Pharaoh's Flowers
The Botanical Treasures of Tutankhamun
Second Edition

F Nigel Hepper
Pharaoh’s Flowers
Contents

Preface vii
Acknowledgements ix
Chronological Chart of Ancient Egypt x
Map of Ancient Egypt xii
Plan of the Tomb xiii
Diagram of the Shrines and Coffins xiv

Introduction 1
The Life of Tutankhamum 1
The Discovery of Tutankhamun’s Treasures 2
The Identification of Tutankhamun’s
Plant Material 4
Archaeobotanical techniques 6
Some archaeological traps 6
Living seeds? 7

1 Flowers and Leaves 8
Finds from the Tomb 9
Stick bouquets 9
Floral garlands and collars 9
A garden scene with floral bouquets 10
Lotus and papyrus motifs 11

Plant Species 13

Mayweed Anthemis pseudocotula 13
Wild celery Apium graveolens 14
Cornflower Centaurea depressa 14
Mandrake Mandragora officinarum 15
Persea Minusops laurifolia 15
Blue lotus waterlily Nymphaea caerulea 16
White lotus waterlily Nymphaea lotus 16
Olive Olea europaea 16
Corn poppy Papaver rhoeas 16
Ox-tongue Picris aspleniodes 16
Willow Salix mucronata 17
Withania nightshade Withania somnifera 18

2 Oils, Resins and Perfumes 19
Finds from the Tomb 19
Oils 19
Resins and incense 20
Perfumes 20
Adhesives 21
Mummification materials 21

Plant Species 22

Acacia Acacia species 22
Egyptian plum Balanites aegyptiaca 23
Frankincense trees Boswellia species 23
Balm of Gilead Commiphora gileadensis 24
Myrrh Commiphora myrrha 24
Henna Lawsonia inermis 25
White lily Lilium candidum 25
Horseradish tree Moringa peregrina 25
Pine Pinus species 26
Mastic and Chios balm Pistacia species 26
Castor oil plant Ricinus communis 26
Sesame Sesamum indicum 27

3 Papyrus, Flax and other Fibrous Plants 29
Finds from the Tomb 29

Papyrus writing material 29
Pen-cases and writing outfits 30
Papyrus boats 30
Flax, linen and dyes 30
Baskets and mats 31
Sandals 31
String and ropes 32

Plant Species 32

Safflower Carthamus tinctorius 32
Papyrus sedge Cyperus papyrus 33
Halfa grass Desmostachya bipinnata 33
Imperata halfa grass *Imperata cylindrica* 33
Rush *Juncus arabcicus* 34
Flax *Linum usitatissimum* 33
Common reed *Phragmites australis* 35
Madder *Rubia tinctorum* 35
Reed-mace *Typha domingensis* 36

4 Trees and Wooden Objects 37
Finds from the Tomb 38
The golden shrines and coffins 38
Thrones, chairs and stools 38
Beds and couches 40
Caskets and boxes 40
Chariots 40
Model ships 40
Wooden bows and reed arrows 43
Throw-sticks, batons and clubs 44

Tree Species 44
Cilician fir *Abies cilicica* 44
Silver birch *Betula pendula* 45
Cedar of Lebanon *Cedrus libani* 45
Cypress *Cupressus sempervirens* 46
Ebony *Dalbergia melanoxylon* 46
Ash *Fraxinus* species 47
Levant storax *Liquidambar orientalis* 47
Valonia oak *Quercus aegilops* 48
Tamarisk *Tamarix aphylla* 48
Elm *Ulmus minor* 49

5 Food and Drink 50
Finds from the Tomb 50
Fruits, nuts and seeds 50
Honey 50

Wine and wine-jars 50
Vegetables, herbs and spices 51
Cereals 52
A model granary 53
Bread 54
An Osiris bed 54
Beer 55

Plant Species 55
Garlic *Allium sativum* 55
Chick-pea *Cicer arietinum* 55
Watermelon *Citrullus lanatus* 56
Cocculus *Cocculus birens* 56
Coriander *Coriandrum sativum* 57
Sycomore fig *Ficus sycomorus* 58
Grewia *Grewia tenax* 59
Barley *Hordeum vulgare* 59
Doum palm *Hyphaene thebaica* 59
Juniper *Juniperus* species 60
Lentil *Lens culinaris* 61
Black cumin *Nigella sativa* 61
Date palm *Phoenix dactylifera* 62
Almond *Prunus dulcis* 62
Pomegranate *Punica granatum* 62
Wild thyme *Thymbra spicata* 64
Fenugreek *Trigonella foenum-graecum* 64
Emmer wheat *Triticum dicoccum* 66
Grape vine *Vitis vinifera* 67
Christ-thorn *Ziziphus spina-christi* 68

Further Reading 69
Glossary 79
Bible References 80
Index 82
Ancient Egypt has a particular fascination, even for people who know little about its civilisation, and tales of golden treasure and weird curses only add to its mystique. Visitors to almost any of the world’s major museums can see Egyptian objects and statues inscribed with hieroglyphs or picture writing. Even the owners of these articles may be seen as they were mumified and buried thousands of years ago along with their worldly treasures in pyramids and rock-cut tombs.

Such tombs were always likely to be robbed of their treasures, so elaborate devices were made to foil thieves. Just a few graves have reached the present time intact, but most have been ransacked for valuables, leaving behind the seeds and baskets, linen and papyrus, timber and resins, that were of no value to the thieves. Egyptologists took a long time to appreciate their significance – archaeologists were more interested in the pots than their contents – although they were the reason for the pot being left there in the first place. Even Tutankhamun’s tomb was not immune from theft, but fortunately the bulk of the objects were left in place.

Tutankhamun was buried with a reed wand which, according to the inscription on it, ‘was cut with his Majesty’s own hand’. His body was garlanded with fresh flowers that, more than 3,000 years later, are still recognisable. The young king’s gilded furniture was buried with him, together with his childhood ebony chair and linen clothes, bark-encrusted bows and reed arrows, perfumes from exotic plants and a host of other items of botanical origin. This book ranges across all of these objects made from plant material. It does not attempt to be comprehensive archaeologically, but in botanical terms it looks beyond the flowers to timbers hidden by gold leaf, to dried-up ointment in alabaster jars, and to botanical motifs on chair backs or as lamps. We shall see the food and drink prepared for pharaoh, and even the gaming boards ready for eternal playing.

Readers will notice that there are allusions in the text to relevant passages of the Bible, especially the Old Testament, where Egypt is mentioned. Many more such references could be found, as Egypt played an important role in biblical history and it has had a great influence on the culture of neighbouring nations.

Each chapter consists of two parts. The first section describes the objects found – wreaths, furniture, textiles, etc. – and the second describes individual plant species and the ways in which they were used. Cross-references between the two sections are provided throughout. Drawings and photographs of the plants are fully integrated with the text. These show what the species look like as living plants as well as their appearance as dried specimens and motifs in art. The Further Reading section will enable both specialists and general readers to follow up other literature and online resources on the...
subject. The book concludes with a short glossary of botanical terms, and a list of the quotations from the Bible that are not incorporated into the main text.

Royal Botanic Gardens, Kew

Since this book was first published by the Royal Botanic Gardens, Kew, and much of it is based on Kew resources, it is appropriate that a brief history of Kew be included.

Popularly known as Kew Gardens, it extends over 121 hectares (300 acres) beside the Thames River in the London Borough of Richmond on Thames. It was founded as a private royal estate and garden in the eighteenth century by Frederick, Prince of Wales and his wife Augusta. When Frederick suddenly died in 1751 Princess Augusta continued to develop the garden with many exotic trees and other plants. When she died in 1772, her son, who had become George III, not only doubled the area by incorporating his own neighbouring garden, but appointed the famous scientist Sir Joseph Banks as the unofficial director. Banks set about running Kew on a scientific basis by sending horticultural botanists to little-known parts of the world in order to enrich Kew's living collections.

When both Banks and his patron died in 1820 these royal gardens declined. By 1838 the Treasury of the day wanted to save expense on the various royal properties, including Windsor, Hampton Court, Buckingham and Kensington palaces, as well as Kew. A working party under the chairmanship of Professor John Lindley was appointed to report on the state of royal gardens. They agreed that the situation was dire at Kew and that there was little need for its maintenance now that the palace was no longer a royal residence. But Lindley's report favoured Kew's development into a National Botanic Garden for the benefit of the colonies in the British Empire. However, this would involve much additional expense and it was only after considerable delay that Sir William Hooker, Professor of Botany at Glasgow University was appointed in 1841 as the first official Director of Kew under the Department of Woods and Forests. Large greenhouses for temperate and tropical plants were built and the general public was encouraged to visit for recreational and educational purposes.

Subsequently, Kew developed close associations with gardens in various territories, such as Singapore, Calcutta, Peradenya, Jamaica and others in Africa. Indeed, the large and increasing collection of dried specimens in the Herbarium enabled Kew botanists to prepare 'colonial floras' such as the Flora of Tropical Africa and the Flora Capensis describing all the plants then known from these areas. Today, the Herbarium collections are estimated as some seven million specimens. Many thousands of botanical books and journals are also held, together with an unrivalled collection of botanical illustrations. Close association with many of these now independent countries has continued through field work by Kew staff with scholars and researchers in those countries, and through international courses on conservation and plant techniques based at Kew.

Sir William Hooker had established in 1848 the world's first museum devoted to plants useful to people, and a resultant collection of more than 81,000 items is now housed in compactor cabinets in the Sir Joseph Banks Centre for Economic Botany, with everything listed on a database. It is here that the Tutankhamun collection is based. Like the Herbarium, these collections are closed to the public, although accessible to visiting researchers and scholars. The original museum building is now the School of Horticulture for the training of students for the Kew Diploma of Horticulture. The Plants + People exhibition in the renovated Museum No 1 at Kew displays more than 450 plant-based treasures from the collection.

In 1877 the Jodrell Laboratory – named after its donor, Thomas Jodrell Phillips-Jodrell – was opened at Kew for research on plant and fungal physiology. Much wider interests soon developed, including plant anatomy, cytology and the current research on microbiology, plant biochemistry, genetics and molecular biology.

In 1965 Kew took over from the National Trust the management of Wakehurst Place, a 700-acre estate in Sussex with a moister, cooler climate than prevails at Kew. It is now the base for the Millennium Seed Bank which houses an increasing representation of the seeds of the world's flora, and already nearly 100% of the British flora. This highlights the importance of Kew's current research and mission to inspire and deliver science-based plant conservation worldwide, enhancing the quality of life'.

* * *

Given the wide expertise of the staff of the Royal Botanic Gardens, Kew, and the historic plant collections, it is no wonder that material from the famous discovery of the tomb of Tutankhamun should have been brought to Kew for identification, as related in the following pages.
For the first and second editions I am grateful to all who have given either encouragement or expert knowledge or both: at Kew, Professor Grenville Lucas, David Field, Professor David Cutler, Dr Peter Gasson and especially Dr Mark Nesbitt; also to Gina Fullerlove and John Harris of Kew Publishing, as well as Valerie Walley and Sylvia FitzGerald for the first edition, with photographic support from Andrew McRobb and Media Resources. For editorial help I thank Daniel Kirkpatrick of KWS Publishers for the second edition and production staff of HMSO for the first. Special thanks to the Egyptologists: the late Dr David Dixon of University College, London, also Dr Nicholas Reeves and especially John Taylor and the plant anatomist Dr Caroline Cartwright at the British Museum. Dr Renate Germer’s account of Tutankhamun’s plant material was published before I had completed my draft and it was a valuable source of reference. I thank Dr J Malék, Miss Fiona Strachan and Nichola Harrington of the Griffith Institute, Oxford, for permission to reproduce Harry Burton’s photographs taken at the tomb with Howard Carter; to Lord Carnarvon and A W Saxton of Highclere for approving the biographical note on the 5th Earl; to Lady Eva Wilson for permission to use several of the splendid drawings in her book Ancient Egyptian Designs (London: British Museum); and to the late Professor Nabil El Hadidi who facilitated my attachment to the Faculty of Science, University of Cairo. I am also grateful to: Robert Harding Picture Library, the Editor of the Journal of Egyptian Archaeology, Professor E W Beals of the University of Wisconsin, Juliet Pannett and Susan Carter for providing additional illustrative material.

The botanical photographs and drawings of flowers and trees with size scales are my own, from actual specimens.

F Nigel Hepper
### Chronological Chart of Ancient Egypt

<table>
<thead>
<tr>
<th>Date</th>
<th>Egypt</th>
<th>Other Civilisations</th>
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<tbody>
<tr>
<td></td>
<td>Pre-dynastic dates are very uncertain</td>
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<tr>
<td>3100 BC</td>
<td>Union of Upper (South) and Lower (North) Egypt</td>
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<tr>
<td></td>
<td><strong>OLD KINGDOM</strong></td>
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<tr>
<td>2686–2613 BC</td>
<td>3rd Dynasty (at Memphis)</td>
<td>Troy settled</td>
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<tr>
<td>2613–2494 BC</td>
<td>4th Dynasty (Great Pyramids)</td>
<td>Middle Minoan Age in Crete</td>
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<tr>
<td>2494–2345 BC</td>
<td>5th Dynasty</td>
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<tr>
<td>2345–2181 BC</td>
<td>6th Dynasty</td>
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<tr>
<td></td>
<td><strong>First Intermediate Period</strong></td>
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<tr>
<td>2181–c.2025</td>
<td>7th–10th Dynasties</td>
<td></td>
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<tr>
<td></td>
<td><strong>MIDDLE KINGDOM</strong></td>
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<tr>
<td>c.2125–1985 BC</td>
<td>11th Dynasty (at Thebes)</td>
<td>Abraham’s journey from Ur to Egypt</td>
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<tr>
<td>1985–1773 BC</td>
<td>12th Dynasty</td>
<td>Reign of King</td>
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<td>1773–after 1650 BC</td>
<td>13th Dynasty</td>
<td>Hammurabi in Babylon</td>
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<td><strong>Second Intermediate Period</strong></td>
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<td>1648–1550 BC</td>
<td>14th–17th Dynasties (rule of Hyksos)</td>
<td>Joseph in Egypt</td>
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<td></td>
<td></td>
<td>Late Minoan Age in Crete</td>
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<tr>
<td>NEW KINGDOM</td>
<td>18th Dynasty</td>
<td>19th Dynasty</td>
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<tr>
<td>1550–1295 BC</td>
<td>18th Dynasty</td>
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<td>1550 BC</td>
<td>Ahmose I</td>
<td>Amenophis I</td>
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<td>1525 BC</td>
<td>Amenophis I</td>
<td>Amenophis II</td>
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<td>1504 BC</td>
<td>Tuthmosis I</td>
<td>Tuthmosis II</td>
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<tr>
<td>1492 BC</td>
<td>Tuthmosis I</td>
<td>Tuthmosis II</td>
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<tr>
<td>1479(–57) BC</td>
<td>Queen Hatshepsut</td>
<td>Tuthmosis III</td>
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<tr>
<td>1479(–25) BC</td>
<td>Tuthmosis III</td>
<td>Amenophis II</td>
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<td>1427 BC</td>
<td>Amenophis II</td>
<td>Tuthmosis IV</td>
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<td>Tuthmosis IV</td>
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<tr>
<td>1391 BC</td>
<td>Amenophis III</td>
<td>Amenophis IV</td>
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<td>1353 BC</td>
<td>Amenophis IV</td>
<td>Smenkhkare</td>
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<tr>
<td>1338 BC</td>
<td>Amenophis IV</td>
<td>TUTANKHAMUN</td>
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<tr>
<td>1336 BC</td>
<td>(Akhenaten)</td>
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<tr>
<td>1327 BC</td>
<td>Ay</td>
<td>Horemheb</td>
</tr>
<tr>
<td>1323 BC</td>
<td>Ay</td>
<td>Horemheb</td>
</tr>
<tr>
<td>1295–1186 BC</td>
<td>19th Dynasty</td>
<td>19th Dynasty</td>
</tr>
<tr>
<td>1186–1069 BC</td>
<td>20th Dynasty</td>
<td>(Ramessides)</td>
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18th Dynasty:
- Ahmose I
- Amenophis I (Amenhotep)
- Tuthmosis I
- Tuthmosis II
- Queen Hatshepsut
- Amenophis II
- Tuthmosis III
- Tuthmosis IV
- Amenophis III
- Amenophis IV (Akhenaten)
- Smenkhkare
- TUTANKHAMUN (Tutankhaten)

19th Dynasty:
- Ay
- Horemheb

20th Dynasty:
- (Ramessides)

Note: many dates are still approximate, especially the earlier ones and those for the Second Intermediate Period. Dates for the First Intermediate Period overlap with the Middle Kingdom. More detailed information is given for the 18th Dynasty than for the others, in order to show the pharaohs who came before and after Tutankhamun. The dates given here are based on papers by KA Kitchen in High, Middle or Low?, Gothenburg: Paul Åströms Vorlag, part 1 (1987), and part 2 (1989).
Map of Egypt, the River Nile and neighbouring lands with some of the ancient and modern place-names.
A plan of Tutankhamun's tomb. The corridor points almost exactly west. Based on The Berkeley Map of the Theban Necropolis, University of California, 1980.
Diagram of the four shrines, three coffins and sarcophagus that enclosed the body of Tutankhamun. Based on The Treasures of Tutankhamun, Beirut: Librairie du Liban, 1987.
The Life of Tutankhamun

The name Tutankhamun is known to all of us on account of the fabulous treasures found in his tomb, preserved nearly intact after 3,000 years. We know what he looked like – his face is familiar to us from its image on the golden coffins, and he and his wife Ankhesenamun are depicted on various objects found in the tomb. But who was this king, and when exactly did he reign?

In order to set Tutankhamun in the context of his times, we need to go back a generation or more before his time, to 1353 BC (roughly the middle of the 18th Dynasty), when the reigning pharaoh, Amenophis IV, changed his name to Akhenaten. He also changed the site of government from Thebes to Amarna far to the north; but more importantly he changed the official religion from a plethora of deities to the worship of Aten, the Solar Globe or Disk. This revolution understandably upset the priests at Thebes and threatened them with redundancy. The most powerful deity in Egypt, also threatened by the change, was Amun-Ra, whose cult was abolished. Osiris, the ruler of the netherworld, who was murdered, dismembered and restored to life, was also deprived of his status as the supreme god of eternal life. The exact details of the succession of rulers and the timing of their accession and decease in this troubled period are problematic for Egyptologists, but it seems that on the death of Akhenaten and the enigmatic Smenkhkare, the throne fell to the ten-year-old Tutankhamun, in 1336 BC.

Before long the young pharaoh, presumably under duress from the priests and people who wanted restoration of Amun worship, changed his name from Tutankhaten to Tutankhamun, transferred his capital from Akhetaten (Amarna) back to Thebes and that huge city was abandoned. It is interesting to note that the gardens of Amarna were a feature of the town and that it was connected by a canal to the Nile. There must have been powerful people behind the throne, in order to make such changes and set about restoring the buildings of Thebes. One such person was Ay, the father of Nefertiti; another was Horemheb, commander-in-chief of the army. When Tutankhamun died in 1327 BC at the tender age of eighteen it is significant that he was succeeded by both of them in turn. Today, Tutankhamun is notable for what was revealed in his tomb, which was discovered almost intact in 1922, more than 3,000 years later. As in life, so in death: the pharaoh was buried with his treasures, for his enjoyment of them in the afterlife,
and also with the ingredients necessary to the survival of a wealthy man – bread, wine, fruits, ointments and other materials of plant origin – as we shall see in this book.

The Discovery of Tutankhamun’s Treasures

The discovery of Tutankhamun’s tomb was no accident. It was the culmination of a prolonged search by a dedicated Egyptologist, Howard Carter, who was sponsored by his patron the 5th Earl of Carnarvon. We can trace this partnership back to 1907, some fifteen years before the great discovery was made. How was it that they joined together as archaeologists?

Lord Carnarvon was a wealthy young man who was an evangelical Christian and quietly generous to needy folk. He inherited his title at the age of twenty-three in 1890, together with the family estate at Highclere Castle in Berkshire. His love of foreign travel was acquired during an exciting sailing cruise around the world after leaving Cambridge; he was an expert shot and was an early motoring enthusiast. Reading became a lifelong interest. Following a car accident in Germany in 1901, when he barely escaped with his life, he found English winters weakened his health, so he visited Egypt in 1903. This triggered his interest in archaeology to such an extent that he was allotted a site at Thebes. As he was a completely untrained ‘digger’, the French head of the Antiquities Service, Sir Gaston Maspero, decided he could use the Theban site to gain experience, since it had already been much worked and there was little danger that he would damage it. Indeed after six weeks’ effort and expense, Lord Carnarvon’s workmen had unearthed only one notable find: a large mummified cat still in its wooden coffin. ‘This utter failure,’ he later wrote, ‘instead of disheartening me had the effect of making me keener than ever.’

Stimulated by the experience, but aware of his limitations, he recruited Howard Carter, who was already a professional Egyptologist. Carter was out of work at the time, having had to leave his post as Inspector-General of Monuments following a dispute between his watchman at Saqqara and drunken French tourists, and when Lord Carnarvon took him on, at Maspero’s suggestion, he was struggling to make ends meet as a self-employed artist at Luxor. Here was a splendid opportunity to excavate in style. From 1907–11 they worked together very productively and in 1912 published a well-produced volume, *Five Years’ Explorations at Thebes*. In the end they excavated for sixteen years, in the Delta and at Thebes, but the results were disappointingly repetitive until they turned to the royal tombs in the Valley of the Kings opposite Luxor. In 1915 Lord Carnarvon was able to take the concession left by the death of Theodore M Davis in 1914. Davis had financed his own excavations in the Valley, with his finds going to the Cairo and Metropolitan museums. In spite of the First World War, Carter remained in Egypt,
continuing to excavate the tomb of Amenophis III, although Lord Carnarvon was in England helping his wife Almina set up a hospital at Highclere Castle – as well as having surgery himself. His return to Egypt in 1919 proved inopportune owing to civil unrest, yet he was keen to see Carter’s excavations of various tombs. From time to time Davis’s workers had found evidence of Tutankhamun – a cache of pots containing material left over from the embalming and funeral of the king, and a cup inscribed with his name – but nobody knew where his tomb was situated. Most of the other pharaohs were known to be buried in the Valley so it was presumed that Tutankhamun’s tomb was also there, although Davis had considered it exhausted.

Labourers shifted mountains of debris from likely spots only to have the disappointing sight of bare stone cliffs or workmen’s homes. After five years’ activity both their patience and their money were nearly exhausted, yet Carter still persisted and he persuaded Lord Carnarvon to try one more season of digging. Despondency turned to elation when three rock-cut steps were exposed. Before long they had dug down sixteen steps to a sealed doorway. Then he cabled Lord Carnarvon, who dropped everything to sail to Egypt, while Carter had the entrance covered up pending his arrival.

The story of the breaking down of the doorway on 22 November 1922, the confirmation that it was indeed the tomb of Tutankhamun and the astonishment at its contents has often been told. A natural impulse to disclose the contents as soon as possible was suppressed in the interests of science and archaeology.

Evidence that the tomb had been entered and resealed appalled these modern discoverers, who feared that the contents might have been taken away already. So it was with apprehension that Carter pierced the wall and gazed in by the light of a candle. When asked whether he could see anything he made the now classic remark ‘Yes, wonderful things.’ This Antechamber was full of a jumble of beautiful pieces of gilded furniture and humble leafy bouquets.

A photographer, Harry Burton of the Metropolitan Museum of Art, New York, happened to be in Egypt and took photographs as the contents were revealed. Many of his original shots are included in this book.
laboratory and photographic dark-room were set up in another tomb nearby and scientific study began. The laboratory was used by A Lucas, a chemist who joined the team and later published results in his book on Ancient Egyptian materials (see Further Reading).

The study and clearance were not without problems. The world’s press and wealthy sightseers descended on the Valley of the Kings to such an extent that Carter’s work ground to a halt. A misunderstanding with the Egyptian government over the terms of the concession was another problem. The sudden death of Lord Carnarvon caused further apprehension, but the work resumed, and culminated in the discovery of the quartzite sarcophagus and golden inner coffin, and the mummy of Tutankhamun himself. Ever since, popular interest has continued, and much research has been done, resulting in thousands of publications and many films.

The Identification of Tutankhamun’s Plant Material

Over the years a wealth of plant material has accumulated from the excavation of the tombs and temples in the Valley of the Kings, and its identification has been undertaken by many botanists of various nationalities. Gradually a picture has been built up of burial customs, local and imported timbers, trade routes and ecological information about the region.

The first scientist to study the living flora of Egypt was a Swede, Petter Forsskål, who perished in 1763 during a royal Danish expedition to Egypt and the Yemen. His results were published in 1775. He was followed by the Frenchman A D Raffenau-Delile, who was the botanist with Napoleon’s expedition and published a superb description of Egypt in 1813. French interest in Egypt has continued ever since – the most notable contribution to the botany of the tombs being that of Victor Loret. The German botanist Georg Schweinfurth (1836–1925) gathered objects of agricultural and botanical interest for the Agricultural Museum which he founded in Cairo, and he sent duplicates to the Berlin-Dahlem botanical museum, where he worked on the material in his later years, publishing many papers on the subject.

However, all this was before Howard Carter’s discovery of Tutankhamun’s tomb; the botanist who was associated with that event was Professor P E Newberry, OBE, MA.

Percy Newberry was still at school in 1884 when he met Flinders Petrie at the British Museum while unpacking his boxes of excavated Ancient Egyptian objects. Petrie even allowed Newberry to draw some of these and the drawings were reproduced in Petrie’s book on the ancient Graeco-Egyptian site of Naucratis. By 1888 Newberry had nearly completed his studies at London University, and he had started to identify the plant remains of wreaths and funerary bouquets, as well as fruits and seeds discovered by Petrie in the tombs. At that time this was an unusual subject to study and he was probably the first British Egyptologist to publish on plants.

Later, Percy Newberry became Professor of Egyptology at the University of Liverpool (1906–19) and Professor of Ancient History and Archaeology at the University of Cairo (1929–33). In 1922 he was with Howard Carter during the excavation of Tutankhamun’s tomb. Much plant material was discovered there, some of which was identified by Newberry, and is kept at the Cairo Museum, with small samples at Kew. He published an account of these finds in Howard Carter’s book (see Further Reading).

Several of the timber samples had been sent to L A Boodle at Kew, who identified them by microscopical examination in the Jodrell Laboratory. He was Assistant Keeper at the time and after his retirement a few years later he was invited to continue the study of Tutankhamun’s plant material by Sir Arthur Hill, the Director of Kew, whose help had been sought by Howard Carter in May 1932. Boodle readily agreed to help for a very
small fee and sent the results to Howard Carter, fully expecting to see the published results of his labours.

Unfortunately the third volume of Carter’s book was nearly ready for publication when the Depression, followed by the Second World War, stopped preparation of the definitive works on the tomb. In any case Carter died in March 1939, leaving all his manuscripts to the Griffith Institute at Oxford. His death was followed in August 1941 by that of Boodle, who, though a shy and diffident person, nevertheless acutely regretted that his study of Tutankhamun’s plants never saw the light of day during his lifetime. Boodle was succeeded at the Jodrell Laboratory by Dr C R Metcalfe, who continued research on ancient plant material, including the Tutankhamun finds, in collaboration with Dr L Chalk of Oxford.

No account of the study of the plants of Ancient Egypt can omit Professor Vivi Täckholm (née Laurent). I first met Vivi – as all her friends knew her – as long ago as 1954, soon after I joined Kew Herbarium. Her large jovial figure rapidly engulfed her friends and acquaintances in a great bear hug and she had a toothy smile that soon developed into an infectious laugh. Although Swedish, she lived for most of her life in Cairo.

She was born on 7 January 1898 of parents who were both medical doctors. After graduating in botany at the University of Stockholm in 1921, she worked her way around the United States and then returned to Sweden as a journalist. Following her marriage to Professor Gunnar Täckholm in 1926, they both left for the newly founded Faculty of Science at what is now Cairo University, to establish a Botany Department. Gunnar died in 1933 but Vivi decided to continue their work on the flora of Egypt and the creation of a herbarium in Cairo. The first volume of her great Flora of Egypt was published in collaboration with Mohamed Drar in 1941, despite wartime difficulties. Unfortunately the Flora was so encyclopaedic in content that the four published volumes contained only the Monocotyledons and a few of the Dicotyledons. But these four are a marvellous source of reference, for they deal with ancient plant remains as well as the living flora. Her one-volume Students’ Flora of Egypt (1956, 2nd ed. 1974) is now superseded by I Boulos’s Flora of Egypt (1999–2005).

Vivi’s generosity was legendary. She gave books, sweets and scarab beetle seals to students and contacts as prizes and gifts according to the status of the receptor. I was also beneficiary of her hospitality in Cairo in 1963. Her wide knowledge of the history of ancient and modern Egypt made for a fascinating tour of the museums, mosques and churches. Of particular interest to me was the Agricultural Museum and the lesser-known parts of the Cairo Museum where Tutankhamun’s treasures are kept. Vivi’s interest in and knowledge of