Technology*
* *Society*

The volume starts with a triple introduction presenting the theoretical, historical, and practical frame of textiles studies. The three first authors, Wild, Bender Jørgensen

and Ciszuk, combine the various aspects in textile studies as they all have practical and academic experience of excavations, textile technology, and application. In addition, all three understand and have worked with North and South European scientific traditions and methods.

In the second section, *Production and Organization*, the articles are presented in a somewhat chronological – although not geographical – order. Despite the time span of more than four thousand years, from Ebla in present-day Syria at ca. 2400 BC to 17th-century AD Germany, major themes emerge in this section: the first and most evident is the similarities in the textile tools. Spindle-whorls and loom-weights are standardized implements in Mediterranean cities as well as in Viking Age settlements. This is seen especially in the papers by Andersson, Peyronel, Trinkl, Kirjavainen, Militello and Burke.

The second theme in this section is the complexity of textile production and organization, from workshop to industrial production, regardless of the place or period. This is evidenced through archaeological sources and discussed by Alberti, Burke, Militello, Gleba, Shamir, and through written evidence, as seen in the contributions by Rougemont, Tidow & Jordan-Fahrbach, Killen, and Hughes.

The third section is termed *Craft and Technology*. It concerns the product of the primary producer, the craftsman, and the actions and interpretations of the secondary receiver, the modern archaeologist or conservator. Again, we have two emerging themes, both concerning the application of techniques and specialization: the one deals with the concrete archaeological material, the other with scientific applications in the laboratory. The introductory article by Ræder Knudsen is a combination of both these aspects in which she takes up the ancient textile techniques as well as modern scientific methods for understanding them, as in the article by Mumford, Taylor & Prosser. Some articles are more concerned with aspects of production, such as that of Waetzoldt about the manufacture of strings, ropes, and related objects, and Möller-Wiering's, about sails. Trnka and Firth take up techniques in Aegean Bronze Age textiles, while Cortopassi, Tsourinaki, and Nikoleishvili & Akhvlediani all present technical analyses of tunics. Spantidaki & Moulherat's and Unruh's articles concentrate more on laboratory work on ancient textiles.

Textiles are important not only by themselves but also as fourth section, entitled *Society*, written by Barber. The symbolic significance of dress, patterns, and textile manufacture is discussed in the articles by Barber, Betancourt, Wincott Heckett, Anaya, Larsson Lovén, Good, Hedeager Krag and Cottica, all of whom place the symbolism and production of textile in a social and political context. Tzachili looks at Bronze Age textile producers as members of a 'guild' and analyzes the socio-economic and political implications while Pautasso looks at female dress found in scenes painted onto the shoulder and chest parts of stone statues in Hellenistic times.

A common thread running throughout the volume is the communality and universality of textiles and textile production. Furthermore, links can be drawn between some articles: at the conference, many of the authors made good use of new contacts with others working in related areas, as can be seen in the articles here on sails in Mesopotamian written documents (Waetzoldt) and in Scandinavian Viking Age archaeology and iconography (Möller-Wiering). Möller-Wiering in turn also includes information on Aegean sails from the contribution by Burke.

A new approach to textiles and textile study was introduced at the *Ancient Textiles* conference: the interaction between academics and craftsmen. This theme is eloquently expressed by Ciszuk. The obvious importance of this connection is seen by the many references to his work and his article. Many craftspeople contributed their time and expertise at the conference, showing the scholars the practical side of textile craftsmanship: carding, spinning, setting up a loom, using different loom-weights and thread thicknesses in weaving, and much more. Martin Ciszuk, Anne Højrup Batzer, Lis Dokkedal, Lena Hammarlund, Anna Nørgaard, and Lise Ræder Knudsen gave generously of their knowledge and skills.

Another important contribution of this volume is the heightening of our awareness of the needs in this multi-faceted area. For example, archaeologists and excavation directors need to budget funding for conservation and storage of textiles. The differences between field conservation, museum conservation, and museum use are sometimes quite large. Advances in the areas of textile conservation, analysis and storage/exhibition provide new sources of information to archaeologists, historians, and other scholars, and have developed the whole area of textile research. In answer to an obvious need, some of the participants of the conference, conservators and fiber analysts, wrote a manual for dealing with textile finds in the field and afterwards (Jones *et al.*). This manual has been combined with an article on digital camera use (Bruselius Scharff). It is included at the end of this volume as an appendix, but can also be acquired separately through Oxbow Books, and will hopefully become an integral part of all excavation equipment and all archaeological training.

This publication has received generous support from the Institute of Aegean Prehistory, USA, the Humanistic Research Council, Denmark, Queen Margrethe's and Prince Henrik's Foundation, Denmark. In addition there are many people who have helped in various ways: our thanks to Evelyn Kim and Carole Gillis for correcting the English, Ulla Mannering and Bengt Pettersson for the logo of the conference, the Saxo Institute, University of Copenhagen, for their support, Peder Dam for drawing most of the maps, Annette Borrell and Cherine Munkholt for assistance in many ways and Oxbow Books for all their help.

It is our hope that the Ancient Textiles conference and these proceedings have provided a foundation for all future research in the history of textiles. Through this monograph, we hope to have influenced the direction of future textile research by combining the specific methods and traditions of all disciplines involving textiles.

Carole Gillis & Marie-Louise B. Nosch, editors
Copenhagen and Lund, December 2005

## *Note*

1 E. Andersson & M.-L. Nosch, "With a Little Help from my Friends : Investigation Mycenaean Textiles with the help from Scandinavian Experimental Archaeology", in *METRON. Measuring the Aegean Bronze Age. Proceedings of the 9th International Aegean Conference / 9e Rencontre égéenne internationale, Yale University, 18–21 April 2002, edited by Karen Polinger Foster and Robert Laffineur*, Aegaeum 24 (2003), 197–205 and table XLV.

# 9 Washing and Dyeing Installations of the Ancient Mediterranean: towards a Definition from Roman Times back to Minoan Crete

*by Maria Emanuela Alberti*

*The present research aims at investigating the techniques and industrial equipment used during the washing and dyeing of textile fibers and textile products and, at the same time, concentrating upon the problem of recognizing a viable archaeological work space. An interpretation grid is proposed on the basis of the most generally acknowledged evidence (different Mediterranean sites from the Late Bronze Age to the Roman period), and then applied to the less known Minoan evidence.*

## *Introduction*

Until now, the aspects of textile production which have received most attention are the spinning and weaving operations, with their iconographic, stylistic, commercial, cultural and administrative implications. Other working phases, such as dyeing, washing, carding and combing, are less known. Some studies have been executed using Iron Age, Classical, Hellenistic and Roman Mediterranean evidence, but the situation for more ancient periods, and especially for the Bronze Age Aegean, remains unclear. The present research aims to investigate useful techniques and industrial equipment for such periods and, at the same time, to concentrate upon the problem of recognizing a viable archaeological work area.

## *Definition of a Working Area and Main Characteristics of Washing and Dyeing Installations*

How might a working area be defined? Many studies have been written on this subject,[1] without finding a unique, simple answer. Whilst architectural features provide no good or unequivocal criteria for recognizing a working area, the presence of many other elements can be considered as a more reliable indicator: built-in facilities, raw materials, tools, debris, scraps, incomplete products, and finished products (if not in store/hoard). The tool kit ought to include any associated pottery, especially coarse-ware (cooking pots, basins, storage jars, *pithoi*). But 'none of the individual categories of objects will, of themselves, act as an infallible indicator. Combination improves the chances, but even this may leave one well short of appreciating what exactly happened where'.[2] Other useful insights could be provided by the techniques of contemporary traditional workers, and by the evidence of commonly accepted ancient workshops, '[...] thus presenting a realistic picture of what can be expected and what actually does survive'.[3] Plucking/shearing, washing, carding, and dyeing are unfortunately crafts whose implements could be largely or wholly perishable or simply mistaken for something else. Through the comparison with traditional and ancient techniques it is possible to outline

the different working steps with their own tools.[4] In these pages, only the evidence related to probable washing and dyeing facilities will be discussed.

The archaeological indicators for washing and/or dyeing workshops have already been outlined.[5] We find in the list all the washing equipment (water supply, basins, vats, drains, a way of heating, drying areas), and the tools to prepare the dye-stuffs (pounders-grinders, etc.), plus a means of salvaging excess dye. The type, the structure and the dimension of each area all depend on the scale of the ancient operations. In any case, however, it is not possible to exclude the possibility that such spaces were multi-purpose.

In order to examine the archaeological evidence, and to be able to interpret the differences occurring between the different contexts, the associated materials can be divided into several categories:

1 Dye-stuffs
2 Features for salvaging the excess dye
3 Other chemical substances: mordants, detergents, not specified, other
} Best indicators

4 Working equipment for the treatment of liquids, substantially multi-purpose
5 Other textile activities evidence, e.g., spinning and weaving tools
} Probably domestic

## *Towards a Model: Analyzing the Best-known Ancient Washing and Dyeing Contexts*

Many ancient Mediterranean sites are generally accepted as probable, if not sure, examples of textile fiber processing structures. They date almost all to the 1st millennium BC, but there are also some cases dating to the late 2nd millennium BC. Their evidence is analyzed here in Fig. 9.1, using the criteria stated above. In this way, their characteristics are outlined and organized according to an interpretation grid, which could constitute a first 'model' for use on lesser known archaeological contexts. The sites can be therefore tentatively grouped as follows:

*Group A – Sites with dye-stuffs and equipment for large-scale treatment of liquids.*
Dating to the Roman period, they are specialized workshops (*officinae tinctoriae*): Pompeii, *offectoria* VII.ii.11 (Italy, 1st century AD); Barcelona (Spain, 2nd century BC); Athribis (Egypt, Roman period). To this group should perhaps be added the more ancient site of Nir David (Israel, 10th century BC), where dyeing was probably not the only activity carried out.

*Group B – Sites with important equipment for large-scale treatment of liquids and, in most cases, with mordants and detergents.*
They could be intended as fulleries or even dye-workshops (see the particular vats adapted

*Fig. 9.1: Non-Bronze Age Aegean Ancient sites.*

| | | A | | | | B | | | | C | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *Pompeii offect.* | *Barcelona* | *Athribis* | *Nir David ?* | *Mirsim* | *Rachi* | *Korsiai* | *Pompeii full.* | *Enkomi* | *Lato* | *Pompeii lanifr.* |
| 1 | dye-stuffs | x | x | x | ? | | ? | | | | ? | |
| 2 | excess dye salvaging | | | | | x | | ? | | | | |
| 3 | mordants – detergents | | x | | | x | x | | x | | | |
| | other chemical substances | | x | | | | | | | | | |
| 4 | pounders-grinders, etc. | | | | | | x | | | | x | |
| | drying areas | x | x | | | | x | x | | | | x |
| | large vases (cooking pots, basins, chauldrons) | x | | | x | x | x | | | x | x | x |
| | vats and drains | | x | x | | x | x | x | x | x | x | x |
| | paved or plastered surfaces | | x | x | x | x | x | x | | x | x | |
| | cisterns, pits, wells | x | | x | | ? | x | x | x | | x | |
| | workbenches | | x | x | | x | | x | x | | | x |
| | heating | x | | | x | | | | | x | | x |
| 5 | Loom-weights, spindle-whorls | | | | x | x | x | x | | ? | | |

to recover the excess dye at Tell Beit Mirsim). A Roman *fullonica* is – not surprisingly – included in this group as well. The more ancient examples, however, should be regarded as multi-purpose working areas.[6] The sites of this group are as follows: Tell Beit Mirsim (Israel, 8th –7th centuries BC); Rachi (Isthmia, Corinth, Greece, 4th–3rd centuries BC); Khorsiai (Khostia, Greece, Hellenistic period); Pompeii, *fullonica* VI.viii.20–22 (Italy, 1st century AD).

*Group C – Sites with medium- or small-scale equipment for treatment of liquids, without any indication of dye-stuffs or mordants.*
They are very probably multi-purpose working areas, for various kinds of processing activities on a domestic or light working level. Washing, dyeing, fulling can obviously be contemplated – and indeed the general pattern is almost the same for a Roman *lanifricaria* (identified mainly on a epigraphical basis). The common domestic association with spindle-whorls and loom-weights does not point to a real textile specialization. The sites of this group are as follows: Enkomi, Area III, room 32 b, Level III A (Cyprus, 13th century BC); Lato (Crete, Greece, 5th–2nd centuries BC); Pompeii, *lanifricaria* VII.xii.17 (Italy, 1st century AD).

## *Exporting the Model: Looking for Washing and Dyeing Installations on Minoan Crete*

For many areas of the ancient Mediterranean, especially for the pre- and proto-historic periods, such an analysis has not yet been carried out. For Crete, the only center that has been considered until now is the Early Minoan (EM) village of Myrtos Fournou Korifi, a good example of a washing/processing fiber area.[7] Fig. 9.2 is an attempt to apply the interpretation grid to some Minoan sites. Other suitable sites will probably be detected in the future. All of the work is conditioned strongly by the different quality and detail level of the field reports. For the moment, the sites can be tentatively grouped as follows:

*Group A – Specialized sites with dye-stuffs and equipment for large-scale treatment of liquids.*
Not found at Minoan sites.

*Group B —Sites with important equipment for large-scale treatment of liquids and/or with evidence of chemical substances linked to textile fiber processing.*
They should probably be regarded as multi-purpose working places for various kinds of processing activities, including washing, dyeing and fulling. The latter operations are suggested from the strong evidence for other textile activities. In particular, the group can further be divided into:

*Ba – EM multi-purpose working contexts with modest scale equipment for the treatment of liquids and chemical evidence of substances probably related to textile processing.* The uncertain nature of those substances, the chronology and above all the small scale of the structures, however, speak against textile specialization. The considered contexts are two groups of rooms at the village of Myrtos-Fournou Korifi: rooms 16–17 and 58–60 (EM II).

*Bb – Medium-scale working contexts with equipment for the treatment of liquids composed of one or more rows of independent, plastered vats of medium dimensions.* The purpose of such structures is far from clear, but they seem unsuitable for wine and oil processing. Dyeing, though not demonstrable, is the only tentative solution that has been suggested. It is probable that jars and other containers were used as vats. The two considered contexts are as follows: Kato Zakros, Palace, rooms xvii–xx (LMI) and Hogarth's House J/I, room v (MMIII–LMI).

*Bc – Medium-scale working contexts with equipment for the treatment of liquids composed by a wide range of different features.* They are the best suited areas for processing liquids at a quite intensive level. The (not exclusive) connection with washing/dyeing is suggested by the strong evidence for other textile activities. The sites are: Myrtos Fournou Korifi, rooms 8–10 (EM II); Kato Zakros, Platon's House B, rooms M/N (LMI–LMIII) and Platon's House Δ, rooms Λ-Λ1 + Θ (LM III A2–B); Petras, House II (LMIB, preliminary data). To this group can perhaps be added the 'villa' at Epano Zakros (see below, group C).

*Group C — Sites with medium or small-scale equipment for treatment of liquids, without any indication of dye-stuffs or mordants.*
They are very probably multi-purpose working areas, for various kind of processing activities at the domestic or light working level. Washing, dyeing, fulling can obviously

| | | B | | | | | | | | C | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | B a | | B b | | B c | | | | | | | | | | | | | | | | |
| | | *Myrtos 16-17* | *Myrtos 58-60* | *KZ W Palace* | *KZ J v* | *Myrtos 8-10* | *KZ B PL M/N* | *KZ Pl +* | *Petras II* | *Myrtos 72-74, 81* | *HT MdB* | *KZ J xvi* | *KZ J gen* | *KZ A Hog* | *KZ E Hog* | *KZ A Pl* | *KZ court* | *KZ E Pl B* | *KZ E Pl and house* | *KZ Z Pl* | *EZ A* |
| 1 | dye-stuffs | | | | | | | | | | | | | | | | | | | | |
| 2 | excess dye salvaging | | | | | | | | | | | | | | | | | | | | |
| 3 | mordents-detergents<br>other chemical substances | ?fuller's earth | animal fats | | | | | | | | | | | | | | | | | | |
| 4 a | row of plastered vats | | | x | x | | | | | | | | | | | | | | | | |
| 4b | pounders, grinders, etc. | | x | | | x | x | x | ? | x | x | | | | | x | x | | x | | |
| | drying areas | | | x | | x | | | | | | | | | | | | | | | |
| | clay basins and collectors | x | x | ? | | x | x | x | ? | x | | ? | x | x | x | x | | x | | x | x |
| | *gournes*, vats, basins | | | | | x | | x | x | | x | x | | x | | x | x | x | | | x |
| | drains | | | x | x | x | x | x | x | | | | | | | x | | | x | | x |
| | cisterns, pits, wells | | | | | | | | | | | | | | | | | | | | |
| | workbenches | x | | | | ? | | x | x | | | x | | | | | x | x | x | x | |
| | paved or plastered surfaces | | | x | x | x | x | | x | | | x | | x | x | x | | | x | x | x |
| | heating | | | | | x | | | x | | | | | | | | x | | | | |
| | cooking pots | x | x | | | x | x | x | x | x | x | | x | | | | | | | x | ? |
| | storage jars, pithoi | x | x | | | x | x | x | x | x | x | x | x | | | | | x | x | x | X |
| | balance pans | | | | | | x | | | | | | | | | | | | | | |
| 5 | Loom-weights, spindle-whorls | | x | | | | x | x | x | x | x | | x | | | x | x | | x | x | x |

*Fig. 9.2: Bronze Age Aegean Sites (first sample).*

be contemplated. Myrtos Fournou Korifi, rooms 72–74 +81 (EM II); Haghia Triada, Complesso della Mazza di Breccia (LMIB); Kato Zakros, Hogarth's House J–I, room xvi (MMIII–LMI), Hogarth's House A (MMIII–LMIIIA), Hogarth's House E (MMIIIB–LMIA), Platon's Houses A, room Λ (mainly LMI), Platon's Court Π, Platon's House E, room B (LMIB), Platon's House E (LMIB), Platon's House Z; Epano Zakros, 'villa', room A (LMI).[8]

## *Conclusions*

From a general point of view, it seems, quite obviously, that the possibility of recognizing a working area for washing/dyeing textile fibers is directly proportional to the availability of data for chemical analysis and to the size of the installation. Actually, in the cases of small-scale industrial activities or undifferentiated equipment, only the chemical traces of dyes, mordants or detergents can point to washing or dyeing operations, as the case of Nir David shows. Without chemical data, it seems therefore very difficult to detect such a working areas in pre- and proto-historic contexts, especially in Minoan Crete, where high-specialized industrial plants seem to be lacking, and the known workspaces are generally multi-purpose. The few cases of 'serial' installations are represented by the two rows of plastered vats at Kato Zakros (see Bb), but their interpretation remains obscure. At the same time, washing tools are quite common in every domestic or working context, pointing to an everyday (not specialized) activity. Unfortunately, very few and controversial chemical data are available for Minoan contexts. During the 1st millennium BC, however, the specialization of working organization increases at every level, leading to high-specialized plants in late Classical, Hellenistic and Roman times. The division of Roman *officinae* in *tinctoriae, fullonicae* and *lanifricariae* illustrates very well this phenomenon. The diffusion of such a model in all the Roman Mediterranean and the preservation of many good examples permit us to appreciate their archaeological differentiation and to afford a more confident final interpretation.

## *Acknowledgements*

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## *Notes*

1 See especially Evely 1988; Tournavitou 1988; Kopaka-Platon 1993; Evely 2000.
2 Evely 2000, 550–551.
3 Tournavitou 1988, 459.
4 Barber 1991; Tzachili 1997.
5 See especially Barber 1991, 239–240 and Monaghan 2000.
6 Mirsim and Rachi have also been interpreted as olive presses, see Eitam 1990; Anderson-Stojanović 1994; Anderson-Stojanović 1998.
7 EM = Early Minoan (Ancient Bronze Age, c. 3700–2300 BC); MM = Middle Minoan (Middle Bronze Age, c. 2300/2200–1600 BC); LM = Late Minoan (Late Bronze Age, c. 1600–1050 BC).
8 With the completion of my Ph.D and the progress of my research, the present classification has been improved and modified in many ways.