A Dodo in the Ark

The Genesis of the Museum of the History of Science
in the Life of Robert T. Gunther

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In the account printed above the late Robert T. Gunther (1869-1940) describes the history of the Old Ashmolean Building from its origins in the seventeenth century to the opening of the Lewis Evans Collection on May 5, 1925. He thus provides us with an insight into his own intervention in the history of the building – for it was the historical background which infused with such passion his efforts to establish a museum of scientific instruments there. The present essay explores a different aspect of the background to this activity: Gunther's own interests and motivations, and their development during the course of his life. It is in some measure a personal view, and proceeds from the assumption that, whatever secondary strands may be implicated, it is in the mind of R. T. Gunther that the genesis of the Museum of the History of Science must be sought.[1]

Noah's Ark

Gunther's story of the Old Ashmolean begins with Noah's Ark, the original museum of natural history. Whatever the archaeologist may make of the Ark, the historian of ideas cannot dismiss it, though he will recognise that its enormous pull on the mind of western man has been inferior to the profound influence of the Garden of Eden. If Noah's Ark is the prototype of museums, Eden is the paragon which validates the prototype. In Eden, all creation was held in one benign containment, perfectly displayed and conserved; man, the custodian, simply had the job of labelling everything.

Museums are a consequence of the Fall, or rather, a consequence of the nostalgia which mortality brought. Sometimes the re-creation of Eden has seemed almost a reasonable endeavour; more often the urgent preservation of what is around in the face of imminent destruction has been the most that could be attempted. Yet all scholarship until recently saw its aim as to rediscover a body of lost wisdom, a lost unity. For the paradox of the Tree of Knowledge was that it bequeathed a *quest* for knowledge, the end of which quest, to paraphrase T. S. Eliot, is in its beginning.[2] Fallen man in his misery has felt the need to imagine every home, every place of worship, every cultivated enclosure, to be a microcosm, to encapsulate a certain redemptive understanding of creation.

No matter how intellectualised, how 'scientific', our relationship with the world becomes, this religious instinct is at its root. Gardens, museums, laboratories, no less than churches or monasteries, each represent an approach to the quest. The notion of a dichotomy between the spiritual and the material, which leads us to lose sight of this, is a recent error for men who once thought that all creation was sacred. Alchemist and historian, collector and priest, were equally motivated by the yearning for an essence once immediate to man's experience, now hidden, diluted, dispersed. Each was performing

rituals the common significance of which lay in their intention to reject the world of suffering and decay, to abolish historical time (and space), and to restore the harmony of creator and created that once had been – as Noah, by building the Ark, 'condemned the world, and became heir of the righteousness which is by faith'.[3]

But if museums, attempting to conserve something of Paradise, are *of* the Fall, they too, as Gunther points out, are subject to decay, are temporary. There were Dodos in Noah's Ark, and there was a Dodo in Tradescant's Ark. That the oldest public museum in Europe is little more than three centuries old, that it has grown into several institutions none of which retain much of the original, and that during those three centuries the Dodo has become extinct and the museum specimen of it has been reduced to a skull and a foot, does not say much for man's achievement. Or rather, it illustrates the irresistible attrition of Fallen time. And as if time were not destructive enough, man has his own nature to curse him, notwithstanding that fundamental to his humanity is the urge to see beyond and to struggle against this cursed world.

Robert T. Gunther

His pupil and friend Sir Gavin de Beer summed up Robert T. Gunther's character as that of 'a fighter'.[4] He was initiated into the struggle, into tragedy and controversy, at a tender age. His mother Roberta died ten days after his birth, and the baby was taken away to Scotland by its uncle, William C. M'Intosh. Only with difficulty was the father able to retrieve his child. In consequence, Robert was to remain out of touch with his mother's family for over thirty years.[5] During his childhood he did not even know that William, after the uncle, was one of his Christian names (Robert William Theodore), and he seldom used the extra initial. His family and close friends called him Bertie, more usual as the familiar form of his father's name, Albert. Perhaps in origin it was a way of avoiding the maternal and Scottish implications of Robert. Much later Sir Ray Lankester experimented with calling him Robert and Bobby. His sons referred to him between themselves as Hor-Hor.

The adult Robert was tall and thin, and sported a moustache. When the season allowed he would be found under a straw boater. He did not use spectacles, though his eyes often looked strained and he was unable to do prolonged work at the microscope. If at times he was nervously exhausted, his intellectual and physical energy was such that he was never known to have nothing to do or to complain of fatigue. He was, however, subject during most of his adult life to a recurring gastric and bowel disorder, which to some extent dictated his routine. This constitutional weakness had a nervous side to it as well. It responded unfavourably to trying situations such as committee meetings, not to mention the strains of family life. I am sure that A. E. Gunther, his younger son and biographer, is right in suggesting that his 'claustrophobia of association' was that commonly symptomatic of a creative personality.[6] Collaboration soon made him irritable and impatient, while aloofness became one of his most frequently remarked characteristics.

Not that Robert was ever likely to become a shy hermit, or even a closeted, bookish scholar. For one thing, his early days in Victorian London among his father's

professional circle equipped him to cope with public life, and to move at ease among a wide circle of eminent men. And the same upbringing presented him with the activities and ideas into which his creativity, if it may be so termed, was to be directed. As a young boy on holiday in Cornwall he learned of marine zoology and began collecting shells. In his later school years he and his father used to visit the beautiful country estate of T. H. Powell, who introduced him to practical chemistry, practical mechanics, photography, carpentry, and especially lathe-turning, subsequently leaving his lathe to Robert. These and similar hobbies, many of them requiring skilful and precise use of the hands, became a serious part of his scientific and historical work. At the high point in his career, when he was appointed Reader in the History of Science at Oxford in 1934, he was to acknowledge Powell's early influence upon him.[7]

As well as dexterity he retained physical agility generally, in spite of his illness, and enjoyed walking, cycling, and boating, travel at home and abroad, all aspects of what used to be called field studies, and also game shooting. He has been likened to an explorer;[8] and it was his spirit of exploration which led him not only on some adventurous expeditions abroad, but also indoors, into the dustier corners of country houses, colleges, laboratories, and museums. All these things exemplify the practical and active nature of his relationship with the world, of his own particular quest for knowledge.

It seems that his taste for mechanics and workshop practices might have drawn the young Robert to a career in engineering, had his family not been so overwhelmingly involved in medicine and natural history, and had engineering not also been regarded by them as insufficiently academic. Studying zoology at Oxford, however, he attended the courses of the great Victorian inventor the Reverend Frederick J. Jervis-Smith, who taught mechanics, instrumentation, electrical engineering, and experimental physics; he learned practical astronomy from the aged and also Reverend Professor Charles Pritchard; he found several intellectual turners to share his enthusiasm for the lathe; and he discovered historical as well as contemporary heroes – like the brilliant scientific technician Robert Hooke, and like Robert Plot, the antiquary, naturalist, and museum curator, a man who seemed to have pursued energetic and empirical enquiry unimpeded by specialisation, class snobbery, or a blinkered definition of source materials.[9]

Like the other two Roberts, Gunther's intense preoccupation with his activities tended to distance him from everyday life. Even his friends thought him 'essentially a seventeenth century antiquarian', which I feel sure he would have taken as a compliment.[10] He saw the world with a penetration unknown to most of the small-minded socialisers and college politicians by whom he was surrounded: he was, like the forebears he admired and studied, constantly aware of the 'wonders of creation', the fascinating complexity of material existence and historical change, and aware in a specific and empirical way, which compelled him to active investigation. He despised pure theorisers, 'armchair classicists', and other idle loafers, but had unexpected resources of patience for anyone who got things done. A kind of classlessness was one inevitable aspect of this. He respected the formalities and ceremonials of the University but had more relish for the

workshop life of the humble mechanic, he championed minor characters past and present and yet the great men of the day 'came at his bidding'.[11]

His aloofness, in spite of this, was not just his preoccupation but also his manner. He spoke in a clipped style, mainly in aphorisms, and had little time for lengthy talking or listening. He had even less time for pretentious subtleties. In his dealings with the world he could be blunt to the point of folly, though invariably exercising this outspokenness in writing – letters to the press, circulated flysheets, articles, the prefaces and all too often the texts of his books, and also speeches and lectures, which he delivered from written notes. He was more than willing to face his antagonists, with whom he was always calm and courteous; but to express his views with proper coherence he preferred to write them down.[12] In part the outspokenness was a rebellion against the complacency of academic Oxford, akin to his rejection of polite donnish scholarship for an uncompromising muck-and-brass approach to historical evidence.

At first this contentious element in his character and behaviour found its campaigning themes largely within science teaching and college affairs. But eventually, about two-thirds of the way through his life, his taste for engaging in polemics came to be directed to historical ideals, and to manifest a consuming instinct for preservation – a concern more important than pure scholarship, scientific or historical. It was, after all, Noah's instinct. Any failure to give priority to the care and preservation of nature, buildings, objects, books, or even information was 'vandalism' (one of his favourite words), and no corporate body or person entrusted with such things was exempt from censure.

Add to this the striving for a fair deal for his own department (once he had established it), and it all seemed like groundless 'perpetual harping' to his opponents.[13] I must admit that his writings can leave one with the impression of an obsessive, demanding, and ungrateful man, who could not even write an obituary without making it polemical. Their saving grace is that they express far-sighted and quite impersonal ambitions. His friends realised that he was fighting 'against what he considered to be injustice'; and a writer of *his* obituary excused him 'an occasional rebellious word' (!) because 'Dr. Gunther was one of the great pioneers of this University, engaged alone in founding a subject'.[14]

A Museum Childhood

The Gunther family during the early part of Robert's life consisted of his German-born father and grandmother. Trained as a physician, Albert Günther (1830-1914) was now a very distinguished and active zoologist, specialising in fish and employed at the British Museum. His late wife Roberta had been a gifted zoological painter; and his mother Louisa, whom he had followed to England in the 1850s, was a determined and intelligent woman possessing both literary and artistic talents, who took up oil painting at the age of sixty. Robert always acknowledged the primary influence on him of 'the best of fathers',[15] but that of his grandmother (who lived until 1899) must not be discounted. He resembled her in appearance; and his fondness for the copy she painted of a picture of the Dodo in the British Museum, and its preservation in the Museum of the History of Science, may hint at the nature of this influence.

The governess employed to teach the young Robert was constantly complaining of his inattentiveness, and urging that he needed the company of other children. In 1880, perhaps for this reason, his cousin Hermann Gunther (later a physician at Hampton Wick, Middlesex) was taken into the household. The two boys got on well, sharing an aquarium, nature expeditions, stamp collecting, and the *Boys Own Paper*. Shortly before this Albert Günther had married as his second wife a young lady of sixteen, and in 1882 a half-brother was born, and a few years later a sister.[16] Robert's response was scarcely favourable: he resented the presence of his father's new family, and avoided close association with them.

In 1875 his father became Keeper of Zoology at the British Museum, a post he held until retirement. They moved to the Keeper's Residence in 1878, the same year that Robert entered University College School, just a few minutes' walk away. By this time the new Natural History Museum in South Kensington was under construction, being completed in 1881, though the installation of the British Museum's natural history collections took another five years.[17] Robert thus spent his entire childhood in intimate contact with the inside workings of one of the world's great museums, and between the formative ages of nine and fourteen actually lived at the British Museum, to which the Keeper's Residence was attached.

The Museum at this period presented him with a marvellous juxtaposition of natural history and antiquities, which was clearly fundamental to his later interests and opinions. He accompanied the attendants on their rounds of duty, played hide-and-seek among the sarcophagi, got to see behind the closed doors of the museum world, and became acquainted with leading antiquaries, museum men, and naturalists. While all the time, the creation of a new museum was in the air; and his father as a scientific Keeper was engaged in the inevitable tussle with a board of non-scientific Trustees, for he too was a man whose commitments led him into controversy. There is no question that these things were Robert's dominant experience of the adult world in childhood, and that participation in museums and in natural science was as good as second nature to him. Small wonder that the crowning achievement of his own life was to be the creation of a museum, and more than that, one which integrated, or bridged the gap between, antiquarianism and science.

The actual transfer of the collections to the British Museum (Natural History) was a lesson in itself, a demonstration of the mortality, if you like, of institutions that usually seem inscrutable and timeless. Few people were in a better position to know that museums are man-made, and impermanent. The architecture must have made an impression too, being so strikingly an antithesis to the style of the British Museum itself, and conceived in a tradition thought to be appropriate to the housing of an Ark of nature. The importance of the architecture of museums, reinforced in Oxford, was to become a potent argument later; so too was the impermanence of their collections.

The museum move brought with it, in 1883, a removal of the family to a house at Kew, within a stone's throw of the Royal Botanic Gardens. Here was a further expression of

the museum-isation of nature for Robert to explore. As well as the garden and glasshouses there were the world's greatest herbarium, and the fascinating and quaint Museums of Economic Botany, showing the range of ethnographic, medical, industrial, and other products which man has made from the vegetable kingdom. Kew, like the Natural History Museum, was not only a part itself of the history of science, but a vivid illustration of the living role of history in the study of nature – continuing dependence upon past observations, type specimens, and preserved records being peculiar to the naturalists' studies. Not the least of the projects proceeding there at the time was the *Index Kewensis*, the first seriously comprehensive world list of plants, the compilation of which was an essentially historical exercise (suggested and financed by no less a figure than Darwin).[18] At Kew Robert absorbed a deeper interest in botany, horticulture, and botanic gardens, from a historical and a scientific point of view. Knowing R. T. Gunther from the context of scientific instruments or the history of Oxford science one can be unaware of the fact that he is still esteemed as one of the great (and few) historians of botany.

Genius Loci

Before coming to Oxford Robert spent a year studying biology privately under E. Ray (later Sir Ray) Lankester, who shortly afterwards became Professor of Zoology at Oxford. Lankester exercised great influence over all his pupils through his combination of talent and a notoriously quirky and disagreeable personality. In 1888 Robert came up to Magdalen College to read natural science, specialising in zoology. In Oxford he discovered the precise milieu in which his life's work was to be done, the greater part of it in the typical role of the don. He developed quickly the love of Oxford and the intense concern for its traditions and environment which were never to leave him: he fell under the influence of the '*genius loci*' to which, years later, not quite joking, he would attribute the achievements of Oxford's great men of science, as well as recognising in it the 'stimulant' to his own work.[19]

As a student (from 1888 to 1892) he was very active in University and College life. In the Michaelmas term of 1891 he was President of the Junior Scientific Club. Shortly afterwards the Club's Robert Boyle Lectures were inaugurated, their name indicating an intention to honour Oxford's scientific past while turning its lessons to the benefit of modern science. If the Lectures were Robert's idea they would represent his earliest achievement in this direction; more likely they should be taken to express the participation of the Junior Scientific Club in the intellectual outlook of the aged Sir Henry Acland. Acland's inaugural lecture contained an important, considered statement of his philosophy, including an account of his ideology in creating the University Museum in the 1850s.[20] His dream had been to see all the sciences flourish there in harmony, reconciled to the humanities and fine arts, and with religious mystery always in mind; and this continued to be his ideal. It was the same philosophy afterwards expressed by Sir William Osler.

One of the coincidences which affected Robert's response to Oxford was that he found there, on a smaller but more historic scale, the same two elements which had dominated

his environment in London – a botanic garden, and a museum of natural history. The University Museum had moreover originated by separation from a museum which originally combined natural history and antiquities (the Ashmolean); and as the earliest building of importance in the Gothic revival style it was a prototype for (among others) its counterpart at South Kensington.[21] More than a museum, however, it was the hub of a series of laboratories and the centre of the University's science teaching. The Botanic Garden in Oxford, Britain's oldest, lies adjacent to Magdalen College, whose Daubeny Laboratory was actually part of the Botanic Garden buildings. The University Museum and the Daubeny Laboratory were the two centres of Robert's studies.

It was also while a student that he began to collect early scientific books, particularly in natural history and biology. One of the first, in 1892, was a copy (John Aubrey's, no less) of Robert Plot's *The Natural History of Oxford-shire* (1677), one of the foundation stones of modern Oxford science. He also acquired the new edition of Acland's own account of the foundation of the University Museum, with contributions by John Ruskin. Both of these books emphasise the *local* nature of his developing interests, and his active fascination with the history of Oxford science dates from this time.[22] But no books capture with more mythic power the atmosphere of Victorian Oxford than those masterpieces of pre-Raphaelite literature, the Alice novels of Lewis Carroll, Robert's fondness for which reflects a shared *genius loci*.[23]

Whether he had read them as a child is not known (they were the latest children's literature of the 1870s), but he was certainly a devotee once he became part of the world from which Alice had so uniquely sprung. According to A. E. Gunther, she remained his favourite child! Speaking in 1932 at a celebration of Lewis Carroll's centenary in the presence of Mrs Hargreaves (the real Alice), Gunther recalled the rare privilege of having heard the real Carroll (the Reverend C. L. Dodgson) preach a sermon, the simplicity and poignancy of which 'gripped his audience'.[24] He scored further points with Gunther for being a science teacher (a mathematician), and even more as an accomplished photographer. It must have delighted Gunther when some of Dodgson's photographic equipment found its way to his Museum.

After taking his degree the young Gunther, encouraged by Lankester, embarked upon research into marine and freshwater *medusae*. In 1893 a Biological Scholarship took him, in Lankester's footsteps, to Italy, to pursue this work at the Stazione Zoologica's famous aquarium beside the Bay of Naples – an opening which was to lead to some of the most important developments of his life. While he was there his tutor Edward Chapman retired and obtained Gunther's appointment, in 1894, to succeed him as College Lecturer in Natural Science. The post involved moral supervision of all Magdalen's science students and directorship of the Daubeny Laboratory, and later brought him Fellowship of the College. At the time, given that opportunities for research would remain, especially in the vacations, an Oxford career modelled on Chapman's was perfect for him, and he settled into it with ease. In spite of the squabbles and frustrations attendant upon science teaching during this period, he served his College with devotion until 1920 – the equivalent of a life's career in itself.

As if this were not tribute enough to the traditions to which he was heir, Gunther was to make many other constructive gestures of his respect. As a student he had formed a close attachment to Chapman, not for being a great scholar but as a typically benign and civilised Oxford teacher.[25] After Chapman's death he organised a Memorial in the form of an essay prize, and he saw to it that his books, papers, and instruments were preserved. He campaigned ceaselessly for a better deal for science at Oxford and especially at Magdalen; he obtained an extension to the Daubeny Laboratory, and later attempted, not wholly unsuccessfully, to minimise the historical and scientific losses resulting from its closure (in 1923); and he produced, in 1904, *A History of The Daubeny Laboratory* (followed in later years by two substantial supplementary volumes).[26]

This important book was Gunther's first published work on the history of science, and in its method and contents anticipated later works, especially the famous *Early Science in Oxford* (1920-45). Like the latter, it combines historical narrative with catalogues of raw information, and is characterised by an intense (though not unhealthy) parochialism, and by an eagerness to intersperse his history with remarks on matters contemporary to himself, usually controversial. In a sense, the Daubeny Laboratory work comes out of the blue, at a time when Gunther would be thought to have been absorbed in his Italian research – except that he was never known to be absorbed in less than a lion's share of simultaneous enthusiasms. Its source materials were ready to hand; and its immediate herald, I suppose, was a paper on Magdalen's chapel porch, delivered to the Society of Antiquaries in 1902, the first product of his interest in the College's history, as well as in the history of architecture.[27]

The founder of the Daubeny Laboratory must have been one of the first heroes from Oxford's scientific history that Gunther discovered as a student. It has been said that his 'intense devotion to the memory of Prof. Charles Daubeny of Magdalen College helped to deflect his interests from the present to the past', which is true in several ways.[28] An inveterate reformer and campaigner for the extension of science teaching, Daubeny had led the movement to found the University Museum, and had also revitalised the Botanic Garden. Acland, whose ideas he influenced, was one of his pupils. All this inevitably endeared him to Gunther's spirit. In addition the scientific research which Gunther developed in Italy in the 1890s and 1900s was consciously modelled on some of Daubeny's work, which he thought of himself as continuing. He also came to see part of his ancestry as a historian of science in Daubeny's historical interests.

But of the various senses in which Gunther was Daubeny's heir, none is more significant than his sympathy with Daubeny's concern to safeguard his apparatus and specimens, which he had bequeathed along with a trust fund for the employment of a 'Curator' (J. J. Manley in Gunther's time) 'to prevent them from falling into decay'. This made the Laboratory in theory as much a museum as a working laboratory, though in practice this was ignored and the large historical collections were increasingly a liability. The situation reflected and encouraged the duality of Gunther's own interests. One of the purposes of his extension in 1902 was to make room for 'a Museum for the Daubeny apparatus', but this did not solve the problem.[29] He described the collections briefly in the 1904 history; and it was in its 1916 supplement, *The Daubeny Laboratory Register 1904-1915*, that he

first argued, if rather vaguely, for the separation of 'Museums and Laboratories', and for the cataloguing and study of surviving laboratory apparatus.[30]

His respect for Daubeny never diminished: in the late 1930s he was still and rightly fulminating against the loss of some of Daubeny's specimens; and even in the context of the Old Ashmolean, whose scientific reputation Daubeny had participated in discrediting, his judgement remained wholly favourable to his great predecessor.[31] It was from the starting point of the Daubeny Laboratory that Gunther came to perceive the unique historical significance of the Old Ashmolean Building. But long before this he had witnessed the building *become* 'Old' – for when he was a student the Ashmolean Museum still occupied it, though in the process of being shaken up by its Keeper, A. J. (later Sir Arthur) Evans, whose brilliant archaeological career Gunther followed.[32] Evans moved the Museum to its new home in 1894, the year that Gunther became a college tutor, leaving the old building redundant and discussions of its fate much in the air.

Neapolitan Charms

In 1900, just before Christmas, Robert T. Gunther was married in Naples to Amy Neville Rolfe (1868-1964), daughter of the British Consul. They had met in the spring of 1893, during his first visit to Naples under the Biological Scholarship; and their romantic friendship had proceeded as Robert extended his research interests to keep him occupied during the summers there. Miss Rolfe was an attractive and cultured young lady, who had been born and partly educated in France. Her family were what might be termed cosmopolitan Norfolk gentry, and her father, Eustace Neville Rolfe, was an old Eton friend of such persons as Lord Rosebery (Prime Minister in 1894-5). Robert, not fond of idle or gregarious society, was nevertheless quite at home among them, and glad of the Italian home-from-home. Part of his appeal to Amy and her father may have been the very contrast which his indefatigably enquiring mind presented. Living by the Bay of Naples, taking a boat out, or walking up the volcanoes, were transformed by his presence from the bored leisure of the English gentleman abroad into fascinating archaeological quests, voyages of discovery, and expeditions into the history of nature.

To Robert's intellectual life Amy brought a wider appreciation of fine culture – she loved great literature, such as Dante and the Psalms, and the visual arts, especially sculpture – together with a command of languages, a greater fluency in writing and sociable communication, and secretarial abilities including typing. He was not a born writer, and the easy style of many of his works, as well as in some measure their wit, their romanticism, and their literary allusions, owe much to Amy's influence, and to her services as proof corrector. The important elements of her character as described by A. E. Gunther were independence of mind, honesty, and a sense of duty. With her 'serenity of temperament', however, went a delicate constitution and a retiring nature. She liked Oxford's social life as little as Robert, though they both coped with it. But the climate at Oxford, particularly in summer, did not suit her, nor the environment of Folly Bridge, where they lived from 1911 in a house which rises up out of the river and has no garden. She preferred her family home at Heacham, and was happy to live a quiet life there. Inevitably perhaps, she became increasingly dissociated from her husband's intense

Oxford existence; and in the late 1920s she retired to Heacham permanently.[33] By this time much had changed: in particular, their two sons had grown up, and Robert had forged himself a new career.

One thing that did not change was the memory of the Neapolitan summers. Arriving as a marine zoologist, Gunther was soon taking photographs of the geology around the Bay. In 1895, awarded a Geographical Studentship, he turned his attentions inland to the mesmerising peak of Vesuvius. His topographical and geological study of the volcanoes of the Phlegraean Fields took him into a scientific area which had irresistible historical dimensions: the subject was essential to understanding the archaeology of the region, the history of changes in the land and coast levels, and thus in particular the archaeology of the seafront. It also expanded the work of Oxford predecessors such as Daubeny and John Phillips.[34]

The summer after his marriage Gunther began to concentrate on the study of historic land levels around and indeed in the Bay of Naples. The theme, originally geological, aptly confused the boundaries between geology, geography, oceanography, archaeology, and history, and left room for incidental studies in zoology, folklore, and so on (part of his beautiful shell collection was gathered during this work). It gave him an opportunity to engage, quite extensively, in practical surveying; the maps produced were signed 'R. T. Günther, mens.' (measured).[35] And it pioneered the subject of underwater archaeology. Although Gunther swam, the actual underwater work was mostly conducted from a small rowing boat, using a 'water-telescope' (an ingeniously simple glass-bottomed box) to obtain a clear view into shallow water, and a technique with long rods to feel the contours of less visible features.[36]

The survey of the coastline was stretched beyond the Bay of Naples, but the larger study which this was to have served was never made. However, the project included a highly concentrated investigation of the partly submerged Imperial Villa of Pausilypon, mainly conducted during the summers of 1905 and 1907 when the family stayed with Eustace Neville Rolfe at Lord Rosebery's villa, adjacent to the site. By any standards this was a superb piece of archaeological fieldwork, and the resulting book, published in 1913, a model of its kind.[37] To those who know Gunther only as a historian of science and scientific instruments, *Pausilypon* could come as a shock. In fact, it is a key work in the development of his peculiarly archaeological approach to the history of science.

Gunther often repeated a story about the incentive for *Pausilypon*, which is equally revealing about his historical method generally. One of his classical colleagues at Magdalen, engaged on research concerning the history of Rome, held the typical view that the documentation was such that nothing would be gained by going there. This stirred Gunther to prove by his own work that such an attitude was foolish: he would show the man, with *Pausilypon*, what the true meaning of 'research' was. A different story from his work on the history of botany develops the same philosophy. Visiting the home of the man who had first distinguished between the common elm and the wych elm, Gunther found a specimen of each growing in front of the house; furthermore, at that particular season only one of them was in leaf.[38] The moral is clear. Material remains

and, emphatically, *locations* should be studied as vital forms of historical evidence; relics discovered or preserved *in situ* would be all the more informative; and the historian should expose himself anyway to the atmosphere of a place, and tempt serendipity. It hardly needs to be remarked that this approach found its greatest expressions in *Early Science in Oxford* and in the rehabilitation of the Old Ashmolean.

Growing up in the British Museum, of course, does not discourage an archaeological perspective; but Gunther had also cultivated an interest in archaeology in the field. He accompanied his father on an ichthyological trip to the Channel Islands and Brittany in 1896, but because he 'didn't care much for that sort of entertainment' (fish) he went off looking at the megaliths instead.[39] The following year he had an opportunity to do some practical excavation in the Shetlands with the microscopist Edward M. Nelson, who was a keen amateur archaeologist and a pioneer in the mathematical interpretation of stone circles. In the Italian context the influence of his father-in-law is apparent: Rolfe was something of an expert on the archaeological remains of the region, especially in the Naples Museum and at Pompeii, as well as an observer of Neapolitan life and customs.[40]

A particular interest of Rolfe's was the collecting of South Italian silver amulets, lucky charms aimed mainly to protect children and animals against the Evil Eye. His friendship was cultivated by the leading authority on this subject, F. T. Elworthy, and by Henry Balfour, the first Curator of the Pitt Rivers Museum in Oxford.[41] Gunther made his own collection of amulets, most of which was purchased in 1921 by the Wellcome Historical Medical Museum. Taking his cue from a brief study by Rolfe, he produced a paper on the structure and development of the *cimaruta*, a particular form of amulet, in the journal *Folk-Lore* in 1905.[42] To my knowledge it remains one of the best studies of its kind. Although its method is not unorthodox, one is struck by a similarity between the approach here and that which would have been appropriate to a morphological study of his shells or his *medusae*. It is also clearly a precursor of his later treatment of scientific instruments, in particular his corpus of astrolabes.

Biology certainly influenced Gunther's view of history, and the anthropological connection was part of this. When Gunther arrived in Oxford as a student the Pitt Rivers Museum had just been established, and was being arranged by Henry Balfour in accordance with the principles of General Pitt Rivers, a strict advocate of anthropology as a science and of museums as a scholarly resource.[43] At this early period the collection was a department of the University Museum, and the subjects it represented were regarded as a branch of biology. Balfour was a fellow member with Gunther of the University's Biological Club, and like Gunther had been educated as a zoologist. From Pitt Rivers' foundation he created one of the great museums of the artefacts of human history, at a time when – for various reasons, not least of them the concepts of evolution and heredity – the boundaries between biology and history were promising to crumble away. That they did not is one of the reasons why Gunther's career can seem an anomaly to modern eyes.

The museum he established, too, might be said to lack what was to have been an aspect of its rationale. For the Pitt Rivers Museum suggestively unites biology and technology;

and if its theme is taken to be human ingenuity in response to the combined circumstances of mind, body, and environment, then the history of science is a branch of the same subject. To Gunther the history of science was an evolution in man's relationship with nature, motivated by his 'questioning spirit'. Scientific instruments were 'the chief means employed by civilized man to improve, and to broadcast his civilization'; and the aim of Gunther's museum of such instruments as originally conceived (about 1916) was to be 'the formation of evolutionary series in juxtaposition', as at the Pitt Rivers.[44] An enduring interest in biological anthropology is manifest in his talk to the Anthropological Section of the British Association in 1926, which hit the headlines with its suggestion that the mastery of fire (discovered, of course, in volcanoes) was what had caused a branch of the apes to evolve without bodily hair – so as not to set fire to themselves![45]

The opportunities for Gunther to continue his work in Italy diminished after Rolfe's death in 1908, and disappeared with the War, not to return. The Research Fellowship for this purpose which he held from Magdalen between 1920 and 1927 passed, apart from a visit in 1922, virtually unused. After 1923, when he was deprived of the use of rooms in the former Daubeny Laboratory and his research materials somewhat wantonly disturbed in the process, he regarded the Italian work as lost – but something which 'I had hoped to make the most important work of my life', as he was still saying bitterly in 1934.[46] Although it is true that circumstances caused the abandonment of a project in which Gunther had invested much work and which might have been moulded to produce a monograph of some importance, his insistence on laying its destruction at the doors of Magdalen College must have been at least partly an excuse for his own newfound preoccupation with the establishment of the Museum. He could hardly have done both.

At a deeper level, the truth is that his view betrays, almost as if it were a conscious metaphor, a nostalgic recollection of the heyday of his personal happiness and fulfilment. Naples and all that he found there was, as his son says, Gunther's 'first and last romantic love'. He agreed with a reviewer of *Pausilypon*, who called it 'one of the most beautiful districts on earth'.[47] For him, and for Amy too, who always recalled the summer of 1907 as the best family holiday of her life, the Garden of Eden would surely have been located beside the Bay of Naples, in the springs and summers of the 1890s and 1900s.

The Oxford Country

Gunther's lovely book *Oxford Gardens* (1912) was conceived as a revised version of Daubeny's guide to the Botanic Garden, but he expanded it to include college and other gardens, the University Parks, and even roadside trees – to ensure greater sales it is said, though one should not underestimate the value of the extra material thus recorded.[48] It was a natural progression from his book about the Daubeny Laboratory, not to mention his botanical apprenticeship at Kew. In his first year as a student he had gone plant-spotting at Mesopotamia (a region of the University Parks), and the results are included. It paved the way for his great work on *Early British Botanists and their Gardens* (1922), though as so often it was the chance discovery of source materials which would have been ignored by most people (in this case John Goodyer's books and manuscripts in

Magdalen College Library) that brought about this later 'triumph of biographical detective work'.[49]

In the same year as *Oxford Gardens* Gunther edited *The Oxford Country*, an anthology of descriptive essays by naturalists and experts on the local countryside.[50] Both guide books of a sort, well written and well illustrated, with touches of humour and a certain romanticism, they evoke something of the flavour of Gunther's life at this time. They show the style of his appreciation of natural history, from historical, sentimental, and scientific points of view; and they reflect the pre-War world of Robert and Amy and their two young sons, cycling and walking in rural Oxfordshire and Berkshire, walking beside and gliding along the Cherwell and the various strands of the Thames – scholar gipsies in the age before the motor car. Ironically, Gunther's first bicycle had been purchased from an enterprising Oxford shopkeeper named William Morris.

In 1911 he had bought number 5, Folly Bridge, a strange house ('Gunther would have found it difficult to live in an ordinary house'),[51] castellated, and embellished with cast-iron balconies and statues, perching on an eyot dividing the main stream of the Thames. This made the river more a centre of their lives, especially for the sons; while the 'life' of the river itself – its flora, its fauna, and its own behaviour, especially in flood – came to be of intense interest to Gunther. In the Thames floods he recognised the dominant force in the ecology of the Valley: he championed the river's *right* to flood, and rejoiced when man's drainage schemes proved ineffective and the spread of suburban Oxford was thereby thwarted.[52]

As a pioneer of environmental conservation in Oxford – for which he has never received due recognition – Gunther was equally outspoken in defence of country and town. The last page of *The Oxford Country*, entitled 'The End of the Oxford Country', is a graphic warning against the 'development' of Bagley Wood. Much later, even though he stood to gain from its construction, he opposed 'the new Bodleian Monster Building' for the double sin of being architecturally hideous and of entailing the demolition of the house of Sir Henry Acland.[53] His Old Ashmolean scheme arose in no small measure from his desire to preserve and restore dignity to the *building*, and it coincided with the awakening of a general interest in conservation in Oxford. Gunther followed the work of the Oxford Preservation Trust, and was a founding Committee member of the Oxford and District Footpaths, Bridlepaths and Commons Preservation Society (both founded in 1926); while nationally he was proud of his association with the Society for the Promotion of Nature Reserves. On the other hand, he refused to join the American-based History of Science Society – a laudable demonstration of priorities!

It was a financial priority as well, of course. Comfortably-off at first (a cook, a 'daily' and a 'mother's help' were employed), by the standards of Oxford society the family was not really well-to-do, and the War brought financial worries. Gunther had a reputation, especially with his sons, for meanness, though it is fairer to say that he was frugal as a matter of principle in his management of resources. The family might, however, have questioned his economies as increasingly they were directed towards financing his publications.[54] The best joke about his meanness was his elder son's expectation at

Cambridge that when his father visited him he would end up, after trying every hotel from Cambridge to Berwick, staying in Edinburgh because it was sixpence cheaper!

Amy's own inherited income was used to educate the sons at traditional public schools; while the cottage she owned at Heacham provided a second home for the vacations. Between 1904 and 1910 Robert busied himself, during several summers when not in Italy, rebuilding and extending this house, mostly with old bricks and ornamental pieces picked up from builders' yards. His taste for bricklaying was inherited from his M'Intosh grandfather, a builder of St Andrews; and from this time onwards he was never more contented than with a building trowel in his hand. Building was added to the recreations – 'travelling, turning, boating' – which he chose to announce in *Who's Who*.[55] All four found expression in his scholarly work, turning most subtly (the lathe being of great importance in the study of scientific instruments), and building most directly in studies of the history of architecture.

The most substantial product of his long interest in the architectural history of Magdalen College was *The Architecture of Sir Roger Pratt* (1928), another example of his versatile command of themes apparently far removed from those in connection with which he is better known. 'Most authors who write about architecture have never essayed building themselves', he wrote mischievously, but Pratt 'has both written and built' – as had Gunther.[56] His earlier architectural and archaeological investigation of the medieval Hospital of St John the Baptist (which had occupied part of the site of Magdalen) was a kind of home-spun *Pausilypon*.[57] It was occasioned again, like much in Gunther's historical career, pragmatically, by chance finds which set off an extended enquiry, as well as 'politically', by the desire to demonstrate how blinkered his colleagues were.

His lecture on the Hospital given to the Oxford Architectural and Historical Society at the Ashmolean Museum in 1917 was delivered, it was reported, 'in an unaffected and businesslike manner'.[58] Gunther gave numerous talks to societies, often illustrated with lantern slides. He became prominent not only in Oxford circles but in the British Association, the Royal Geographical Society, the Linnean Society, the Ray Society, and the Zoological Society. This was, of course, the normal way into print for scholarly papers, but Gunther was happy to address any type of non-academic society or group too. He also enjoyed showing people around Oxford, especially cherished sites like the Botanic Garden and, later, his own Museum in the Old Ashmolean.

In 1908, rather surprisingly, he had applied for a job which would hardly have suited him, as Keeper of Zoology at the British Museum (Natural History). It was perhaps a gesture of respect to his father, who had held the post for so many years, and to Lankester, who had just retired as Director of the Museum. But what is important is that it can be seen as evidence of an enduring interest in the museum world he had known as a child, and perhaps of an ambition to return to it professionally. Even so, everything else about Gunther's life and career in the years before the War would lead one to suppose that, for all his varied interests, he had carved out his niche and was well set to continue in it like any other Oxford don.

Friar Bacon's Study

It was also in 1908 that Oxford scientists celebrated the fiftieth 'jubilee' of the University Museum. The Vice-Chancellor who presided over the events happened to be the President of Magdalen, T. H. (later Sir Herbert) Warren, who had written the Preface to Gunther's history of the Daubeny Laboratory. His speech now endorsed the value of studying the history of Oxford science: 'A very interesting book might, and will, I hope, some day be written about it'.[59] Afterwards the chemist A. G. Vernon Harcourt gave a lecture on the history of the Museum. This, and information from Gunther's friend Professor G. C. Bourne, were the basis on which the Magdalen scientist H. M. Vernon and his wife K. Dorothea Vernon produced *A History of The Oxford Museum* (1909). It was a conscious piece of 'history of science', and helped to determine the scope of Gunther's *Early Science in Oxford*, which mostly stops short of the great changes of the mid-nineteenth century and after to which he considered the Vernons had done 'full justice'.[60]

With the move to Folly Bridge, the route of *Early Science in Oxford* was already being mapped out. From their first home in the High Street the Gunthers had looked out on to the site of the house where Boyle and Hooke had conducted their experiments in the seventeenth century. At Folly Bridge they became neighbours of the patriarch of Oxford science, Roger Bacon, supposed founder of the experimental ethos four centuries before that. Until the late eighteenth century a tower gatehouse known as Friar Bacon's Study, traditionally his astronomical observatory, had straddled the Bridge. The association was pleasing to Gunther, who, as we have seen, was never unsensitive to historic environments. He was proud to write the astronomy volume of *Early Science in Oxford* from 'a room which, more nearly than any other in the town, corresponds in situation and outlook with the Study', as he was later to introduce one of his volumes on Robert Plot 'From Dr. Plot's Study' in the Old Ashmolean.[61]

Gunther's opportunistic dependence upon anniversaries for the occasion of so much of his historical work, and of his Old Ashmolean 'publicity', stems from the impact upon him of several anniversaries at this period. After that of 1908, there was the seventh centenary of Roger Bacon in 1914 and, crucially, the tercentenary of Elias Ashmole's birth in 1917. As well as drawing him more deeply into the history of science, these occasions, along with the millennium in 1912 of the first historical reference to Oxford, to which he alluded in *The Oxford Country*, reinforced the passion of his local interests. And these, together with his experience as a naturalist, took him to scientific beginnings before Bacon: the Rollright Stones, interpreted astronomically and metrologically; St Frideswide's legendary curative use of a mineral spring at Binsey (about 700 A.D.); the accurate botanical observation attested by Frideswide's twelfth-century tomb canopy in Christ Church; and the hospitals and spiceries, contemporary with Bacon, underlying parts of the City.[62] In a sense Gunther saw as much significance in Frideswide as in Bacon – and quite rightly.

But Bacon was more useful as a hero. Gunther placed a quotation from him over the doorway of the Daubeny Laboratory. At Folly Bridge he is bound to have thought of

turning to some appropriate study, but for the first few years was fully occupied with several books he was already preparing.[63] It must also be said that Gunther's historical procedures did not always strike gold: the short sections in *Early Science in Oxford* indicate the limitations of what he had to say about Bacon. Yet it was his thoughts of Bacon in 1911-14 which were the original inspiration for such a history. The first part, on chemistry (issued in 1920), opens by claiming that but for the War it 'would have been printed in 1914, when ... a few notes on Roger Bacon came aptly as a beginning'.[64] This may be an exaggeration, but it indicates that some of the preparation of the chemistry section, which begins with Bacon and concludes (in more detail) with Daubeny, took place before the survey of specimens and instruments (begun in 1915) which was the basis of the remainder of volume I (issued afterwards) and the next two volumes, and which gave them the more distinctive identity of a *catalogue raisonné*.[65]

Gunther had no direct hand in the celebrations of Bacon's anniversary in 1914. Indeed, they were hatched at a rather higher level – sponsored by a large international committee including such dignitaries as the French scientist and philosopher Pierre Duhem, and organised in practice by Sir William Osler, Falconer Madan, Professor E. B. (later Sir Edward) Poulton, and F. A. Dixey, all friends of Gunther's and afterwards supporters of his work. Dixey kept him informed of the arrangements, which were also announced in a printed programme: a statue in the University Museum, to be unveiled as the central event of the celebration; a book of essays on Bacon by leading international experts; a publishing project for critical editions of his works; and the formation of a Roger Bacon Society.[66] Even though the War caught up with the last two items, the occasion was to prove a landmark in the development of the history of science as an academic subject in Britain.

This is not the place to start churning out an account of that development.[67] It will be useful, however, to digress somewhat in order to see Gunther in his context as a historian of science. It is clear that there was a great deal of interest in the history of science at this period, largely among scientists. The philosophically-minded, such as Duhem and George Sarton, advocated it as a unifying and humanising intellectual force upon which a 'new humanism' would rest. So, in their different way, did the 'statesmen' of science such as Osler and Sir William Ramsay. Colleagues of Osler in medicine drew on a longer tradition of interest in their own history, and provided a powerful voice in support of general developments. Yet the lowest profile was kept by those whose influence was probably the greatest – the *teachers* who thought a historical approach useful, even necessary, in teaching sciences at school and university. Many textbook histories had already been written for this market.[68]

One of them, F. P. Armitage's *A History of Chemistry* (1906), was the work of a school teacher who had been one of Gunther's very first students.[69] That Gunther infected his pupils with an interest in the history of science hardly needs to be confirmed. The three Daubeny Laboratory volumes presuppose such a background; and volume I of *Early Science in Oxford* is dedicated to his pupils. In the 1916 volume of the former he insisted upon 'Recognition of the value of the study of the History of Science' (and 'the formation of suitable collections') as a condition for the ideal university science course.

The 1924 final volume includes a summary of work that had been done in Oxford on the history of science, necessarily prominent in which was another of his own pupils, Charles Singer, the senior name associated with the establishment and professionalisation of the history of science in Britain.[70] Before reading zoology at Magdalen in the late 1890s, Singer had already discovered his historical interest in the usual way, by collecting old scientific books, and had been briefly but memorably encouraged by Ramsay. We know nothing of Gunther's influence upon him, though they remained cordially in touch. He was largely a historian of biology and medicine, but it may be relevant that he was also – unlike Sarton – a devotee of the history of technology.

Gunther remains, for all this, staunchly his own man, and difficult to place in relation to the main stream of the study of the history of science represented by Singer and Sarton. In a subject dominated by such summarisers and encyclopaedists, Gunther was a true heir to Ashmole's dictum of 'the inspection of Particulars'. More astonishingly, in an age of virtually unanimous positivism among historians, he was not a positivist. A local historian cannot be, and Gunther was, of course, notoriously parochial. His commitment to a locative, empirical, and archaeological approach was highly distinctive; though his publications drew upon and put into print a voluminous amount of documentation too. They are source-books of a classic kind, rather than textbooks; and *Early Science in Oxford* introduces itself as 'a first attempt to bring together such scattered information as is relevant to a fuller history of the progress of science'.[71] Most of his historical themes were occasioned pragmatically, and thus showed unusual variety. He did not (and I do not mean 'failed to') promulgate a philosophy to give his work coherence. He did not ally himself to any school of thought or programme. And he did not bequeath a school of followers (though I think that as Reader in the History of Science, from 1934, he would have wished to). Even at the Museum his successor, Frank Sherwood Taylor, was a pupil of Singer, and had met Gunther only the once.[72]

The extra-curricular part of the Bacon celebration in 1914 was the inauguration of an arrangement whereby, with the encouragement of Osler and the blessing of Bodley's Librarian, Falconer Madan, Singer and his wife established themselves in a bay of the Radcliffe Camera which became known as the 'Science Room'. Here for six years they and an impressive selection of occasional collaborators and guests (including, not insignificantly, the historian Joan Evans, half-sister of Lewis and Sir Arthur) worked productively on a variety of themes in the history of science, using Bodleian books and manuscripts. It is obvious in retrospect that this was an attempt to gain a foothold for the creation of a University department of the history of science. In 1920 Singer was appointed University Lecturer in the History of the Biological Sciences, the first academic post in the history of science in Oxford, and presumably in Britain. But shortly afterwards he left Oxford, reportedly disappointed at the failure to establish the subject there. According to Gunther, the new Bodley's Librarian, A. E. (later Sir Arthur) Cowley, had 'bundled him out'.[73] Back in London he had less difficulty, and the first university department of the history and philosophy of science, at University College, was soon off the ground.

The Science Room experiment went on independently of Gunther; and there are quite different reasons why his commitment, ideological and active, to the history of science developed during the same years. Nevertheless the points of contact are significant, especially in 1919, when Gunther's exhibition of instruments shared with Singer the patronage of Osler, the hospitality of the Bodleian, and honourable mention in Osler's great speech, persuasively selling the history of science to the classicists and thus to the University.[74] The retirement of Madan, and then the death of Osler at the end of 1919, were among the factors which frustrated developments. But Osler's speech and the Singer arrangement remained in Gunther's mind, and he nursed the hope of reviving the Science Room in connection with his Museum. Inevitably there will have been a negative relationship too. One can easily imagine the *Pausilypon* incentive lying behind the survey of scientific objects which Gunther embarked upon in 1915: the urge, that is, to demonstrate to Singer and the others, entombed in the Radcliffe Camera, what a wealth of 'history' lay ignored all around them.

The Oxford roots of all this historical interest in science extend beyond *A History of The Daubeny Laboratory* and the Robert Boyle Lectures into the ideology of Acland and Daubeny, and thus (coming full circle) into the intellectual traditions of the Old Ashmolean itself, where science and history had coexisted from the start. The historical awareness of the scientists of Acland's generation is attested, one might even say exaggerated, in the architecture of the University Museum, and in the statues of great scientists placed around the museum court. Acland in fact had wanted Roger Bacon to be added to the original sequence, as Gunther pointed out in a characteristic letter to the local press after the 1914 unveiling, quibbling with a suggestion that the idea was of more recent origin.[75] The Friar, incidentally, is depicted holding an armillary sphere – as if engaged in observation from his tower-study on Folly Bridge.

War

When Robert T. Gunther reached his forty-fifth birthday in August 1914 there must have seemed little likelihood of any dramatic change in the course of his life. But the War changed everything. Or what it did not change, seemed to change in time with it. Gunther's world was as profoundly disrupted by the War as if he had himself fought in it, as if Oxford had been the battlefield. Indeed, to some extent it was. Many buildings were occupied as hospitals for the war wounded; and with University and College life reduced to a minimum Gunther found himself teaching physiology in the University Museum, acting as an examiner in forestry, and undertaking in 1916-17 (in connection with the wartime needs of agriculture) an investigation into agricultural damage by game-birds and other 'vermin'.[76]

The psychological immediacy of the War cut deeper than this of course. The word 'Germans' written in chalk on the pavement in front of their house is a sufficiently eloquent expression of one aspect of the experience. The son of an Anglicised German, Gunther had grown up in an age of the closest integration between the two peoples, without any cause to feel foreign or to be ashamed of his roots. He and his father had produced a book about the history of their family, and the name of their notional Teutonic

ancestor ‘Eberhard’ had been given to his younger son (Everard). But it was during the War – in 1916 in fact – that Gunther stopped using the umlaut on his surname, to which he had adhered scrupulously until now. Several of his friends and pupils had to make more drastic changes to their names.

In spite of being at the receiving end of this virulent popular feeling against all things German, and the almost equal prejudice against men out of uniform, the War roused Gunther to instinctive feelings of patriotism which he did not hesitate to express. When, in *The Oxford Magazine* in 1916, he protested about the unnecessary felling of two veteran elm trees at Magdalen, he wanted new ones to be planted so that ‘when our heroes return it may be, so far as possible, to the Oxford they knew and loved’. And his letter on ‘Patriotic Cabbages’ the following year suggested that part of the Botanic Garden be given over to food crops.[77] Rather than interrupting his usual concerns, the War supplied a newly emotive urgency, especially to questions of conservation. His observations of nature underwent a revival, helped by the vermin survey; and in correspondence with his friend Lord Moreton, who reported on the activities of his wild neighbours, especially the toads, Gunther emerges as a keen and knowledgeable zoologist. In the same spirit was his short article describing, with diagram, an Australian swan on the river near Folly Bridge which, unfamiliar with the northern swan’s techniques for keeping warm in winter, grew an icicle on the end of its bill: it is one of the nicest of Gunther’s published minutiae, combining scientific observation with compassion and humour.[78]

But there were other kinds of writing to be done too: obituaries, messages of condolence. News came, often from parents in brave and moving letters, of the deaths of former pupils, some of them young scientists of much promise. The lives of thirty-one former Daubeny Laboratory students were lost in the War;[79] while the sons of colleagues and younger colleagues themselves did not escape. Osler was deeply affected by his son’s death, and the War’s impact was another tie when he and Gunther came to collaborate in 1919. The brilliant H. G. J. Moseley fell in 1915, and when his apparatus was acquired for the Museum of the History of Science twenty years later Gunther described it as ‘perhaps the most important single piece of apparatus that the Museum could receive’ – an assessment with which one would be hesitant to disagree.[80]

That Gunther went to teach in the University Museum during the War reminds us of the permanent changes which the War saw in the arrangements for science teaching. The situation was that colleges provided a general science tutor, and in a few cases happened to have a laboratory too; while at the University Museum (and also at the Botanic Garden and the Radcliffe Infirmary) were the University’s *central* facilities, under the Professors and with their own teaching staff. Gunther’s criticisms had not been about the adequacy of these facilities, but about the nature of the syllabus, and the opportunities for science students to come to Oxford in the first place. These were to improve without fuss. But a change less pleasing to him was the shift of the two-tier balance away from the colleges and towards the Science Area (as the University Museum complex was to become known).[81] The establishment here of the Dyson Perrins Laboratory in 1916 made the Daubeny Laboratory redundant; and even before it was finally closed the burden of

teaching had moved so much that Magdalen felt no further need for its science tutor, and Gunther was retired from his post in 1920. It was not this but the closure of the Laboratory, and its transfer to the Botany Department, which infuriated Gunther. Otherwise the end of his teaching career was peculiarly acceptable under the circumstances – for the direction of his own destiny had shifted during the War too.

Underlying it all were various personal factors. Edward Chapman, who had remained a kind of 'father confessor' in College affairs, had died in 1906, and Eustace Neville Rolfe in 1908. 1914 then opened with the death of his father, Albert Günther, in his eighty-fourth year. Latterly the sociable and tolerant elder Günther had been much admired by his daughter-in-law and enjoyed by his grandsons, and his death became part of a turning point in their family life. One suspects that both father and father-in-law had offered important common ground between Gunther and his wife and sons, as also did his much-maligned Scottish uncle Willie (who endured until 1931).

Part of the crisis was a more inevitable aspect of the family's development – the adolescence of the sons, and the demands and worries presented by their education. Rolfe, the elder, went off to boarding school in 1916, and Everard in 1917. Even before this, in 1915, the boys had discovered a new attitude to their father. I suppose they were at an age where they could see him objectively, as a person quite separate from themselves, faults and all. In particular they became aware of his aloofness, and of attitudes and mannerisms both real and imagined. This led to his becoming a figure of fun: they christened him Hor-Hor (after the manner in which he completed his aphorisms), and Rolfe made up 'Hor-Hor stories' and drew strip cartoons of them. Such humour (inherited from him) offered some compensation. But even with a sense of fun, being a Gunther was a serious business: growing up, as A. E. Gunther thought of it, was a progression from 'Being a Rolfe ... into Gunthership' – from trivial idleness into the business of doing things.[82]

Meanwhile for Gunther himself the War offered no respite from ill-health. He continued to see his doctor (a former pupil), and made frequent trips to the chemist. Liquid paraffin and prescriptions containing plenty of sodium bicarbonate or magnesium sulphate were his mainstays.[83] Shortage of certain foods early in the War disrupted his diet; and it may be that exhaustion from work added to the stresses of the time. In the spring of 1915 he was as near to physical collapse as can be recalled. He went to stay with his friend Captain E. G. Spencer Churchill, at whose Gloucestershire home farm food was available. Rather than relaxing there, however, he set about the precise identification of items that interested him in Churchill's extensive art and antiquity collections. Illness as well as war clearly contributed to the urgency of his mind.

His wife too was ill in 1915. And while the dreadful reality of the War in Europe was still sinking in, there came the new threat of its extension into the English sky. Not surprisingly, in June 1916 Gunther made a Will, which was very much the product of this uneasy period in his life. Entrusting his sons to the guardianship of his cousin Hermann Gunther arose from immediate worries about their education and future. A bequest to the Royal Geographical Society of the library relating to his Italian research reflects the

importance he still attached to this work. The specific mention of his two lathes, and of the Dodo painting by his grandmother, indicates their special place in his affections. The Will, interpreted as best it could be, being somewhat out of date, was to be proved in 1940.

For Gunther's life ended in war too. Although the University had finally agreed to his demands relating to the expansion of his Museum, and the matter was in the hands of trustworthy officials (Sir Douglas Veale and G. D. Parkes), Gunther sadly never saw the full realisation of his vision – the Old Ashmolean in its entirety as a museum of scientific instruments.[84] He died with the tragedy of war once more disrupting Oxford's life, once more threatening the survival of the historic objects whose value had stirred him at just such a moment in the First War. A quarter of a century on, the instinct which led him in the winter of 1939-40 to pack away and hide some of the Museum's exhibits was the same instinct out of which the Museum had been born – the concern which led him, in the Michaelmas term of 1915, to set about taking stock of the historic scientific objects within the University. The deep roots in his thought and experience from which this concern grew will, I hope, be apparent. The circumstances of his personal life and the crisis in the outside world, each at a watershed, provided the conditions for his response. The catalyst, as Gunther indicates in the account printed above, written at the end of his life as air-raids once more threatened, was the prospect in 1915 of the dropping of bombs upon Oxford.[85] One might be forgiven for saying that a test of faith was in the air. It was time for an Ark.

Energetic Remedies

Lewis Carroll's Dodo, seeing that the recital of dry-as-dust history was having no effect, proposed instead 'the immediate adoption of more energetic remedies', a phrase quoted by A. E. Gunther as aptly expressing his father's views.[86] So it was that Tradescant's Dodo alerted Gunther to the need for energetic remedies to the neglect, and potential extinction, of part of the material remains of history. An anonymous article in *The Field* in 1907 had pointed out that what was left of the Dodo in Oxford's University Museum amounted to the oldest surviving natural history museum specimen, a thought that may not have occurred to Gunther before.[87] What was immediately obvious was the unique significance not just of the Dodo but of all that remained of the Tradescant Collection – if any of it could be found.

This was the starting point in October 1915. Mitigating the apparent suddenness of his burst of energy was the visit to Captain Spencer Churchill, where his studies doubtless gave him an appetite for such business back in Oxford. From the Tradescant specimens in the University Museum, hardly surprisingly knowing the nature of Gunther's interests, 'the work spread to the whole of the early Scientific equipment of the University'.[88] The exact chronology of his extension from zoological specimens to scientific instruments, and of his subsequent progress around the departments and colleges, is not certain. The earliest date at which his correspondence (to my knowledge) reveals him enquiring after apparatus is mid-December 1915, when he received a very detailed and helpful letter from Professor R. B. Clifton, the founder of the Clarendon Laboratory. The letter also

reveals something we did not otherwise know about Gunther's criteria – he had asked Clifton to point out 'instruments in the collection previous to October or November 1865'; in other words, his cut-off date was fifty years before the commencement of his survey.[89]

The most exciting and unexpected discoveries were to be made in the colleges. The first was at Christ Church, where, 'in a dark cupboard ... all smothered with the dust of ages that had crystallized upon them', he found the Orrery Collection – a complete 'cabinet' of philosophical and mathematical instruments constructed around the beginning of the eighteenth century by the best makers of the day.[90] It presented a nearly comprehensive insight into the instrumentation of its time, and also into the trade of the instrument maker, which his finds increasingly drew him to study. The Orrery Collection remained for Gunther the most exciting among treasures which seemed now to tumble from every college and University cupboard, ranging from medieval astrolabes at Merton College to a torsion balance electrometer at the Radcliffe Observatory.

Systematic search was perhaps aided by the University's reduced wartime activities, and the survey went on intensively for several years. Finds were not merely catalogued, they were identified and interpreted in some detail, they were compared with relevant manuscripts and books, and they were *photographed* 'so that, if perchance a misdirected bomb should destroy the originals, there might be some record of their existence'.[91] As with the Neapolitan work, the information was accumulated in Gunther's Daubeny Laboratory rooms. The Daubeny Collection was also looked at afresh. It was an archaeological exercise in the history of science, the first of its kind, and the results were later published in the first three volumes of *Early Science in Oxford* (1920-25), a unique inventory of the material remains of science in a particular place.

Apart from the obvious intention of publishing his results, two important ideas suggested themselves: a temporary exhibition of instruments with the Orrery Collection as its nucleus; and the restoration of the Tradescant specimens to their original home on the top floor of the Old Ashmolean Building. While the latter clearly implies a permanent museum, it was in fact the needs of the instruments which first prompted such a concept. Gunther was to recall that 'the idea of a Science Museum to illustrate the progress of scientific studies in Oxford was promulgated about 1916'. In *The Daubeny Laboratory Register* of that year, as I have mentioned, he recommended 'the formation of suitable collections' to accompany 'the study of the History of Science', and followed this by implying the need for a museum which could relieve working laboratories of their historic contents.[92] His idea for 'a central Museum for Sci. Apparatus' appears fully conceived, its aims and its problems realistically discussed, in a document from about the same time, drafted as an introduction to the catalogue of his survey. The predominant motives it reveals are to ensure the preservation of the objects, and to facilitate their scholarly and didactic use.[93]

It is now that we see Gunther the scientist and Gunther the antiquary fully reconciled as Gunther the museologist – the child who, of course, had been there all along. Museums had been a fundamental influence upon his view of the world, and now with his world in

crisis a museum was the solution. It is worth remembering that the Oxford survey started with an aspect of museum history – the Tradescant specimens as relics of a *museum* of natural history. A stimulus to the study of such museums was found in the writings of Sir William Flower, first Director of *the* Natural History Museum, and in the observation made by Gunther's zoological mentor Sir Ray Lankester – though it was obvious enough from his father's career – that zoology until recently had been essentially a museum activity.[94] Hence the history of zoology and the history of museums (even more than that of botany and botanic gardens) were inseparable.

In Oxford, of course, what was generally referred to simply as 'the Museum' – the University Museum – was a science teaching complex with no historical function. Its forerunner was a building which, as Gunther increasingly realised, had itself been founded as a scientific institution, of which the Ashmolean Museum, a lecture room called the School of Natural History, and the University's first Chemical Laboratory were the main components. This was the Old Ashmolean. Having in 1916 proposed its empty top floor as the location for his exhibition of instruments, it was in May 1917 that Elias Ashmole's tercentenary provoked the more controversial suggestion of reassembling the Tradescant and Ashmole relics there, making the Old Ashmolean (so to speak) a museum of its own history.

Gunther was angry that the official commemoration of the anniversary made no mention of science, or of the old building. Ashmole had founded 'the first public museum of natural history' and was 'one of the pioneers of scientific education in England'.[95] The Old Ashmolean was moving into the centre of Gunther's vision. It is not easy to convey the precise significance it had for him, which was emotional as much as intellectual. It stands for a seventeenth-century mode of thought which Gunther was uniquely equipped to comprehend, whereby museums and laboratories, antiquities and natural specimens, were integral parts of a concerted scholarly endeavour pre-dating 'science' as we now understand it, and which elsewhere I have called 'Ashmolean scholarship'.[96]

By the time Gunther's instrument exhibition materialised in 1919, in the Bodleian Library, he had made the acquaintance of Lewis Evans, and had studied some of his instruments in comparison with those in Oxford. Inspired by the exhibition, and no doubt equally by Gunther's enthusiasm and competence, Evans offered his magnificent private collection to the University. The offer did not necessarily imply the formation of a new museum, still less had it any bearing upon the revival of the gallery in the Old Ashmolean. The achievement of both at one stroke was, however, made possible (though not at all easy) by the condition that Evans approve the accommodation for his collection, a condition that smacks of Gunther's influence. Evans was also receptive to Gunther's interpretation of the gift as an 'attractive' nucleus around which other materials would gather, and as a study collection to be used 'for the benefit and development of Science' – that is, to improve the reputation of science in Oxford, and to illustrate its history as part of the ideal scientific education, as proposed by Gunther.[97] It was not hard, persuaded of these aims, to see that a separate museum in its own premises was called for, and that the Old Ashmolean Building was the perfect place.

I have referred here and there to Gunther's 'vision'. He himself went only as far as calling it an 'ideal'. No amount of analysis can hope to do justice to it *as* a vision. And yet it is the best witness of all in his plea that historical knowledge is enhanced by immersion in the locative ambience of the subject under study. To Gunther personally the construction of this Ark, as is the way with Arks, involved a commitment amounting to obsession. His old hobbies in *Who's Who* were supplanted by the consuming pastime of 'founding a science museum', which dominated the last quarter of a century of his life. It also brought him a new career as Curator of the Lewis Evans Collection, which at the age of fifty-five he regarded as 'a new start in life'.[98]

Friends of the Old Museum

The end of things being in their beginning, the purpose of this essay has been to give an impression of the genesis in Robert T. Gunther's life of what became the Museum of the History of Science. We have now reached its beginning. Gunther's own words in Part I conclude his story of the Old Ashmolean with a detailed narration of the events leading up to the opening of his Museum in 1925. In the pages that remain I shall make some observations about the study of scientific instruments, and about Gunther's 'friends' and 'enemies' in the creation of the Museum. His startlingly frank comments about the latter need, of course, to be balanced by mentioning some of the numerous collaborators whose support and influence were indispensable in bringing his scheme to fruition. Indeed, his talent in orchestrating such support was one of the most remarkable aspects of the achievement.

One can detect the presence of influential men whose names were never prominent behind several strategic developments, while there were many others whose support and generosity were equally heartening. The decisive gift of money from the Worshipful Company of Goldsmiths, for instance, arose from the influence of John B. Carrington, who had become a friend of Gunther's in the 1900s after his son had studied in the Daubeny Laboratory. The help given to the history of science by Falconer Madan during the few crucial years that he was Bodley's Librarian has already been mentioned. The Reverend L. R. Phelps, a contributor to *The Oxford Country*, was responsible for Oriel College's generous attitude towards the Museum. In spite of Gunther's acrimonious dispute with the Dictionary branch of the University Press, the unstinting and gentlemanly support of John Johnson, the Printer to the University, is commemorated in many small rarities which he gave to the Museum Library. One of the first private individuals to donate objects to the Museum was the rose gardener Ellen Willmott. While from the museum world David Baxandall, of the Science Museum in London, wrote a marvellously spontaneous and friendly letter to Gunther expressing his pleasure at the offer to Oxford of the Lewis Evans collection.[99]

Many pages could be filled in this way, and a very complicated essay written exploring motives and interrelationships. I have mentioned only non-scientists because the approval of scientists was virtually unanimous. Many supporters were Gunther's own friends, school and University contemporaries, colleagues, and pupils. Lewis Evans too had contacts, not least in the world of Freemasonry. The progress of his benefaction was

followed with interest in the Masonic press;[100] and we need hardly doubt that some of the muscle exerted in its favour was that of brother Freemasons. They knew Ashmole as one of the earliest recorded Masons, and had, like the Goldsmiths, natural affection for some of the instruments and fine craftsmanship in the collection. Gunther was ever sensitive to such specialised interests, and very good at deploying the different ingredients of his scheme to capture them. This included the knack of turning history to the service of his objectives, not always accurately. Sir Christopher Wren, for instance, was the architect of Gunther's Old Ashmolean because of the advantages this had for 'publicity', and because it recruited the Royal Institute of British Architects.[101]

A great deal of interest came from physicians and medical teachers. Sir William Osler's patronage and endorsement were absolutely fundamental, and not readily forgotten in such circles. They were continued by Lady Osler; by his successors in the Regius Chair of Medicine, Sir Archibald Garrod and then Sir Farquhar Buzzard; and by his contemporary, the venerable Sir D'Arcy Power, who had himself done much to advocate the history of science and medicine. The Royal College of Physicians, the Royal Society of Medicine, and the British Medical Association all came to Gunther's support. In 1928 a very high-powered group of scientists met at the Royal Society of Medicine and formed themselves into the Friends of the Old Ashmolean. The chairman of the meeting was Sir Humphry Rolleston, Regius Professor of Medicine at Cambridge, and among those present were Power, Gunther's friend F. A. Dixey, A. G. Gibson, who had recently written a history of Oxford's Radcliffe Infirmary, Sir George Fordham, the historian of cartography, E. B. Knobel, the astronomer, and W. T. Calman, Keeper of Zoology at the British Museum (Natural History).[102]

The Friends of the Old Ashmolean (or 'Musei Veteris Amici' as they are called in the armorial window which they presented in Gunther's honour) were an interesting body. They existed, firstly, to advocate the establishment of museums illustrating the history of science and medicine 'at the older universities'; secondly, to support in particular the development of such a museum in Oxford; thirdly, to press for the restoration of the Old Ashmolean Building in its entirety as a historical scientific institution; and lastly, to assist in adding to the collections there. They were not, in other words, merely friends of the Lewis Evans Collection; indeed, it was they (or Gunther in their guise) who coined the name 'Museum of the History of Science'. The Old Ashmolean was the symbolic focus for their ideal, which was Gunther's vision given national status and (by implication) philosophical underpinning. The Friends may even have given Gunther's immediate intentions a push forward: in the Museum's first few years he was having difficulty enough consolidating what had been gained, and the Friends' programme announced in 1928 was the first overt attempt to extend this.

It can sometimes seem as if Gunther's contentious temperament retarded his schemes. Sir Douglas Veale, who as Registrar (from 1930) had the unenviable job of sharing out the University's cake among the squabbling brood, remembered him as 'an incomparable controversialist who naturally enjoyed using his talent', and whose ill timed attacks on those with whom Veale was negotiating were 'sometimes quite maddening'.[103] Still, it is impossible to imagine Gunther achieving anything so improbable as he did without this

characteristic. As for his opponents, it is easy to understand the resistance of the Dictionary and the Bodleian Library, whose occupation of the middle and lower floors of the Old Ashmolean Building was perfectly legitimate. That of the Ashmolean Museum of Art and Archaeology was differently motivated. Gunther had from the outset antagonised the Ashmolean both with his unorthodox opinions and with his provocative ways of expressing them: '*The truth is* that it is upon the University Museum of Natural History that the title of Ashmolean Museum *should by rights* have descended, rather than upon *the antiquities and curiosities in the Taylorian Institution*'.[104] The italics are mine, but the strident polemics are all Gunther's, and were repeated by him many times.

Even so, the controversy as it matured can almost be simplified to one about nomenclature. The Ashmolean view was expressed to Gunther by Sir Arthur Evans, writing from Knossos in 1924: his brother's collection should not be used as the basis for 'a kind of rival refoundation'; 'any official attempt to describe it as the "Ashmolean Museum" or even the "Old Ashmolean Museum" would be a monstrous breach of faith'. D. G. Hogarth's offer to restrain Evans if Gunther would toe the line on this matter got the epigrammatic rejoinder: 'The proper antithesis between the collections is the antithesis between "Art" & "Science", as elsewhere'.[105] Hogarth could be forgiven for concluding that Gunther intended to speak of an 'Ashmolean Museum of Science', and the term indeed exists on labels still prominently displayed beneath the Duncan portraits in the Museum of the History of Science. That he hung portraits of these nineteenth-century Keepers of the Ashmolean, not to mention their manuscript table of benefactors which had somehow come into his hands, left no doubt that this was a usurpation. The Friends' 'Museum of the History of Science' started life with the prefix 'Ashmolean'; and Gunther insisted on using the name 'Old Ashmolean Museum' even after the official title was changed from Lewis Evans Collection in 1935. The same issues lay behind the storm of controversy in 1933, when Gunther and the Friends celebrated the Old Ashmolean's 250th anniversary. But that is another story.

Dodos and Astrolabes

Gunther, it has been rightly said, had 'an archaeological enthusiasm for all branches of his subject'. He himself described the purpose behind his Museum as 'the study of the Archaeology of Science'.[106] It seems to me that this term could now be adopted as a useful label for the aspect of the history of science that Gunther pioneered, based upon the recovery and study of *all* types of material remains, and the examination of locations. While historical scholarship has caught up with some of Gunther's peculiarities, such as non-positivism and respect for local history, teaching and research in the history of science continue to underestimate the value of his archaeological approach, including its central feature, the study of instruments.[107]

Interest in collecting antique scientific instruments, especially those of fine workmanship in brass or ivory, emerged with the rise of a European concept of 'industrial art' during the Industrial Revolution, and the consequent establishment of museum collections of 'applied art' whose role was to educate and broaden the minds of designers and craftsmen. In Britain the Great Exhibition of 1851 gave rise to the South Kensington

Museum, now the Victoria and Albert. A loan exhibition of contemporary and historical scientific instruments here in 1876 resulted in an expanded science and technology department, which became an independent museum, the Science Museum, in 1909. Meanwhile a number of valuable private collections were being assembled, still primarily viewing the instruments as art objects, though they *were* occasionally appreciated as antiquities, and by scientists as 'sacred relics'. At the British Museum one of the Keepers of antiquities throughout Gunther's early life, and a neighbour when the Gunthers lived at the Museum, was A. W. (later Sir Wollaston) Franks, who looked after the lawns on which the young Robert played cricket. Franks was one of the first British collectors to take an interest in scientific instruments, and also introduced them into the archaeological context of his museum.[108]

Lewis Evans inherited his family's long tradition of association with the mathematical sciences along with the archaeological interests of his father (a friend of Gunther's father, and of Franks). His first instruments were acquired at the age of eleven. Later, he chose and documented his purchases with great care, preferring dated and signed examples, and concentrating within a specialised range of early mathematical and horological devices, principally portable sundials.[109] He also collected early books and manuscripts on the construction and use of such instruments, clear proof of his interest in their *technical* history. His collection thus became an unprecedented resource for historical scholarship. The fortunate alliance between Evans and Gunther allowed this potential to be harnessed, and brought together two distinct approaches – the collector whose hunting ground is the sale-room, and the archaeologist whose hunting ground is the laboratory and the college cupboard.

Gunther's attitude to instruments was not that of a collector. Although he developed a love of the astrolabe, and had always taken an interest in sundials, it was not the typical contents of the collector's collection but the mundane laboratory and workshop equipment of the practical scientist to which he attached most importance. Preservation was an urgent problem with this kind of material; but even here the need for a museum, which he knew could never be more than an incomplete compromise, was secondary to the need for scholarly inventories based on fieldwork. As early as 1916 he regarded a national inventory of 'all early oddments of apparatus scattered about the country' as 'essential'.[110] This was the broad framework of Gunther's 'archaeology of science', while at its centre was the taxonomic and evolutionary study of scientific instruments *as* such (and not as art objects, nor even as sacred relics).

In combining this with a museum he saw himself as elevating science to the museological status of the 'exotic barbaric arts' (ethnography and classical archaeology)[111] or of zoological morphology, all of which we have seen influencing him. He was equally conscious of introducing an archaeological corrective to the study of the history of science; and of emphasising thereby how science, too often treated as purely a process of thought, has been dependent upon its tools and technicians. Such work, subversive even now, can make Gunther seem an undistinguished and peripheral character in the academic world of Duhem and Sarton. Those interested in the history of scientific instruments nevertheless quickly recognised him as the leader of their field, especially

after the appearance of volume II of *Early Science in Oxford* in 1923. The following year E. B. Knobel sent a very rare sixteenth-century book about a type of surveying instrument as a personal gift to Gunther, because (he wrote) 'You are so interested in old instruments & probably know more about them than any other man'.[112]

The background to Gunther's expertise hardly needs to be reiterated – at the London museums, on the estate of T. H. Powell, in the Junior Scientific Club, the laboratory of Jervis-Smith, the Daubeny Laboratory, and in his own lathe and carpentry workshop. As a microscopical zoologist he had naturally formed a respect for that instrument, later expressed in his studies of Robert Hooke. He also preserved, and displayed alongside material relating to Hooke, some of the microscopical work of his friends E. M. Nelson and H. M. J. Underhill.[113] And he insisted upon ability to use a microscope as a necessary qualification in his successor as Curator! He would be pleased that, from the small number in his own day, the Museum now houses one of the largest collections of microscopes in the world, and certainly the finest.

When the Lewis Evans Collection was opened in 1925 it already consisted of much more than the name implied. It is described as it stood on that day in the Museum's first guide, *Historic Instruments for the Advancement of Science*, a very fine little catalogue; and also in a beautifully illustrated article in *Country Life*, which conclusively demonstrated the architectural qualities of the Old Ashmolean Building.[114] Several colleges had lent their instruments, among them the Orrery Collection from Christ Church, which Gunther considered essential. The only natural history at first was the exquisite Oglander Collection of *materia medica*, from New College. But in 1926 some of the Tradescant remnants were transferred from the University Museum, achieving to some degree (though not permanently) Gunther's 1917 idea that they should be restored to their old home. The Dodo never came. But he hung his grandmother's painting in the Museum, and published a set of postcards bearing different images of the extinct bird.

Volume III of *Early Science in Oxford*, with the painting reproduced as its frontispiece, contains his account of the deliberate, almost ritual, incineration of the Tradescant Dodo in 1755.[115] In Gunther's mythology this was more relevant than the actual extinction: it was the prototype of the University's irresponsible neglect of science and of non-classical archaeology; it was an archetypal act of 'vandalism'. The Dodo, 'more extinct than almost any other extinct animal', expressed his overriding concern for preservation.[116] When Lewis Carroll (whose stammer made his name Dodo-Dodgson) caused it to speak 'solemnly' of 'energetic remedies',[117] it was as if he had put his finger on the psychology of extinction – the urge to preserve incited by the shock of destruction. And being the Oxford Dodo, an original inhabitant of the Old Ashmolean, its opinions had a certain authority for Gunther. After 1914 it seemed all the more significant: like the fallen in war, the sacrifice made and the reasons for it should not be forgotten, and the future should be built on the lessons learned from their tragedy (which is what Osler was saying in 1919).

As it turned out, Gunther's Ark was constructed to bear Dodos of a different kind. To many the glory of the collection was its remarkable sequence of astrolabes, and in these

Gunther took ‘a very special pride’.[118] It is an instrument which has always exerted a certain mystique. Less urgent or embracing a symbol than the Dodo or the Old Ashmolean, it was for Gunther the paragon of scientific instruments, a product of the human intellect and hand which has controlled man’s perception of the universe. Like the lathe, it consists of an ingenious synthesis of several operations and uses; like the Dodo, more advanced birds have supplanted it. In Gunther’s view only the far younger microscope came near to it in terms of ‘its accumulated utility’. For two thousand years it had sustained ‘the fundamental truths of Astronomy’. While its all-important Oxford connections went back almost (but not quite) to the time of Bacon, through examples surviving *in situ*, as well as through Chaucer’s famous treatise.[119]

Gunther’s monumental *The Astrolabes of the World* (1932) was the most ambitious published result of his archaeology of science, the first such study of a corpus of non-optical scientific instruments. Its origins lie in the comparative study of the Oxford and Evans astrolabes before 1919, by way of volume II of *Early Science in Oxford*; and he set about preparing it in the very month that the Museum opened. Inevitably with such a pioneering work, fifty years have revealed many inaccuracies, especially in its eastern volume. But those who can now improve upon Gunther’s achievement have developed their knowledge from the foundations which he built – not in his writings only but (as Plot said of Ashmole) in the preservation of ‘the real things themselves’.[120] It should never be forgotten that Gunther’s books are footnotes to a greater work – the Museum of the History of Science. Writing *The Astrolabes of the World* was ‘an act of piety’ both to Lewis Evans, and ‘to the University which has enabled me to realize (in part) my ideal of a Restoration of Charles II’s old and neglected Ashmolean as a public Museum of Science’.[121] Note the mild polemic, the joke (a capital R), and the historical conceit (Charles II).

The Preface of that book is among those notorious for combining the usual acknowledgements with criticisms of those who refused to assist him. Its condemnation of the apparent policy of the British Museum, however, reveals him as a champion of standards of scholarly museum curatorship from which no one would now dissent, however difficult they are to maintain. The Dodo was, apart from anything else, a terrible symbol of the *failure* of museums; as, in a different sense, was the Old Ashmolean itself. Robert T. Gunther’s Museum, his ‘good ship for the History of Science’, arose in part from, and did not allay, his profound concern for the impermanence of museums, or rather, for their deplorable tendency to be ‘continually refashioning’ themselves, to forget why they were founded.[122]

NOTES

The following abbreviations are used for sources cited frequently:

DLR	R. T. Gunther, *The Daubeny Laboratory Register 1849-1923* (3 volumes in one, Oxford, 1904-24), on which see n.26.
ESO	R. T. Gunther, *Early Science in Oxford* (14 volumes and supplement, Oxford, 1920-45), on which see n.65.
ESO XV	A. E. Gunther, *Robert T. Gunther: A Pioneer in the History of Science 1869-1940* (Oxford, 1967), published as volume XV of *Early Science in Oxford*.
HIAS	R. T. Gunther, *Historic Instruments for the Advancement of Science: A Handbook to the Oxford Collections Prepared for the Opening of the Lewis Evans Collection on May 5, 1925* (Oxford, 1925), the Museum's original guide book.
MHS	Museum of the History of Science.
OHSc	R. T. Gunther, *Oxford and the History of Science* (London, 1934), his Inagural Lecture as Reader in the History of Science; reprinted with the same pagination in ESO XI.
Simcock	A. V. Simcock, *The Ashmolean Museum and Oxford Science 1683-1983* (Oxford, 1984).

The prefix MS indicates a manuscript in the Museum of the History of Science.
Refs to pages 'above' are to Robert T. Gunther, 'The Story of the Old Ashmolean 1683-1925' which forms Part I of *Robert T. Gunther and the Old Ashmolean* (ed. A. V. Simcock, Oxford, 1985), 1-42.

[1] The indispensable sources for the information in this essay, and for the impression I have formed of R. T. Gunther's life and ideas, are as follows: the published writings of Gunther himself (a bibliography of which is in preparation); the personal and professional papers and correspondence forming the Robert T. Gunther Archive in the MHS; Mr A. E. Gunther's biography of his father, published as volume XV of *Early Science in Oxford*; and information supplied personally by Mr A. E. Gunther, including access to certain confidential documents. The references which follow make no attempt to reflect the full extent of my indebtedness to these sources, except for identifying very specific allusions to them, such as quotations. In certain passages my dependence upon Mr A. E. Gunther amounts to co-authorship; but the opinions and interpretations are my own responsibility.

[2] 'East Coker' I, line 1; 'Little Gidding' V, lines 26-32.

[3] Hebrews 11:7. On the preceding ideas see for instance: Mircea Eliade, *The Myth of the Eternal Return* (English translation, London, 1955); idem, *Forgerons et Alchimistes* (Paris, 1956); idem, *Myths, Dreams and Mysteries* (English translation, London, 1960), esp. chapter III; Christopher Hill, *The World Turned Upside Down* (London, 1972), chapter 8; A. Victor Murray, *Personal Experience and the Historic Faith* (London, 1939), esp. chapter 3; Graham Neville, *City of Our God: God's Presence Among his People* (London, 1971); John Prest, *The Garden of Eden* ... (New Haven & London, 1981); Simcock, 1-3, 6, 30 n.56; F. A. Yates, 'The Hermetic Tradition in Renaissance Science' in C. S. Singleton (ed.), *Art, Science and History in the Renaissance* (Baltimore, 1967), 255-274; and p.3 above. For a down-to-earth history of the habit of forming collections see Arthur MacGregor (ed.), *Tradescant's Rarities* ... (Oxford, 1983), 70-97.

[4] ESO XV, p.v.

[5] See A. E. Gunther, *The Life of William Carmichael M'Intosh, M.D., F.R.S. of St. Andrews 1838-1931: A Pioneer in Marine Biology* (Edinburgh, 1977), esp. 60-61.

[6] ESO XV, 322.

[7] OHSc, 7.

[8] 'Death of Dr. R. T. Gunther' (obituary) in *The Oxford Times*, March 15, 1940.

[9] For his devotion to Hooke see: ESO XV, 229, 267-270; 'Dr R. T. Gunther' (obituary) in *The Times*, March 11, 1940; A. S. Russell, 'Dr R. T. Gunther' (obituary) in *Nature*, CXLV (April 6, 1940), 541. His main works on Hooke were ESO VI, VII, VIII, X, XIII, and on Plot ESO IV, XII.

[10] Russell in *Nature* (op.cit., n.9).

[11] Ibid.

[12] Sir Gavin de Beer in ESO XV, p.v; obituary in *The Oxford Times* (op.cit., n.8).

[13] E. T. Leeds in a letter to *The Times*, June 29, 1931.

[14] Sir Gavin de Beer in ESO XV, p.v; obituary in *The Oxford Times* (op.cit., n.8); and see R.T.G., 'Dr. Lewis Evans' (obituary) in *Nature*, CXXVI (November 1, 1930), 692-3.
[15] OHSc, 7. On Albert Günther see: Albert E. Gunther, *A Century of Zoology at the British Museum Through the Lives of Two Keepers 1815-1914* (Folkestone, 1975), 211-475; R. T. Gunther, 'Bibliography of the Works of Dr. Albert Günther ...' in *The Annals and Magazine of Natural History*, tenth series VI no.32A supplement (August 1930), 233-286; R.W.T.G. & A.G., *Günther Family Records* ... (London, 1910), esp. 5-7 (and for Louisa 18-19); W. C. M['Intosh], 'A. C. L. G. Günther, 1830-1914' (obituary) in *Proceedings of the Royal Society*, B LXXXVIII (1915), pp.xi-xxvi.
[16] *Günther Family Records* (op.cit., n.15), 7.
[17] See: Albert Günther, *The History of the Collections Contained in the Natural History Departments of the British Museum*, II, Appendix (London, 1912); Albert E. Gunther, *A Century of Zoology* (op.cit., n.15), chapter 26; A. E. Gunther, *The Founders of Science at the British Museum 1753-1900* (Halesworth, Suffolk, 1980), 138; Edward Miller, *That Noble Cabinet* ... (London, 1973), 243-4.
[18] Joseph D. Hooker & B. Daydon Jackson, *Index Kewensis* ... (4 volumes, Oxford, 1893-95).
[19] Review of Eugene F. MacPike (ed.), *Correspondence and Papers of Edmond Halley*, in *The Oxford Magazine*, November 10, 1932; R. T. Gunther, *The Astrolabes of the World* (2 volumes, Oxford, 1932), I, p.v; and cf. DLR (1924), 345, and OHSc, 32.
[20] Sir Henry W. Acland, 'The Inaugural Robert Boyle Lecture ...' in *Journal of the Oxford University Junior Scientific Club*, nos.7 and 8 (1892), 69-111; reissued (with same pagination) in *The Robert Boyle Lectures*, I (Oxford, 1897), with Preface by Acland, pp.vii-xi; and see n.22 below.
[21] See Eve Blau, *Ruskinian Gothic* (Princeton, 1982), esp. 79-81, and J. Mordaunt Crook, *The British Museum* (London, 1972), 200-203.
[22] Robert Plot, *The Natural History of Oxford-shire* (Oxford, 1677); Henry W. Acland & John Ruskin, *The Oxford Museum* (3rd edition, London & Orpington, 1893); ESO XV, 173. Gunther's copies are in the MHS; on his Plot see R. T. Gunther, 'The Ashmolean Copy of Plot's "Natural History"' in *The Bodleian Quarterly Record*, VI (1930), 165-6.
[23] Lewis Carroll, *The Annotated Alice* (ed. Martin Gardner, revised edition, Harmondsworth, 1970). The first editions were *Alice's Adventures in Wonderland*, 1865, and *Through the Looking-Glass, and What Alice Found There*, 1871; see Mavis Batey, *Alice's Adventures in Oxford* (London, 1980).
[24] ESO XV, 148-9; MS Gunther Archive, 'Manuscripts Relating to the Museum of the History of Science volume III'.
[25] See DLR (1924), 414-425, and OHSc, 7.
[26] R. T. Günther, *A History of The Daubeny Laboratory* ... (London, 1904); idem, *The Daubeny Laboratory Register 1904-1915* (Oxford, 1916); R. T. Gunther, *The Daubeny Laboratory Register 1916-1923* (Oxford, 1924). The three were issued in one volume as *The Daubeny Laboratory Register 1849-1923* (Oxford, 1904-24), and were also supplemented by several collections of offprints of scientific papers.
[27] R. T. Günther, paper read on December 11, 1902, on 'the History of the Chapel Porch of Magdalen College, Oxford' in *Proceedings of the Society of Antiquaries of London*, second series XIX (1901-1903), 153-170.
[28] Russell in *Nature* (op.cit., n.9).
[29] DLR (1904), 18-19, 27.
[30] DLR (1916), pp.vii, 182-184.
[31] MS Gunther 27, item 4; ESO I, 78, XI, 175; and cf. Simcock, 45 n.176.
[32] MS Gunther Archive, 'Press Cuttings c.1889-1907/13'.
[33] This sketch of Mrs Gunther's life and character is based partly upon A. E. Gunther, *Rolfe Family Records* (volumes I and III in one, Heacham, Norfolk, 1962), esp. 109-111, and upon information supplied by Mr Gunther, including access to confidential documents.
[34] See: DLR (1924), 326-328; ESO XI, 175, 318; OHSc, 10-11; R. T. Günther, *A Bibliography of Topographical and Geological Works on the Phlegraean Fields* (London, 1908).
[35] R. T. Günther, *Contributions to the Study of Earth-Movements in the Bay of Naples* (Oxford & Rome, 1903), reprints of 'The Submerged Greek and Roman Foreshore near Naples' from *Archaeologia*, LVIII (1903), and 'Earth-Movements in the Bay of Naples' from *The Geographical Journal*, August and September 1903.
[36] Ibid.; 'Search for Lost Worlds ...' in *Daily Chronicle*, January 19, 1926.
[37] R. T. Günther, *Pausilypon: The Imperial Villa near Naples* ... (Oxford, 1913).

[38] Retold by Sir Gavin de Beer in ESO XV, p.vi.
[39] ESO XV, 93.
[40] See: Domenico Monaco & E. Neville Rolfe, *A Complete Handbook to the National Museum in Naples* ... (3rd edition, London, 1883); Luigi Fischetti & E. Neville Rolfe, *Pompeii, Past and Present* (London, 1884); Eustace Neville Rolfe & Holcombe Ingleby, *Naples in 1888* (London, 1888); Eustace Neville Rolfe, *Pompeii: Popular and Practical* ... (Naples, 1888); E. Neville-Rolfe, *Naples in the Nineties* ... (London, 1897); MS Gunther 24.
[41] F. T. Elworthy, *The Evil Eye* (London, 1895), esp. pp.viii, 18; Neville-Rolfe, *Naples in the Nineties* (op.cit., n.40), 235; MS Gunther 24; and see Gunther's copy of 'The Cimaruta' (n.42 below).
[42] R. T. Günther, 'The Cimaruta: Its Structure and Development' in *Folk-Lore*, XVI (June 24, 1905), 132-161. Gunther's own copy with many additions is in the MHS. Most of his collection is still together in what is now the Wellcome Museum of the History of Medicine, and pieces not sold in 1921 are in the MHS. Cf. Rolfe & Ingleby (op.cit., n.40), chapter VI, and Neville-Rolfe, *Naples in the Nineties* (op.cit., n.40), chapter II.
[43] See: Beatrice Blackwood, *The Origin and Development of the Pitt Rivers Museum* (separate issue, Oxford, 1974); Hélène La Rue, 'The First Hundred Years' in *The Ashmolean*, no.5 (1984), 12-15; M. W. Thompson, *General Pitt-Rivers: Evolution and Archaeology in the Nineteenth Century* (Bradford-on-Avon, Wiltshire, 1977).
[44] MS Gunther Archive, 'Manuscripts Relating to the Museum of the History of Science volume III'; HIAS, p.iii.
[45] Cuttings in MSS Gunther Archive, 'Newspaper Cuttings volume II 1923-1927' and 'Album of Printed Matter volume II', including: 'Why Man Lost His Hair ...' in *Evening News*, August 9, 1926; 'Scientist Consoles the Bald – But Brainy: Why Man Has Parted From His Hair ...' in *Evening Standard*, August 9, 1926; 'World Land Shortage ...' in *Daily Mail*, August 10, 1926; 'Bald Men Are Brainiest ...' in *Daily Mirror*, August 10, 1926; 'When "Singes" Came In ...' in *Daily Telegraph*, August 10, 1926; 'Brain Grows As Hair Thins Out ...' in *Evening Telegram* (Toronto), August 10, 1926; 'If You're Bald – Or Shingled – You're Brainy ...' in *Evening News* (Sydney), August 10, 1926.
[46] OHSc, 11.
[47] ESO XV, 79; anon. review in *The English Review*, September 1914.
[48] R. T. Günther, *Oxford Gardens* ... (Oxford, 1912); ESO XV, 92.
[49] R. T. Gunther, *Early British Botanists and their Gardens* (Oxford, 1922); commented upon by David Elliston Allen in Pietro Corsi & Paul Weindling (eds.), *Information Sources in the History of Science and Medicine* (London, 1983), 352.
[50] R. T. Günther (ed.), *The Oxford Country* ... (London, 1912).
[51] ESO XV, 86.
[52] See for instance: DLR (1924), 337-8; R. T. Gunther, 'Town Planning at Oxford' (letter) in *The Times*, December 12, 1925; idem, 'Floods near Oxford' (letter) in *The Times*, January 6, 1926; idem, 'Thames Floods and Pollution' in *Nature*, CXXV (January 11, 1930), 49-50.
[53] *The Oxford Country* (op.cit., n.50), 314 (chapter XXXVI); letter from R. T. to A. E. Gunther, June 3, 1938 (made available by Mr A. E. Gunther); MS Gunther 28.
[54] See ESO XV, 230-231.
[55] Cuttings in MS Gunther Archive, 'Newspaper Cuttings volume I 1898-1926'.
[56] R. T. Gunther, *The Architecture of Sir Roger Pratt* ... (Oxford, 1928), p.v.
[57] R. T. Gunther, 'On the Architecture of the Hospital of St. John' in H. E. Salter (ed.), *A Cartulary of the Hospital of St. John the Baptist*, III (Oxford, 1917), 393-434; and see n.58 below.
[58] *The Oxford Magazine*, June 1, 1917; and see *The Oxford Times*, May 19, 1917.
[59] H. M. Vernon & K. Dorothea Vernon, *A History of The Oxford Museum* (Oxford, 1909), 110, and generally chapter V.
[60] Ibid., 3; ESO I, 79. For the terminal date intended in ESO see also ESO I, 80, III, 236.
[61] ESO II, 74, XII, p.xi.
[62] *The Oxford Country* (op.cit., n.50), 233-241, and ESO II, 6-7 (Rollright); ESO III, 1, 198-200 (Frideswide); ESO I, 3-6, III, 3-9, and see n.57 above (hospitals and spiceries).
[63] Viz.: *Oxford Gardens* (op.cit., n.48); *The Oxford Country* (op.cit., n.50); *Pausilypon* (op.cit., n.37); R. T. & A. Günther, *Rolfe Family Records*, II (London & Aylesbury, 1914); R. T. Günther, *A Description of Brasses and Other Funeral Monuments in the Chapel of Magdalen College* (Oxford, 1914).

[64] ESO I, 1. For what he had to say about Bacon see ESO I, 1-3, 7, II, 1, 29-30, 42, 44, 74-76, III, 2, and also DLR (1916), 139.
[65] R. T. Gunther, *Early Science in Oxford* (14 volumes and supplement, Oxford, 1920-45). Volume I was issued in parts: I in 1920, II in 1922, and III and IV together in 1923, at which stage the parts were bound in one with a new title page and Preface. Volumes II and III appeared in 1923 and 1925, completing the initial intention of the title. The subsequent volumes, from IV in 1925 to the posthumous XIV in 1945, have a quite different character, and, except for XI, consist primarily of documentary material printed in extenso. They are supplemented by *The Old Ashmolean and its Historic Scientific Collections* (no place, 1939), a reprint of the Museum's *Annual Reports* prepared as an Appendix to the projected fifteenth volume, which was to have been the story of the Old Ashmolean, the drafts for which form Part I of the present work.
[66] MS Gunther Archive, 'Old Ashmolean Letter Book volume II 1912-1933'. The book of essays is A. G. Little (ed.), *Roger Bacon: Essays Contributed by Various Writers on the Occasion of the Commemoration of the Seventh Centenary of his Birth* (Oxford, 1914).
[67] See for instance: Corsi & Weindling (op.cit., n.49), esp. chapters 1 and 2; A. C. Crombie & M. A. Hoskin, 'A Note on History of Science as an Academic Discipline' in A. C. Crombie (ed.), *Scientific Change* (London, 1963), 757-764; Henry Guerlac, 'Some Historical Assumptions of the History of Science' in ibid., 797-812; *Isis*, LXXV no.276 (March 1984; special issue entitled 'Sarton, Science, and History: The Sarton Centennial Issue'); Arthur Marwick, *The Nature of History* (reprint, London & Basingstoke, 1973), 201; *Dictionary of Scientific Biography* (ed. Charles Coulston Gillispie, 16 volumes, New York, 1970-80), IV, 225-233 (Duhem), XII, 107-114 (Sarton), XIII, 251-256 (Tannery); and see n.70 below.
[68] For instance: J. Villin Marmery, *Progress of Science: Its Origin, Course, Promoters, and Results* (London, 1895); Sir William Ramsay, *The Gases of the Atmosphere: The History of their Discovery* (London, 1896); G. F. Rodwell, *The Birth of Chemistry* (London, 1874); Robert Routledge, *A Popular History of Science* (3rd edition, London, 1894); C. J. S. Thompson, *The Mystery and Romance of Alchemy and Pharmacy* (London, 1897); J. Arthur Thomson, *Progress of Science in the Century* (London etc., 1908); William Cecil Dampier Whetham, *The Recent Development of Physical Science* (London, 1904). Gunther's copies of some of these works are in the MHS.
[69] F. P. Armitage, *A History of Chemistry* (London, 1906); DLR (1904), 127; and see OHSc, 12. Gunther's copy in the MHS is inscribed to him by the author.
[70] DLR (1916), p.vi; DLR (1924), 389-399; and cf. OHSc, esp. 12-13. On Singer and his views see also: A. Rupert Hall, 'Charles Joseph Singer, 1876-1960' (obituary) in *Isis*, LI (1960), 558-560; Charles Singer, 'The History of Science' (essay review) in *History*, January 1919; idem, 'Presidential Address' in *Bulletin of the British Society for the History of Science*, I (1950), 59-63; E. Ashworth Underwood, 'Charles Singer (1876-1960)' (obituary) in *Medical History*, IV (1960), 353-358; and see n.73 below.
[71] ESO I, p.iii; and cf. ESO I, 89 (Preface to Part II).
[72] MS Gunther Archive, 'Old Ashmolean: Last Letters under Robert T. Gunther 1939-1940'. On Sherwood Taylor see: A. C. Crombie, 'Beginnings at Oxford' in *Isis*, LXXV (1984), 25-28; [C. H. Josten], 'Obituary: Frank Sherwood Taylor' in *The Oxford Magazine*, March 1, 1956; 'Dr. F. Sherwood Taylor' (obituary) in *The Times*, January 7, 1956.
[73] ESO XV, 194. The foregoing information is from: DLR (1924), 396-398, 500-502; OHSc, 12-13; University of Oxford, *Supplement to the Historical Register of 1900 ... 1901-1930* (Oxford, 1934), 171; Hall in *Isis* (op.cit., n.70); Underwood in *Medical History* (op.cit., n.70).
[74] Sir William Osler, 'The Old Humanities and the New Science' in *Sel
ected Writings of Sir William Osler* ... (London, 1951), 8-33, esp. 30-31; and see p.20 above. The speech, his Presidential Address to the Classical Association, was first published in the *British Medical Journal*, II (1919).
[75] R. T. Günther, 'The Roger Bacon Statue' (letter) in *The Oxford Magazine*, October 16, 1914.
[76] R. T. Gunther, *Report on Agricultural Damage by Vermin and Birds in the Counties of Norfolk and Oxfordshire in 1916* (Oxford, 1917).
[77] R. T. Günther, 'The Magdalen Elms on the High Street' (letter) in *The Oxford Magazine*, March 3, 1916; R. T. Gunther, 'Patriotic Cabbages' (letter) in ibid., February 19, 1917, 179.
[78] MS Gunther Archive, 'Lord Moreton's Letters 1916-1918'; R. T. Gunther, 'Note on the Acclimatisation of the Australian Black Swan (*Chenopsis atrata*)' in *The Ibis*, April 1917, 241-244; and cf. DLR (1924), 356-362.

[79] Counted from the student registers in DLR (1916 and 1924).
[80] Quotation from the disused later pages of the manuscript printed in Part I above, now in the MHS.
[81] See Simcock, 10, 14-17.
[82] This sketch of the sons' development (as well as many other insights into the family life of the Gunthers) derives from information supplied by Mr A. E. Gunther, including access to confidential documents, in particular an autobiographical account of the early lives of himself and his brother (the late Mr E. R. Gunther, who was tragically killed during the Second World War).
[83] The prescriptions are in the MHS.
[84] On the MHS since Gunther's time see: ESO XV, 297-311; *Alden's Oxford Guide* (Oxford, 1958), 13-14; Anon., 'The Oxford Museum of the History of Science' in *Oxfordshire Roundabout*, I no.1 (June 1965), 17-20; C. R. Hill, *Museum of the History of Science: Catalogue 1 Chemical Apparatus* (Oxford, 1971); C. R. Hill & R. E. A. Drey, *Museum of the History of Science: Catalogue 3 Drug Jars* (Oxford, 1980); C. H. Josten, 'Elias Ashmole's Museum' in *The Shell Magazine*, September 1951; idem, 'Museum of the History of Science' in *The Museums Journal*, LII (1953), 263-265; [idem], *Scientific Instruments (13th-19th Century): The Collection of J. A. Billmeir C.B.E.* (2nd edition, Oxford, 1955); [F. R. Maddison], *A Supplement to a Catalogue of Scientific Instruments In the Collection of J. A. Billmeir, Esq., C.B.E.* (Oxford & London, 1957); F. R. Maddison & A. J. Turner, *Museum of the History of Science: Catalogue 2 Watches* (Oxford, 1973); A. V. Simcock, 'The Museum of the History of Science and its Library' in *Oxford University Libraries Bulletin*, no.30 (1982), 4-6; F. Sherwood Taylor, *Catalogue of an Exhibition of Scientific Apparatus Pertaining to Medicine and Surgery* (Oxford, 1947); idem, 'The Museum of the History of Science' in *The Oxford Magazine*, November 3, 1949; idem, 'Museum of the History of Science, Oxford' in *The Museums Journal*, XLIX (1950), 233-235; idem, 'Old Ashmolean Building and the Growth of Science' in *The Pharmaceutical Journal*, September 11, 1954, 200-201; G. L'E. Turner, 'The Museum of the History of Science' in *Oxford*, XXI (1967), 53-60; University of Oxford, *Handbook of the University of Oxford* (reissue, Oxford, 1957), 257-259, (1969 edition), 247-249.
[85] See p.18 above; and cf. DLR (1924), 390, and ESO I, p.v (Preface to complete volume).
[86] Lewis Carroll (op.cit., n.23), 47; ESO XV, 148.
[87] Anon., 'The Oldest Museum Specimens' in *The Field, the Farm, the Garden: The Country Gentleman's Newspaper*, CIX (February 23, 1907), 307; ESO III, 343.
[88] DLR (1924), 390. On the survey and its results see pp.18-21 above.
[89] MS Gunther Archive, 'Old Ashmolean Letter Book volume II 1912-1933'.
[90] ESO I, 378, and generally 378-382; and see HIAS, 26-28, and p.18 above.
[91] DLR (1924), 390.
[92] Ibid.; DLR (1916), pp.vi-vii.
[93] MS Gunther Archive, 'Manuscripts Relating to the Museum of the History of Science volume III'.
[94] William Henry Flower, *Essays on Museums and Other Subjects Connected with Natural History* (London, 1898); E. Ray Lankester, 'The History and Scope of Zoology' (reprinted from *Encyclopaedia Britannica*, 9th edition) in his *The Advancement of Science: Occasional Essays and Addresses* (London, 1890), chapter IX, esp. 293, 295. Gunther's copies are in the MHS.
[95] R. T. Gunther, 'Elias Ashmole, F.R.S., Founder of the First Public Museum of Natural History' in *Nature*, XCIX (May 17, 1917), 234-5; and see pp.18-19 above.
[96] Simcock, 1-3, 17.
[97] R.T.G., 'The Attractive Power of the Evans Collection' in *The Oxford Magazine*, February 8, 1923; MS Gunther Archive, 'Old Ashmolean Letter Book volume I 1919-1940'; and see pp.21, 26, 27 above. For the story of the Evans offer and its acceptance see pp.20-32 above.
[98] ESO XV, 146; OHSc, 12.
[99] For Carrington, Phelps, and Baxandall see MSS Gunther Archive, 'Old Ashmolean Letter Book volume I 1919-1940' and 'Old Ashmolean Letter Book volume II 1912-1933'; for Johnson and Willmott see ESO XV, 226 and Appendix (*Annual Reports* of the Museum), and MS Gunther Archive, 'Old Ashmolean Letters: Sir John Findlay, Miss Ellen Willmott 1924-1934'.
[100] For instance: *The Freemason*, March 15, 1924, March 14, 1925, May 16, 1925, and February 6, 1926; *Masonic News*, May 31, 1930.
[101] See for instance: R. T. Gunther, 'Wren's Science Museum' (letter) in *The Times*, February 19, 1923; idem, 'Sir Christopher Wren's Science Museum' in *Nature*, CXI (March 3, 1923), 299; idem, 'New Light

on Ashmole's Museum' in *The Oxford Magazine*, May 3, 1923; and p.25 above. But cf. the more reasonable discussion in HIAS, 4-6, and the defence of the stone mason Thomas Wood in Simcock, 4-6.
[102] 'Science to Tell its Story ...' in *The Sunday Times*, May 6, 1928; '"Friends of the Old Ashmolean"' in *The Oxford Magazine*, May 10, 1928, 192-3; '"Friends of the Old Ashmolean"' in *British Medical Journal*, May 12, 1928, 813; *Nature*, CXXI (May 12, 1928), 766-7; and see the printed ephemera in MSS Gunther Archive, 'Album of Printed Matter volume II' and 'Newspaper Cuttings volume III 1927-1940'.
[103] Letter from Sir Douglas Veale to Dr C. H. Josten, December 19, 1963 (in the MHS).
[104] R. T. Gunther, 'The Tercentenary of Ashmole' (letter) in *The Oxford Magazine*, May 25, 1917. On Gunther's disagreement with the Ashmolean Museum see pp.12, 23, 29-31 above.
[105] MS Gunther Archive, 'Old Ashmolean Letter Book volume I 1919-1940'.
[106] Obituary in *The Times* (op.cit., n.9); DLR (1924), 392.
[107] On instruments in the study of the history of science see for instance: DLR (1916), 183-4; OHSc, esp. 22-36; Crombie in *Isis* (op.cit., n.72), 26; Francis Maddison, 'Early Astronomical and Mathematical Instruments: A Brief Survey of Sources and Modern Studies' in *History of Science*, II (1963), 17-50; Henry Michel, *Scientific Instruments in Art and History* (English translation, London, 1967); Derek J. de Solla Price, *Science Since Babylon* (New Haven, 1961), chapter 2; A. J. Turner (n.108 below); G. L'E. Turner, *Essays on the History of the Microscope* (Oxford, 1980), esp. Preface; idem, 'Scientific Instruments' in Corsi & Weindling (op.cit., n.49), 243-258.
[108] I am indebted in this paragraph to Mr A. J. Turner, who kindly allowed me to see part of his forthcoming *Early Scientific Instruments: A History of the Classical Tradition from Antiquity to c.1780*. See also Anon., *The Science Museum: The First Hundred Years* (London, 1957), 1-7.
[109] On Evans see: ESO XV, 197-199; Gunther's obituary in *Nature* (op.cit., n.14); 'Dr. Lewis Evans' (obituary) in *The Times*, September 25, 1930; Joan Evans, *The Endless Web* ... (London, 1955); idem, *Time and Chance: The Story of Arthur Evans and his Forebears* (London, 1943); [H. H. Turner], 'Ancient Scientific Instruments: The Evans Collection in Oxford' in *The Times*, December 8, 1922.
[110] MS Gunther Achive, 'Manuscripts Relating to the Museum of the History of Science volume III'; DLR (1916), 182-184.
[111] ESO II, p.viii.
[112] Letter enclosed in the book, Bartolomeo Romano, *Proteo Militare* (Naples, 1595), in the MHS.
[113] Now to be found in: MS Gunther 47; MS Gunther Archive, 'Letters of Edward M. Nelson ...'; MSS Museum 61 and 157; MSS Underhill.
[114] R. T. Gunther, *Historic Instruments for the Advancement of Science: A Handbook to the Oxford Collections Prepared for the Opening of the Lewis Evans Collection on May 5, 1925* (Oxford, 1925); idem, 'The Old Ashmolean Museum, Oxford: The Oldest Museum in England Restored to its Original Purpose' in *Country Life*, May 9, 1925, 730-736; and see p.29 above.
[115] ESO III, frontispiece and 358-363, esp. 361-2; and see R. T. Gunther, 'The Oxford Dodos' in *Bird Notes and News*, October 9, 1937, 141-2.
[116] ESO XV, 148.
[117] Lewis Carroll (op.cit., n.23), 44, 47.
[118] E. G. R. T[aylor], review of *The Astrolabes of the World*, in *The Geographical Journal*, December 1933.
[119] *The Astrolabes of the World* (op.cit., n.19), I, pp.v-vi; and see R. T. Gunther, 'The Astrolabe: Its Uses and Derivatives' in *The Scottish Geographical Magazine*, XLIII (1927), 135-147.
[120] Robert Plot, *The Natural History of Stafford-shire* (Oxford, 1686), 277.
[121] *The Astrolabes of the World* (op.cit., n.19), I, p.v.
[122] OHSc, 36; DLR (1916), p.vii; and see p.3 above.

[from *Robert T. Gunther and the Old Ashmolean*, edited by A. V. Simcock, Oxford, 1985, pp.43-92]