國立自然科學博物館
雙年報 (94~95年)

Biennial Report of the National Museum of Natural Science (2005~2006)

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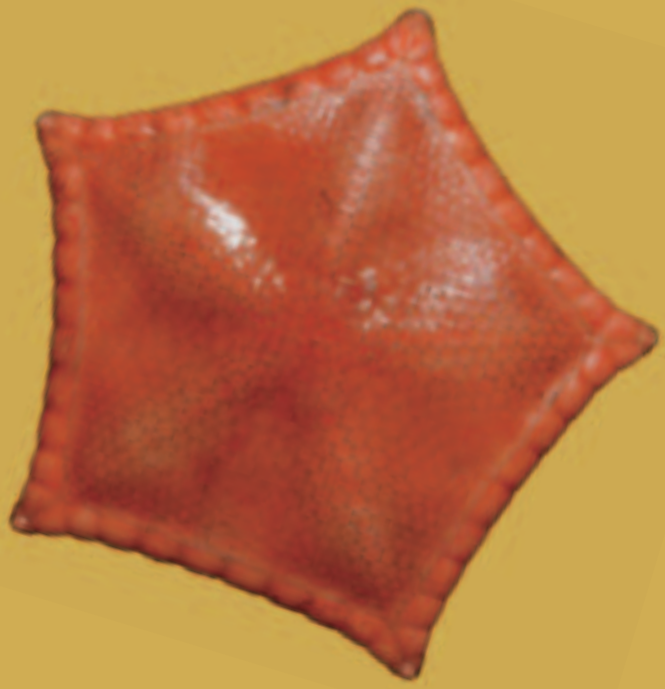

館長序

國立自然科學博物館館長　林宗賢




自然科學乃探究自然環境與生命的演化及交互作用的學問。生命雖將其遺傳訊息貯存於DNA並在38億年時間長河中不斷演化，但生命個體仍須隨時與環境交換物質和能源。眼見世界人口越來越多，但貧富懸殊；生態系遭到人為破壞，生物多樣性急劇降低；過度耗用能源，石油價格高昂，二氧化碳排放過量，造成全球暖化及氣候異常；我們應如何立身處世？如何與其他生命及環境共生？這些都是當今人類需嚴肅面對的課題。

國立自然科學博物館（以下簡稱本館）籌建時就針對國內需要，擷取國外自然史博物館優良制度，矢志於自然科學現象及其物品的研究、蒐藏、展示與教育，並以臺灣地區的動物、植物、地質及人類等學門為執行重點。除進行生命科學、宇宙環境與人類文化的展示及教育外，也積極試圖建構臺灣的自然史，讓觀眾瞭解生命與環境奧秘、生命與環境關係，以及思考我們對居住環境應採取的態度。

蒐藏、研究、展示與教育乃是本館經營四大任務。其中，蒐藏與研究為展示及教育的基礎，必須持續而有目標地執行，且將成果公諸於世；經由常設展和特展的交互運用，將自然科學重要主題真實而優美地呈現出來；除了館內，也將展品送至國內外各地，提高展示效果；以解說、演講、演示及動手做等方式的教育活動，將本館蒐藏、研究成果及展示精義生動地傳播給觀眾。來訪觀眾雖以中小學生為主，但展示、教育仍考量到所有年齡層，並兼顧偏遠地區及弱勢人士等。

經由優秀、熱誠的專業與行政同仁全心投入，加上教育部、國科會及其他相關單位的資助，本館在2005及2006年的研究、典藏、展示與教育成果甚豐碩。專業人員致力蒐藏與研究，將成果發表於國際學術期刊，持續進行國際交流；很感謝日本佐藤正孝教授將一生蒐集的12萬餘件昆蟲珍貴標本贈予本館。藉著教育部服務升級計畫的實施，一些已有十餘年歷史的常設展完成更新；教育活動不僅生動活潑，也日趨多元。希望這些活動能促進臺灣自然科學的進步，提昇國人對自然科學的興趣與瞭解；希望不僅加深學生學習效果，也可提供一般民眾終身學習的場所。

由於歷年來同仁努力與社會支持，本館已成為重要文化旅遊重鎮，並連續兩年獲服務品質獎，其中，2006年更獲行政院整體性服務品質獎的殊榮。

開館迄今已逾二十年，感佩先進建立宏基，感謝同仁盡心營運；希望大家繼續秉持「探索自然，特色典藏，多元展示，活化科教，保護環境，服務社會」之願景，並以熱誠、尊重、體貼的態度服務觀眾，讓他們滿足、感動。

學組動態》

科學教育組

科教活動參加人數

項目	94年度	95年度
導覽解說	274,127	310,190
科學演示	84,074	83,525
科學教育研習	1,739	5,517
特展教育活動	2,467	8,213
科博有約在離島		9,743
幼兒科學園教育活動	45,473	50,636
自然生態探索教育學習	12,175	10,315
劇場教室教學及主題活動	126,500	114,328
輔助中部及偏遠地區中小學來館參觀	5,628	5,893
星象教學及動手做	15,745	11,780
戲劇及音樂表演	10,154	36,865
戶外及觀測活動	1,622	332
比賽及頒獎活動	3,910	2,039
其他主題活動	41,887	100,722
到校服務	31,899	31,168
專題演講	3,888	3,121



楔子

在2005、2006年，已邁入「熟齡」階段的科博館科教活動，除了持續以解說、動手做、演示、劇場教室教學、幼兒活動等常態性活動服務觀眾外，自然學友之家亦於2006年1月以全新面貌，向10歲以上的自然愛好者招手，開出本館蒐藏研究成果的窗口，讓觀眾游目騁懷於自然探索的奧秘中。

幼兒科學園活動、導覽解說服務等等，加入義工朋友的創意，共同規劃、執行活動。配合「生命的律動」特展推出的偶劇表演，匯聚了義工及同仁們腳本撰寫、戲偶縫製、肢體表演的本領，這項新嘗試在炎炎暑假為觀眾帶來溫馨的歡樂氣氛。

學生及親子一向是科博館參觀的主力族群，但是面對老齡化社會的來臨及為擴展其休閒活動的空間，我們在2006年舉辦了重陽敬老活動，邀集社區銀髮族朋友前來共享科學的趣味，開闊自然與人文的視野。

對於一般明眼人，參觀博物館就像是到鄰家串門子，但是對視障者來說，卻需要克服重重的障礙，因此我們透過視障者與一般小朋友的互動，開了一扇通往彼此世界的窗。

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臺灣堪稱富饒的蕞爾小島，資源分布卻存在著差異性。為了促進城鄉交流，在我們的穿針引線下，20位雲林縣水林鄉的小朋友住進臺中市幾個接待家庭，在三天的共同生活中，來自城鄉的小朋友從不同的角度親近科博館。

2005及2006年的跨年晚會都加入兒童到開放展場的夜遊探險活動，在沒有干擾而且寧靜、昏暗的博物館展示廳中，以事前規劃好的故事線，讓年輕學子們體驗有別於平時燈火通明、川流不息的展示廳，滿足徜徉於科博夜色的想望。

「將知識送上門」持續到校的服務，將有趣的科學教材教具送到新竹以南、嘉義以北各地學校。而「科博有約」的活動，則配合金門自然學友之家在2006年遷移並重新於金城國中開放，將動手做、劇場教室教學、演示、影偶戲、天文觀測及研習活動等帶給金門的民眾。

2005、2006年，藉由「豔紅鹿子百合」及「重新發現臺灣獼猴」雙聯展巡迴中國大陸之際，我們也將科教活動經驗帶到福州、無錫、九江等地，尤其博物館與學校的合作模式，備受中國博物館界的重視，認為這是值得學習的寶貴經驗。

由於一場意外的邂逅，科博庭園「黑冠麻鷺」的追蹤觀察發現牠的巢位，架設攝影機觀察到牠育雛、成長和生活的過程，這一切透過實況轉播的方式，讓一般民眾隨時都能窺探科博庭園外來客的一舉一動，這也是科學教育結合資訊科技的展現。

科教人員掌握時機，嘗試自實踐中聯貫博物館展示、蒐藏、研究等功能，而自然學友之家每季更新的主題展，即是配合專業人員將幕後蒐藏加以展示呈現的主動出擊；而為了紀念鄭和下西洋六百年推出的特展亦是出自科教人的手筆，重新奏響造船、航海、貿易的海上交響曲。

有一句話說：「生活中充滿了選擇，大的選擇常在我們的心中『擱淺』經年，就像在等待一陣莫名的風。」但科教活動的與時俱進乃片刻不得須臾，我們以「善觀察、能多情、知謙卑」自我期許，微笑地站在永遠的第一線！

1. 假日專題解說活動
2. 蝙蝠傳奇特展定時解說
3. 假日專題解說活動
4. 鷺鷥鳥在臺灣影像展特展定時解說
5. 認識博物館之旅春節活動——準時雞
6. 恐龍記憶中的杉林——瓦勒邁杉特展定時解說

導覽解說

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導覽解說活動擔任展示品與觀眾間「聯繫橋樑」的角色，使觀眾能瞭解展示特色、理念與內容。除接受學校及一般團體導覽解說預約外，並依人力狀況安排導覽解說臨時服務，依照一般、特殊、專業、臨時、貴賓等各種參觀團體性質安排適合行程，帶領觀眾在有限的參觀時間裡，能具體且深入認識各展示主題和展品內容的奧妙。每場次約30分鐘，一般團體或學生團體（每團次20人以上）可事先預約或臨時洽排解說人力服務。2005年總計辦理常設展導覽3,606場次，參加人數109,509人次；2006年總計辦理5,505場次，參加人數159,377人次。

此外，也推出特展定時解說及假日專題解說活動，特展定時解說以特展為專題，施行深度解說，介紹展示設計內容，期使觀眾能廣泛瞭解及學習不同學域的自然科學知識。2005年配合特展總計辦理4,342場次，參加人數110,644人次。2006年配合特展總計辦理5,120場次，參加人數113,686人次。

假日專題解說則配合推廣介紹本館「地標性」或「獨特性」展示內容。2005年總計辦理797場次，參加人數24,632人次；2006年總計辦理635場次，參加人數計13,940人次。

科教活動的分項涇渭分明，提供給觀眾不同性質、多類別、多選項的參與方式，而綜合性的組合滿足了不同層次的觀眾需求；其中，「認識博物館之旅」假日科教活動更綜合了導覽解說、科學演示、劇場教室教學、自然學友之家探索等各項活動，並配合特展更換時程，設計安排活潑有趣的主題式系列參觀行程。以每月一單元模式逐月推出，且預先介紹行程，提高社會大眾參與的興趣。2005年辦理654場次，參加人數29,342人次；2006年計辦理568場次，參加人數23,187人次。

科學演示

科學演示活動乃配合展示之內容，運用簡單的標本、模型、儀器等，透過輕鬆活潑的解說表演，對觀眾闡釋有趣的科學原理與現象。2005年辦理5,851場次，參加人數84,074人次；2006年辦理5,474場次，參加人數83,525人次。

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星象教學及動手做

1. 星象教學及動手做

星象教學及動手做活動乃利用簡單的材料及扼要的講解，設計科學學習主題，引導觀眾從動手實做的活動中，瞭解科學的原理，激發對科學的興趣。2005年辦理719場次，參加人數15,162人次；2006年辦理649場次，參加人數9,367人次。

另配合教育部終身學習系列活動，2006年7月改變型態推出「出門看天氣」研習，辦理9場次，參加人數357人次；而8月推出「動手玩科學」研習，辦理44場次，參加人數1,770人次；9月份的週六推出「原汁原味的石板屋」動手做研習，辦理5場次，參加人數147人次；而9月週日則推出「驚天動地的地震」動手做研習，辦理4場次，參加人數139人次；合計共辦理62場次，參加人數2,413人次。

2. 我是樂器達人

配合「故宮及奇美珍藏樂器展」，藉由認識聲音相關的科學原理及動手製作簡易樂器（排笛）的過程，讓參加者對樂器的製作有較深入的瞭解。於2005年10、11月共辦理8梯次，276人參加。

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3.「舟舟有玄機」動手做

配合「六百年前的海上交響曲──鄭和下西洋」特展，於2005年7月的週六辦理10梯次「舟舟有玄機」動手做活動，活動中除介紹相關的科學知識、歷史及不同區域的船文化之外，也讓學員自己設計船隻並進行競賽，以增加學習的效果。共有307人參加。

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1. 科學演示──大氣與真空
2. 動手做──我是音樂達人
3. 動手做──日晷

幼兒科學園教育活動

幼兒科學園是專為3至8歲的學齡前及低年級兒童量身訂做的學習空間，融合了科教展示與活動，提供親子休閒、探索的最佳去處。在學期中配合學前機構的教學，以常設展、特展、蒐藏或新的動態訊息為主題，提供團體參觀教學服務。

每年的3~6月及9~12月都辦理兒童衛教活動，藉團康活動、戲劇和主題解說，教導小朋友衛生保健常識，從小養成愛護身體以及愛惜生命的觀念。2005及2006年與中山醫學大學合辦此項活動，各14梯次，分別有1,175位及1,235位兒童參加。

2005年3月至2006年1月，配合紅火蟻特展開發「螞蟻的故事」親子書活動，加上「蝦兵蟹將」、「彩蝶翩翩」等課程，共辦理232梯次，7,415位兒童參加。2006年3至12月，配合本館蒐藏及特展，共辦理191梯次，5,662位兒童參加。

2005年寒假，鼓勵假日義工服務轉型，推出科學DIY、科學百寶箱、探索精靈、發現科學活動，共辦理16梯次，315位兒童參加。暑期則配合常設展和戶外庭園，共辦理10梯次活動，422位兒童參加。還開發了「跟我一起看地球」動手做小冊子。2006年寒假共辦理8梯次的「凹凸之間」、「咬牙切齒看食性」、「精打細算我最行」及「狗狗豆豆畫」等活動，有241位兒童參加。暑假辦理「光影穿梭」、「生命的節奏」、「人體時光機」共12梯次，513位兒童參加。

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為增強義工服務機能的多元性，工作從服務台服務轉型參與引導活動或演示，從2005年寒假起，假日系列科學活動改以「主題活動」為主，頗受大小朋友的青睞與肯定。

週六、日的幼兒科學活動，2005年完成216場次，5,284人次；2006年完成171場次，5,275人次。此方案最大的邊際效益是改變了假日義工的值勤型態，建立義工參與教案設計及帶領活動的信心。另外週三下午的小型親子團體活動， 2005年2至4月辦理3梯次，共有66人參加。2006年5至6月辦理4梯次，共95位參加。2006年9至10月，配合教育部終身學習節活動，辦理4個梯次「認識秋天的植物」，共120位參加。

社區特殊服務方案包括婦女節活動和教師研習、終身學習節特別活動、跨年晚會配合活動等。2005年4月，配合婦幼節邀集臺中地區學前機構及警察婦幼保護機構等24個單位，舉辦「共鳴的學習環境──科博館與幼稚園之間」活動。為配合婦幼節關懷兒童權益，於2006年3月辦理「健康．生活．百戰百勝」活動，共19個單位參與，服務近2,000人；藉此活動提供學前機構與家長尋求協助的資訊與管道，各學前教育機構也進行交流和發表成果。2005年終身學習節，「咬牙切齒的魔術──指南車再現」活動共舉辦8梯次，132人參加；2006年「走進南島圖騰的世界」活動共辦理44梯次，1,360人參加。2005年12月31日配合跨年晚會活動首次辦理「博物館夜遊探險」活動，共150人參加。

為讓兒童擁有更多元的體驗，推出動手做活動單，2005年服務1,420場次，共30,514人次；2006年服務1,198場次，共36,135人次。

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4. 幼兒科學園──暑期活動
5. 幼兒科學園──終身學習節

劇場教室教學及主題活動

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劇場教室以生動活潑、寓教於樂的方式，結合多媒體、標本、模型以及實驗器材，配合精心設計的情境及講員的展演與解說，提供觀眾目標明確、內容豐富、多樣化的學習機會。

2005年新增教案有「電磁魔法秀」、「節能總動員」、「憂災悠哉」、「雷克斯之謎」，總計辦理5,386場次，參加人數100,364人次。2006年新增教案有「探索能源之旅」、「生命之源水知道」、「洋流」，總計辦理6,767場次，參加人數106,449人次。

2005年每月推出「彩繪劇場驚奇之旅」假日親子活動，以生動有趣的課程主題搭配不同的動手做，讓觀眾在遊戲中學習新知，總計辦理396梯次，參加人數22,565人次；2006年總計82梯次，參加人數7,380人次。

「小室家族科博遊」活動，結合了館內各項展示、教育設備及教學資源，並將學習觸角延伸至戶外，形成多元學習成長營活動，在2005年暑假分別辦理6梯次，參加人數 215人次。2006年暑假分別辦理6梯次「跟著能源走」，參加人數228人次。

此外，於2005年配合「入侵紅火蟻」防治計畫宣導教育，將服務延伸至中部五縣市偏遠學校，總計辦理26場，參與學生1,906人。2006年有關防災的科教活動推廣至臺北縣消防局、臺中女中，有關「入侵紅火蟻」的科教活動推廣至全國童子軍總會。

2005年5月辦理2梯次「手護水土」教師研習，7月至10月與臺灣省農會合辦「科學萬花筒」，共辦理20個梯次，參加人數670人次。

為培養科學探索的精神與創新思維能力及災害防範的理念，於2006年4月及9月分別辦理「科學探索與創新思維能力培養」及「現代科學與環境教育創意教學」研習活動，參加人數為271人次。

另外，為加強觀眾對「電」的認識，讓民眾了解電生磁、磁生電的基本原理，於2005年6月推出「來電感應」科學展演，說明簡易的電磁學，參加人數為780人次。

1. 彩繪劇場驚奇之旅──樹精靈話水土
2. 劇場教室上課照片──神州異獸大熊貓

自然學友之家

本館除展示和教育活動之外，幕後還有實力堅強的蒐藏研究部門。為了讓民眾也能分享博物館幕後的資源，自然學友之家於2006年1月以全新面貌服務大眾，讓新的標本和研究資源經過轉化後不斷匯入，使可用資源不斷累積，讓有興趣探索自然的學友得以藉此摸索到科學研究的門徑。

自然學友之家依照動物學、植物學、地質學和人類學四大領域，分區陳列及放置標本文物、相關圖書資料和簡易儀器。每一區除了代表性標本展示外，標本櫃內分類排放的標本或文物，民眾可從中自由選取感興趣的標本，利用相關器材和圖書，自行觀察或進行研究。

「標本鑑定」一直是本館服務大眾的項目之一，自然學友之家即是此項服務收件的窗口，我們鼓勵民眾親自來此練習鑑定，最後再會請研究人員確認。2005年完成的標本鑑定有27件，2006年標本鑑定共25件。

為引導大眾進入科學研究的殿堂，每一季推出以標本門類或物件詮釋為主軸的主題展，在蒐藏研究人員的指引下，培養大眾的觀察力及以科學方法探索自然的能力。2006年共推出棘皮動物、化石中的棘皮動物、「貝」受矚目—神奇的建築大師及生活中的礦物等四個主題展。

為讓觀眾更了解每個主題展的精髓及館內專業同仁的研究，自然學友之家設計了演講、演示、動手做活動或述說科學研究的故事。2006年舉辦21場「與標本對話講座」及9場「誰來說故事」，共吸引1,285人參加。

學有專精的義工教師群，利用自然學友之家標本，已開發出5個實體教學教案，2006年3至6月試行配合學校課程，將3個教案開放網路預約，共有15個學校團體，437人參加教學活動。

為配合2006年終身學習節，自然學友之家特別以「貝受矚目」為題，引導民眾認識各種貝類及生態，同時舉辦「科學繪圖研習」，共有110組155人報名參加。

針對視障與聽障生舉辦「觸覺探索體驗活動」，以《恩典之手》一書作者的成長與奮鬥為例，編寫口語故事腳本，讓學員認識世界著名的視障貝類演化學家希拉特．韋梅耶（Greeat Vermeij）博士如何善用視覺以外的感官進行田野調查與科學研究，並以此建立其信心，以觸覺體驗進行貝類分類與鑑定練習。

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3. 與標本對話講座，提供參加觀眾現場觀察活體或標本

4. 貝類分類與鑑定練習

5. 一般生協助視障生，運用觸覺進行貝類分類

輔助中部及偏遠地區中小學來館參觀

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2. 輔助偏遠地區學校來館參觀

針對各縣、市偏遠及特偏遠地區中小學來館參觀者，酌予補助交通及膳宿等費用，以鼓勵其來館進行校外參觀教學，以均衡城鄉學校差距。每年3至11月受理偏遠學校到館參觀教學，並依據學校需求預約，由專人安排及帶領。2005、2006年分別補助來館學校92及86所，師生3,794人及3,858人。

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1. 輔助中部地區學校來館教學

凡中部地區中小學專程來館進行教學，活動時間在4小時以上者，皆可預約與教學主題相關之輔助性課程及活動，以充實校外教學內容，活動當日得免費出入預定教學活動場所，並補助部分所需交通費用，以鼓勵有效利用本館展示設備及教育資源，彌補學校教具教材及資源的不足。2005、2006年分別輔助41、42校到館教學，服務師生人數合計達3,869人。

1. 導覽解說恐龍廳——臺南縣白河鎮竹門國小
2. 到校服務——苗栗縣苑裡鎮苑裡國中
3. 到校服務——雲林縣四湖鄉南光國小

科學教育研習

為加強運用本館資源，統整專家學者之實務與教學經驗，提供學生、教師及有志於自然科學者進修的機會，2005及2006年辦理以下各項科教研習活動。

1. 少年科技創作研習營

結合「物質世界」、「科學探索」展示區與學校「生活科技」課程，增加國中、小學生接觸生活科技活動的機會，以激發其對科技創作的興趣，研習採主題式教學方法，以動手實做啟發學童的創造力與思考力，且為當年度「Power Tech全國少年科技創作競賽」進行教學推廣。2005年辦理20梯次，574名中小學生參加；2006年辦理16梯次，442名中小學生參加。

2.「哺乳動物的牙齒世界」研習

2006年3月，結合「咬牙切齒——哺乳動物的牙齒世界」特展，以國小學童為對象。採主題式教學方法，運用解說、演示及動手實做，介紹特展精要，激發學童主題探索學習的能力。共7梯次，192名學生參加。另亦針對中小學教師，運用解說及動手實做，介紹特展精要內容，提昇教師對展場教學活動的瞭解，以期應用於學校教學活動。共22名教師參加。

3. 魯凱族生活體驗營研習

2006年5月，配合「力鼓百合——魯凱族霧臺部落植物頭飾」特展，採生活體驗學習方式，介紹魯凱族人的生活文化。共2梯次，55位中小學生參加。

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4. 安捷倫趣味科學活動

2006年8月，結合「光與影的魔術師」特展，運用臺灣安捷倫科技（股）公司（Agilent Technologies）所捐贈的日晷（Time Shadows）及潛望鏡（Pericopes）等教具，邀請臺中、彰化及南投三縣家扶中心輔導的學童共同參與，藉由導覽解說與動手做活動，使學童體驗與瞭解自然科學的奧妙與樂趣。共6梯次，274人參加。

5. 高中生生命科學研習營

為介紹生命科學的概念，激發高中生對生命科學的興趣，從分子生物學、生物技術、生物醫學、生態及分類學、生物演化、生物哲學等角度探討生命科學的概念。除專題講授外，並安排參觀蒐藏庫及實驗操作。每年於寒假辦理一梯次的研習活動。

6.「認識我們的蝙蝠朋友」教師研習

2005年3月，以中小學教師為研習對象，介紹本館特展及生態保育的觀念，以提供學校教學利用；並邀集蝙蝠研究的生物學者，介紹並分享多年來的成果與經驗，藉以傳遞蝙蝠保育的意識，進而落實臺灣生態保育的工作，共52人參加。

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4. 哺乳動物的牙齒世界
5. 魯凱原住民生活體驗營
6. 魯凱原住民生活體驗營
7. 安捷倫趣味科學關懷兒童家扶篇
8. 蝙蝠特展

7.「入侵種植物畫」教師研習

2005年12月共辦理兩梯次，讓學校自然科教師瞭解入侵種植物與臺灣的生態，並培養科學繪圖技巧、科學與藝術領域的知能，共70位教師參加。

8.「閱讀生命」教師研習

配合「我們的身體──生老病死」更新展示，2006年6、7月辦理兩梯次研習，以導讀的方式介紹醫學與人文等有關生命的內涵。邀請學者專家進行生命相關議題的研討，並藉由經驗分享，協助教師推展生命教育。共193位教師參加。

9. 年度榮譽教師頒獎活動暨「科老師工作坊」研習

每年選出1~2位榮譽教師，致贈榮譽教師證書及1,000人次免費入館榮譽卡，並邀請教育局貴賓蒞臨頒獎典禮勉勵，歷屆榮譽教師薪火相傳之祝福，榮譽教師博物館教學成果觀摩，讓新任的科老師認識基本科教活動資源。2006年活動主題為認識「聲音與光」的科學演示教學，參加人數131人。

10.「探索極地恐龍」學生團體研習

2006年4月舉辦4梯次，引領學生深入參觀「極地恐龍特展」及介紹其他相關展示，並分組提供暴龍骨架教學模型進行動手合作組裝。參加人數94人。

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11. 高中生自然科學研習活動

與中部12所高中合作辦理一系列的研習活動，透過連貫的教學內容及實際操作，使學員有較完整的觀念，瞭解博物館專業人員如何進行實驗研究等。2005年共240人參加，2006年共192人參加。

12.「魚的傳奇」及「昆蟲蒐秘」寒假研習

結合相關展示、館藏標本及專業人員的指導，於2006年1、2月各辦理4梯次研習，以增進學員對魚類及昆蟲的認識，提昇其接近自然、吸收科學知識的興趣，透過親身體驗及野外自然探索觀察，激發對臺灣原生種魚類及昆蟲的保護意識。參加人數310人。

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13.「蛇類的秘密花園」研習

於2006年5及6月辦理2梯次，透過解說、標本觀察及與活生生的蛇面對面的接觸，讓學員對蛇類有更深入的瞭解，並學習野外防範處理的方法。共136人參加。

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14. 史特林引擎模型製作研習

近年來由於引擎燃燒不完全造成的空氣污染，加速全球暖化現象，使得史特林引擎成為關注的焦點。2004年暑假至2006年8月，共推動6梯次的高中生組裝史特林引擎研習，逾210人次參與；並辦理4梯次的教師指導組裝史特林引擎研習，加強高中教師相關學科概念的教學職能，藉以發展出有別於一般動手做活動的程序，應用創意問題解決模式(CPS)之活動流程。

15. 中小學教師科博館教學導覽能力培訓——「咬牙切齒特展教師研習」、「教具動手做研習——電磁篇」、「展場實物探索研習」

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此項研習旨在協助教師應用展示區介紹展品，培養其對展場教學資源應用的能力，提高其運用展場教學資源之意願。舉辦12梯次，400人次參加。

2005年初階教學導覽研習以介紹中、低年級教師引導學生在展場進行科學探究為主，由解說員進行現場演示、經驗交流及教案綱要討論。

2006年以科學中心四樓的電學展示區相關概念介紹為主。初階課程介紹電學相關展示及其科學原理，並安排教具動手做活動；進階課程則以與電、磁相關的科技產品原理介紹為主。

16. 國民中小學教師天文研習

2005年11月，本館協同國立彰化師範大學，執行「健全師資培育及教師進修制度」項下之「建立教師終身進修制度」工作，共同舉辦國民中小學教師天文觀測研習。2006年11月，特別針對天文科學發展新知，配合天文基本常識，分別規劃「重新認識太陽系」及「從恆星到宇宙」兩個主題，辦理國民中小學教師天文輔助教學研習活動。2005年舉辦2梯次，參加人數124人次；2006年辦理4梯次，參加人數145人次。

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17. 國民中小學教師大氣研習

為了增進教師對氣象預報的瞭解、充實大氣科學知識、加強科學教學知能，特別結合了國立中央大學學者的專業知識、交通部中央氣象局專家的實務經驗及本館動手做活動的教育推廣內容，規劃辦理國民中小學教師大氣科學研習活動。於2005年12月舉辦1梯次，參加人數145人。

1. 探索極地恐龍學生研習活動
2. 高中生自然科學研習活動
3. 魚的傳奇
4. 昆蟲蒐秘
5. 蛇類的秘密花園——參觀本館浸液標本蒐藏庫
6. 史特林引擎研習
7. 教學導覽教師研習
8. 國民中小學教師天文研習營

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1. 物理博覽會
2. 探索物理教師研習
3. 解說小尖兵體驗培訓研習
4. 歡樂成長營研習
5. 尋找蜘蛛人親子專題研習

18. 國民中小學教師「探索物理」研習

配合終身學習節活動，以國科會「2005年科學季：探索物理博覽會」特展及本館物理相關展示與特展內容為主題，藉由館內外物理學者專家做專題演講，本館解說人員及義工導引操作相關展示，提供國中小學教師深入理解展示內涵，以激發其運用展示輔助教學及開發物理學相關展示的興趣。2005年舉辦2梯次，參加人數144人次。

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19.「植物頭飾製作」親子研習及原住民舞蹈活動

2006年4月，結合本館「力鼓百合——魯凱族霧臺部落植物頭飾」特展，運用解說及動手實做，使大眾瞭解魯凱族人創造特殊頭飾文化的生活智慧，提供親子觀眾多樣、活潑且具趣味性的教育活動。共20梯次，1,245名親子觀眾參加。

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20. 2006科博小小解說員體驗營研習

2006年7月針對國小六年級學生安排不同形式的體驗，觀摩學習解說技巧與能力，讓他們學習擔任解說員的角色及應有的儀態表現；另安排與本館自然科學專家面對面研討，認識蒐藏標本的功能，參加人數120人。

21. 科博歡樂成長營研習

為讓國小學生瞭解本館「臺灣原住民」相關展示內容，並深入認識原住民的傳統文化特色，於2006年8月針對國小四、五年級學生舉辦歡樂成長研習，讓小朋友製作原住民紙偶道具，並進行分組活動編講故事，參加人數121人。

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22. 奇妙的光──偏光畫製作特展研習

針對國小五年級以上觀眾，於2006年9月安排特展解說、專題講座及觀賞立體劇場影片等方式，並製作偏光板畫，介紹本館「光與影的魔術師」特展內容，參加人數共160人。

23. 尋找蜘蛛人親子專題研習

2006年9月舉辦尋找蜘蛛人親子研習，提供觀眾瞭解本館「蜘蛛」相關展示，帶領觀眾認識蜘蛛的特徵與習性，並分組進行蜘蛛網的動手創作與趣味競賽。參加人數共1,215人。

24.「穿越時空會樑柱──榫卯結構」研習

2006年8月，配合2006年終身學習活動，針對年輕族群透過展品解說、演示活動，帶領學員實地參觀相關古蹟，認識中國傳統建築中的榫卯結構。共辦理2梯次，80名國中小學生參加。

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6.、7.、8. 穿越時空會樑柱

特展教育活動

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因應特展的推出，有了教育活動的延伸，強化了特展的教育意義，2005、2006年針對特展舉辦了下列各項教育活動。

1. 蝙蝠闖關遊戲

2005年春節期間辦理每日一句祝福活動，由觀眾給予本館一句吉祥話的祝福（福音同蝠），有2,167人參與。

2. 夜婆在哪裡？──賞蝠活動

以親子為對象，透過引導讓參加者認識活躍在臺灣超過30種的星空精靈，再利用簡單的材料表現蝙蝠的特徵，指導及示範照顧小蝙蝠的方式，並介紹蝙蝠活動地點的生態、偵測儀器的使用等。2005年4、5、6月的星期假日在本館戶外庭園辦理活動，7月份活動地點則選在臺中市筏子溪。參加的孩童及家長，5梯次共約300人。

3. 狗年特展通關活動

配合生肖特展，於2006年2月假日辦理狗年趣味通關活動，以國小學童及親子觀眾為對象，讓民眾了解狗的特性及其與人類的關係，藉以建立正確的生命教育觀念。購買活動護照並完成闖關活動者有812組/人。

4. 認識新展區體驗活動

為配合本館「生老病死」更新展的推出，於2006年5月的週休二日舉辦認識新展區通關體驗活動，以引導觀眾參觀新展示，讓大眾接近生命深奧的生物醫學實相，並探索生命的心理層面。活動對象為國小學童及親子觀眾。共18場，2,684人參與。

5. 我的生命密碼動手做活動

2006年6月辦理的動手做活動，以四年級以上學童及親子組為對象，讓觀眾根據自己的英文名字，認識DNA三密碼子與胺基酸之對應關係。8梯次的活動共472人參與。

6. 垂涎三「齒」大挑戰活動

2006年寒假，配合「咬牙切齒──哺乳動物的牙齒世界」特展，進行闖關遊戲，介紹哺乳動物的特徵、牙齒及食性。提供親子觀眾瞭解哺乳動物多樣化的攝食構造及作用機制之活動。共16場次，4,245名親子觀眾參加。

1. 賞蝠活動　　2. 狗年特展通關活動

3.「咬牙切齒──哺乳動物的牙齒世界」展場

專題演講

1. 科學中心科普演講

為提昇社會大眾對科學中心展示中相關科學的認知，普及並推廣大眾科學教育，結合展示內容與館內外專業研究、教育、團體等人力資源，定期舉辦常識性及專題性的科普演講，以增進博物館的社會教育功能。於每月第四週週六於科學中心演講廳舉行科普演講，2005年辦理24場次，參加人數1,914人次；2006年辦理24場次，參加人數1,631人次。

2.「物理之美」科普演講活動

配合終身學習活動及「2005年科學季──探索物理博覽會」特展，以生活中的物理應用為主題，邀請館內外物理學者專家進行通俗性專題演講，藉以激發民眾對周遭物理學應用的興趣。2005年總計辦理10場次，參加人數1,500人次。

3.「空想不科學、科學要空想──超級英雄的電影物理學」大眾科學講座

為使大眾瞭解科幻電影中英雄人物顯現超能力是否符合物理學的合理性，本館與東海大學物理系透過教育部顧問室基礎科學前瞻性人才培育計畫，於2005年11月邀請教授、網路動漫畫評論以及電影評論家，來館進行大眾科學講座。共1場次，230人參加。

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4.「風之島──臺灣生態探索」系列演講

「風之島──臺灣生態探索」影片是一部完整呈現臺灣地區67種固有生物的生態教育紀錄片，本館於2005年1月運用此部影片，邀請國內各生態教育學者專家闡釋片中精要，傳遞環境保育觀念及新知，期能引起社會大眾廣泛的討論及關注。共3場次，244人參加。

5.「動、植物的生命律動」專題演講

2006年8月，結合本館「生命的律動」特展，邀請國內生態教育學者專家闡釋特展精要及新知，期能引起社會大眾關懷生態保護。共2場次，205人參加。

4. 天文演講
5.「空想不科學、科學要空想──超級英雄的電影物理學」海報
6. 墾丁研習
7. 墾丁研習──泥火山
8. 墾丁南海岸研習

戶外及觀測活動

1.「墾丁──南海岸地區自然探索」活動

本活動在於提供學生接近和學習大自然的機會，培養學生參與正當的休閒活動，激發對自然科學的興趣，促進保護自然的觀念。內容係透過本館資源、星空教學與觀測、地形景觀與植物生態觀察，規劃每梯次三天二夜課程，提供學員實地進行野外研習。2005年辦理3梯次，參加人數118人次；2006年辦理3梯次，參加人數120人次。

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2.「兩岸中學生暑期自然探索夏令營」活動

為推動兩岸中學生交流學習，建立兩岸博物館間合作關係，透過本館基金會的贊助，與北京自然博物館舉辦兩岸中學生暑期夏令營。運用本館蒐藏、展示及教育資源，規劃館內自然科學教育活動及野外自然探索活動，提昇學生對大自然的喜愛，激發保護自然的意識，活動期間為2005年8月15至24日。兩岸參加的學生共28人，包括中國北京育才學校中學生13位及臺中地區中學生15位。2006年7月則由臺灣學生組團赴大陸參加為期10天的夏令營活動，兩岸參加活動學生共41位，包括北京第十四中學國中學生15位及臺灣地區國中學生26位。2006年8月，本館與紹興科技館合作，科技館館長與當地建功中學師生共21人來臺參加夏令營，本地則有15位中學生參與。

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3.「尋找太陽公公的黑斑——太陽黑子觀測」活動

2005年7、8月週日，透過特製的太陽黑子觀測器，導引太陽影像到平面白紙上，以間接方式觀察太陽表面，尋找太陽黑子，提供民眾觀察太陽表面影像的機會，藉以激發民眾探討天文現象的興趣。共舉辦54場，1,476人參加。

1. 兩岸中學生暑期自然探索夏令營
2. 太陽黑子觀測活動
3.、4.、5. 尋訪臺灣哺乳動物化石之旅
6. 榮譽教師頒獎

4.「尋訪臺灣哺乳動物化石之旅」野外採集研習活動

2006年暑假，結合本館「咬牙切齒——哺乳動物的牙齒世界」特展，辦理野外採集活動，增加國中小學童對「臺灣哺乳動物化石」的瞭解。運用演示、參訪及動手做，介紹臺灣哺乳動物化石及出土地點，體會科學家野外研究經驗。共3梯次，135名學生參加。

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比賽及頒獎活動

1. 年度榮譽教師頒獎活動

年度榮譽教師是每年從科老師中選出一至兩位優秀教師加以表揚，同時邀請貴賓蒞臨勉勵，並安排博物館教學成果觀摩，由榮譽教師親身示範本館資源利用的方法。藉此活動讓與會的科老師們得悉新的特展，瞭解研究及有關資源以供教學利用，彼此分享經驗，便於學校教師以本館進行校外教學。2005年獲選者為臺中市崇倫國中陳韻如及協和國小張素女老師，2006年獲選者是臺中市忠明高中胡金枝老師。

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2. 蝙蝠活動徵文比賽——「星月」拜訪親戚

配合本館蝙蝠特展，結合科學教育與人文關懷，於2005年3月辦理徵文比賽，以狐蝠「星月」為故事主角，國小學童根據指定的參考資料，創作具有科學性的故事，從98篇投稿作品中，評選出11件佳作，公開表揚與獎勵。

3. 蝙蝠屋設計競賽——幫「星月」的親戚蓋新家

2005年4月由觀眾組隊參加設計競賽，參賽者以簡單的環保材料，設計東亞家蝠的家。評選出9件優勝作品並公開展出。

4. 攜手搭起一座知識的橋樑——動手搭建虹橋競賽

虹橋是北宋流行的一種構造獨特的木拱橋，利用構件縱橫相貫、交錯搭置的結構方法，創造以較短木材構築較大跨徑，不用中間橋柱的巧妙構造技術。本活動介紹所展示「虹橋」的原理與沿革，讓觀眾親自搭建縮小虹橋模型的方式，達到親子或朋友共同學習、寓教於樂的效果。2005年辦理68場次，2,100人參加；2006年辦理36場次，1,001人參加。

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5.「飛躍二十年、科博新紀元」青少年機器人表演邀請賽

為推廣青少年機械人設計活動，並結合國內青少年機械人競賽成果，為持續推展國內RoBoCup青少年機器人競賽(RoBoCupJunior)進行暖身，於2005年2月辦理4場「飛躍二十年、科博新紀元」青少年機器人表演邀請賽活動，共20隊77名師生參賽，737人參加活動。

6. 凹凸之間——斗栱創意競賽

中國傳統建築中的榫卯結構是有趣又實用的立體拼圖，配合終身學習活動，本館透過展品解說、演示及動手做活動為觀眾介紹傳統的「斗栱」技藝，期待參與者能從中體會三度空間的立體概念，進而在實作中激發創造新空間結構的意念。2006年10月辦理32場，809人參加。

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7.「Power Tech全國少年科技創作競賽」活動

為結合本館「物質世界」與「科學探索」展示，改進中小學校「生活科技」教學單元，與臺灣師範大學、中華創意發展協會等單位共同推展兼具科技創作性與趣味性之競賽活動，增加國中、小學生接觸生活科技活動的機會。於2005年10月間辦理臺灣中區初賽，國中小共61隊，244名學生參加；並於11月間辦理全國總錦標決賽，國小86隊，國中94隊，約720名學生參加。2006年辦理臺灣中區初賽，國中小共57隊，228名學生參加。

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7. 蝙蝠屋設計頒獎典禮會場
8. 搭起知識的橋樑——搭虹橋競賽
9. 凹凸之間——斗栱組裝創意競賽活動
10. Power Tech 2005全國少年科技創作競賽活動

戲劇及音樂表演

1. 暑假偶劇「密訪科博的外來份子」

配合「失序的自然——外來種特展」與「植物駭客——入侵種植物特展」，於2005年暑假推出「密訪科博的外來份子」偶劇秀，透過偶劇人物的對話，反省人類在外來種事件中所擔任的角色，進而減少一般大眾對外來種的負面印象，重新思考目前所面臨的生態問題。共演出27場，5,414人參加。

2. 雅美傳統技藝在臺中

於2005年8月邀請蘭嶼鄉朗島部落15位鄉民到本館參觀及表演，加強本島民眾對達悟族傳統舞蹈及織布技藝的認識；亦利用現場教學實做，教授達悟族傳統珠鍊技藝，總計辦理21場次，2,075人參加。

3.「穿越時空的天籟之音」系列活動

配合「故宮及奇美珍藏樂器展」，於2005年10至12月舉辦12場的週末音樂會及講座，邀請知名音樂家、樂評家及演奏團體到館表演及演講。上萬民眾參與此次活動，在欣賞優美樂聲之餘，也能增加對樂器種類及其歷史發展的瞭解。

4.「飛躍二十年、科博新紀元」偶劇表演

配合建館20週年，結合「雞年」特展，提供社會大眾多樣、活潑且具趣味性的教育活動。運用擬人化布偶與人偶之戲劇表演，結合影音、幻燈多媒體的介紹，傳遞特展的科學知識及概念。於2005年2月演出「黃鼠狼給雞拜年」偶戲劇目，共12場2,665名觀眾參加。

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5. 科博動物嘉年華遊行

於2006年寒假及農曆年假期間，以多具人偶配合熱鬧音樂，在展場內進行「嘉年華遊行」活動，吸引觀眾圍觀與人偶互動，以營造年假熱鬧氣氛。共22場次，7,462名觀眾參加。

6.「原來如『齒』」影偶戲表演

於2006年寒假及農曆年假期間，結合「咬牙切齒」特展，運用擬人化影偶與人偶之戲劇表演，配合影音、幻燈多媒體介紹，傳遞特展的科學知識及概念。劇中以詼諧有趣的故事情節，配合時空穿梭的虛擬表現手法，傳遞「不同食性的動物，各有其特有攝食的齒列及構造」等知識。共22場次，4,095名觀眾參加。

1. 暑假偶劇——密訪科博的外來份子
2. 達悟族傳統舞蹈表演
3. 穿越時空的天籟之音
4. 春節偶劇——黃鼠狼給雞拜年
5. 雞媽媽夢遊仙境
6.「偶說故事」教育活動——小鳥與果蝠
7.、8.「友」你真好——參觀自然學友之家
9. 忘年之交互動體驗活動

其他主題活動

7. 全民音動生活藝術年暨中秋節月光音樂會

2006年10月，結合街舞表演、親子寫生比賽、藝術創作DIY、舞蹈、武術、歌唱、樂團演出、2006「全民音動」競賽優勝者現場表演等精采內容，與民眾歡度中秋節。約4,000人觀賞。

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8.「唱自己的歌」原住民民謠演唱會

2006年12月邀請臺灣原住民各族群之創作歌手，舉辦民謠演唱音樂會，讓年輕學子聽見臺灣原住民的聲音，使社會大眾從各種角度聆賞原住民音樂。參加人數約1,000人。

9.「雞媽媽夢遊仙境」偶劇表演

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2006年暑假期間，利用簡單生動的劇情，以手偶搭配人偶的方式演出，以「生命的起源」展示為主題，透過與觀眾的互動，導引觀眾認識生命演化的過程。共48場次，10,108名觀眾參加。

10. 偶說故事──生命的律動

由本館現場教育人員及義工共同演出。參與人員於演出前聆聽美國偶戲大師Roccoberton的演講，及接受「無獨有偶」劇團的專業訓練。從無到有皆由全體共同腦力激盪不斷修改，再經專業演出示範指導而發展完成「日與夜：小鳥與果蝠」、「季節：野雁」及「生命長度：再見小乖」。部分並以英語演出。演出期間獲熱烈迴響，共演出216場，10,020人參與。

1.「友」你真好──城鄉交流活動

為了讓偏遠地區學生接觸博物館資源，促成不同地區的學童及家庭分享彼此的生活經驗，於2006年6月30日至7月2日辦理本活動，為小朋友們搭起友誼的橋樑。

本館第一次扮演中介的角色，運用多年來累積的經驗及精心安排的課程，使參加的學童從各種角度認識博物館，引發或加強其接觸自然科學的興趣。同時，連結附近小學組成接待家庭，讓學童藉由共同參與科學教育活動及生活經驗的分享，開拓不同的視野，藉此發掘願意合作辦理類似活動的族群，增加博物館提供教育服務的方式，並活絡與社區的關係。

三天的活動中，20位雲林縣水林鄉中興國小的同學與臺中市中華國小9位同學、中正國小1位同學及其家庭相處融洽，共同創造新的生活體驗及不同於以往的學習經驗。

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2. 旺年（忘年）之交──互動體驗學習活動

2006年4月辦理3梯次，邀請視障學校班級來館和社區學校班級進行互動學習，藉以建立正確的生命教育觀念。

希望彼此都能夠向對方學習，「從另一扇窗來看世界」。在視障同學與明眼同學的互動中，由特殊教育學校的教師指導明眼的小朋友關於盲人點字的規則，以及對視障者的定向行動；而盲生也能夠克服學習的障礙，瞭解狗的生物特徵、牙齒與食性等科學知識。最後在鹿港民藝師傅的帶領下，共同進行分組合作學習，用捏麵材料來形塑狗的特徵，並體會出對生命的尊重與關懷。

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3. 他是誰？──票選「天才愛因斯坦」活動

全球物理學界特別選在愛因斯坦第一次發表有關量子理論、布朗尼運動及相對論等論文100 週年的2005年訂為「世界物理年」，並配合2005年終身學習活動，挑選6幅愛因斯坦照片，透過觀眾票選「天才愛因斯坦」活動，使觀眾進一步認識愛因斯坦及其對人類的偉大貢獻。活動於2005年7月辦理，13,696人參加。

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4.「陶器親體驗」── 視障生特殊教育活動

藉由讓視障觀眾親自動手觸摸「陶」器物的教學活動，進行考古研究、製陶技藝專題介紹，使其也能體驗文化器物的形制，於2005年7月，分4梯次邀請視障學校或社會團體參加「陶器親體驗」視障生特殊教育活動，共172人參加。

5. 科學教育合作推廣活動

》 臺中市中小學科學展覽活動：2005、2006年6月配合臺中市教育局辦理，展出各校學生自行設計的自然科學研究內容，推廣相關科學教育課程知識。本館並以科學演示及劇場教室教學課程中適合的動手做項目提供攤位，共同參與此項「教育園遊嘉年華」活動。

》 社教機構終身學習節系列活動：終身學習節配合國際博物館日，規劃系列精采活動。2005年7月辦理1,018場次，27,449人參加；2006年5至11月辦理3,284場次，92,074人參加。

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1. 愛因斯坦紀念點燈儀式
2. 陶器親體驗
3、4. 科學園遊會
5. 科博99・長青九九 活動
6. 臺灣博物館博覽會

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》 科學教育影片節目拍攝錄製：協助各媒體到館拍攝展示品或錄製宣傳節目教學單元，以推廣科普常識。2005年拍攝錄製3次，2006年14次。

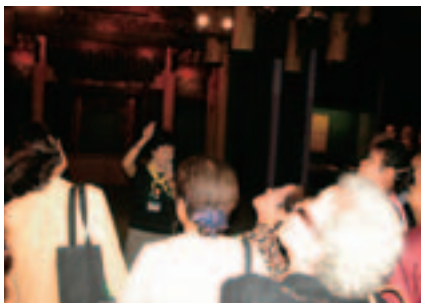
》 外借特展或展示巡迴車相關解說培訓支援：依各特展或巡迴展示車外展時程，配合借展單位推廣教育之需，安排解說員進行解說教師或志工培訓，以擴大教育服務層面。2005年培訓支援3次。

》 「藍蝶飛舞」影片播放：內容闡釋生命價值教育意旨，展現「鼓舞生命、奮發向上」的生命真諦。2005年7月本館與華展影業公司合作，於立體劇場舉行中部地區特映會，共有450人觀賞。

》 小小聽友科博大聚會：以「哺乳動物的牙齒世界」特展為專題，邀請國立教育廣播電臺臺北總臺「閱讀娃哈哈」優質兒童節目於2005年5月來館舉辦「小小聽友科博大聚會」活動。共120位參加。

》 「子宮內日記——動物篇」試映會：本館與國家地理頻道合作，於2006年12月辦理試映會，並就影片中所記錄的大象、狗及海豚的胚胎發育過程進行解說，讓民眾進一步認識、關懷動物，並培養尊重生命的態度。共有350人觀賞。

6. 科博99・長青九九重陽敬老活動



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配合教育部95年度重陽敬老終身學習活動，使銀髮族觀眾能瞭解自然科學及文化，於2006年10月邀請曉明常青大學、長青學苑等機構，協助安排60歲以上銀髮族團體來館免費參加。以「養生保健」為主題，進行相關展區解說，並邀請醫藥專家進行講座，提供銀髮族實用的保健知識。共80人參加。

7. 中華民國心臟學會春季會夜間參觀活動

為提供團體專案申請夜間參觀本館展示區或特展，於2006年4月規劃提供中華民國心臟學會春季會會議場地及開放適合參觀展示區或特展動線，使觀眾能舒適觀賞展品、深入認識科博館。參加人數300人。

8. 2006 Disney Channel臺中市萬聖節親子歡樂嘉年華活動

2006年10月配合迪士尼頻道與臺中市政府合辦之國際節日嘉年華活動，規劃活潑有趣的活動，邀請親子民眾共同參與兼具趣味性與創作性的教育活動。參加人數2,000人。

9. 中國信託公益親子園遊會活動

2006年12月本館配合中國信託公益親子園遊會，設置「科博大競賽」及「動手玩科學」等闖關活動，提供親子觀眾探索瞭解有趣的科學知識，啟發小朋友養成動腦的習慣，並透過動手做，培養科學創造力。500人參加。

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10. 2006年臺灣博物館博覽會

2006年12月於臺北市華山文化園區，配合教育部首次舉辦的博物館博覽會，本館規劃「自然生態區」展示，由專業解說員介紹展示內容，並設置「教育體驗區——動手玩科學」，提供觀眾參加「彈指神功（聲泡）競賽」、「凹凸之間——斗栱創意」組裝活動，另有數位線上學習活動。解說服務共1,400人次，而教育體驗420人次。

11.「夜探科博館」活動

在夜間的博物館展示廳中，藉由事前規劃好的故事線，透過各種不同形式的遊戲與活動介紹給學童，體驗有別於平時的展廳參觀經驗。2006年5、6、10、11月，利用週末假日推出「夜探科博館活動」，運用不同情境導引觀眾認識精采的自然科學展示。共辦理6梯次，540名國中小學生參加。

12.「讀」來「讀」網──捕捉展示板知識競賽活動

以閱讀本館自然科學展示面板文字說明為主題，透過小組合作、問答競賽的方式，導引觀眾細看本館各項主題展示與面板文字說明，建立實物與文字間的關聯性。2006年8月辦理32場次，313人參加。

13.閱讀博物館簡訊有獎徵答活動

以「閱讀，Young 視界」為主題，將本館20年來各期簡訊整理成冊，提供觀眾翻閱，並透過題庫與問卷設計，考驗觀眾的查閱與閱讀效果，藉以拉近與觀眾的距離，誘發其透過書面閱讀或網頁瀏覽本館簡訊的意願。2006年7月共辦理20場次，2,123名觀眾參加。

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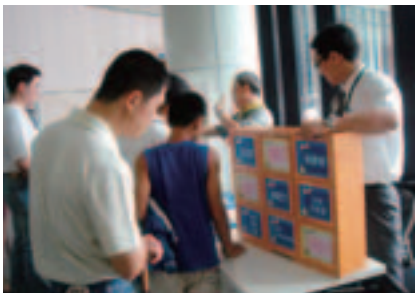

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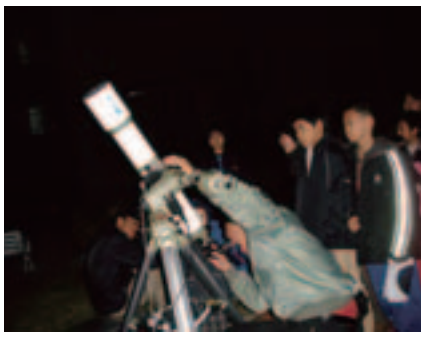
科博有約在金門

在本館與金門縣政府及關心自然科學教育之熱心人士共同規劃下，已將「金門自然學友之家」由金門縣文化局附設圖書館遷移至金城國中，並於2006年3月對外開放，希望能扮演臺灣與外島自然科學教育的橋樑。

為配合重新開幕，特地移展「入侵紅火蟻」及「深海火山」特展，並與財團法人國立自然科學博物館文教基金會及金門縣政府，於2006年3月共同舉辦「科博有約在金門」活動，包括55場特展導覽解說、28場科學動手做、31場劇場教室教學、36場科學演示、18場「原來如齒」影偶戲、2次夜間天文觀測及特展教師研習、地球科學教師研習、植物標本製作教師研習等。教育局安排國中小師生參觀學習，福建省政府員工也蒞臨參觀。總計9,743人參與活動。



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教材教具開發

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日常生活中的各種科技產品多少都與法拉第定律有關，由於無法目睹這些電流方向、磁場感應產生的現象，因此學生常無法完全加以掌握，造成教學的困難。針對常見的電學學習困擾，本館向國科會申請補助開發這組教具，2003年由本館提出專利申請後，接受學校的訂製。

本組教具在2005年1月應物理教學與實驗研討會邀請，設置於國立中山大學物理學年會現場，許多中學以上教師及物理相關科系教授，對這組教具在輔助理解的效果持正面的態度。同年6月於新竹清華大學設置「來電感應」展示區，也以這組教具搭配腳踏發電機，引發許多家長的迴響。12月也應彰化師大科教所之邀，於第21屆科學教育年會會場設置此一展示，同樣獲得現場教師的歡迎，紛紛探詢自行製作的相關事項。

1.「讀」來「讀」網──捕捉展示板知識競賽活動
2. 閱讀博物館簡訊有獎徵答活動
3. 科博有約在金門──深海火山特展解說
4. 科博有約在金門──夜間天文觀測
5. 電教具展
6. 義工訓練──自然學友之家經營理念
7. 義工訓練──顯微鏡概念與操作

科學教育電腦多媒體

為充實博物館科學教育資源，建構前瞻與創新數位的學習環境，應用電腦資料庫、數位多媒體等技術，開發多元化「數位科學教育資源」，提供科學教育推廣和學術研究的規劃與應用。

2005年完成「失序的自然——入侵外來種」螢幕式電腦節目及「哺乳動物的牙齒世界——咬牙切齒」電腦多媒體展演系統；2006年完成「各說各話」、「繞著太平洋跑」、「大洋洲臉譜」3個互動式電腦多媒體節目及「大洋洲的身體與裝飾」電腦展演節目。

自然生態探索教育學習

自然界生態的多樣性必須透過科學教育來傳達，初期以科博館庭園為自然生態觀察的範圍，2005年實地拍攝黑冠麻鷺築巢、育雛和成長的實況，以即時轉播的方式在本館網站播放，讓觀眾在家裡就能觀賞珍貴的生態「活教材」。2006年開闢「科博自然探索學習網」，提供教育資料和自然生態影像及影片等，內容包括黑冠麻鷺、小白鷺、夜鷺、貢德氏赤蛙和赤腹松鼠等，同時觀眾可以電子信箱發表心得或意見，由本館專業人員解答及提供服務。科博自然探索網的點閱人數，2005年為12,175人次、2006年為10,315人次。

義工人力運用

依本館各區域和特殊活動之需求，2005年計有1,154人參與本館志願服務，整體奉獻158,720小時，相當有酬人力78.7人，平均每日可支援之義工人力有115人次 (1人次為1人值勤半日)，因應各項特殊活動全年臨時調動支援之人力共1,022人次。2006年計有1,033人參與志願服務，整體奉獻158,688小時，相當有酬人力78.6人，每日可支援之義工人力為120人次，因應各項特殊活動之支援人力共1,969人次。

為及早因應未來人事精簡與經營策略調整的趨勢，義工將逐步替代主力服務工作，展場服務及「地震教育園區」都增加配置義工人力；並繼續與中山醫學大學、中國醫藥大學、彰化師大及臺積電文教基金會簽訂服務協議，認養本館的導覽服務工作。2005年臺積電文教基金會有239位義工投入855人次，每假日增加4至6個專業解說人力，服務觀眾人數共計11,275人。2006年臺積電文教基金會有230位義工投入791人次，服務觀眾人數59,203人。在徵募策略上以網路登錄報名（35.5%）和義工伙伴推介（34.7%）為主要媒介。

每年招募臺中市四所國立高中學生32人擔任寒暑假義工，中區各高中職學生110人擔任學期中假日義工，負責特定展品與小區導覽及觀眾安全維護，2005年起延長服務期間為1年，每人約服務100小時，正式服務前接受訓練12小時。

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為提升義工服務知能，2005年辦理電腦教育訓練，共5梯次101人參加；各展區或特展相關活動專業知識及技能演練共492小時；英、日語導覽訓練17次。2006年辦理電腦教育訓練，5梯次103人參加，各展區或特展相關活動專業知識及技能演練共460小時，培訓人數共計2,309人；展場服務美語訓練1次16人參加。

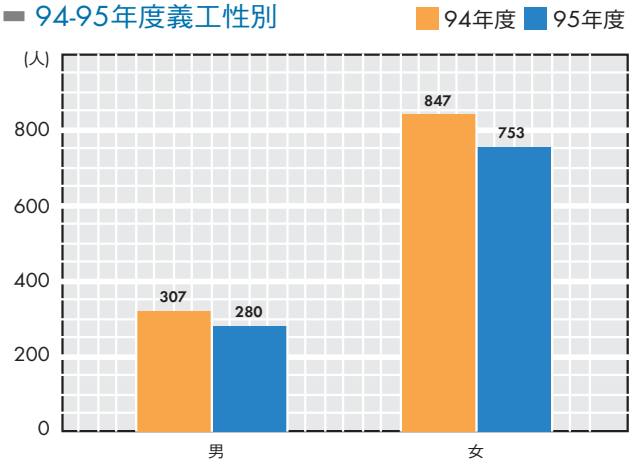
為了內部行銷與凝聚義工團隊向心力並追求進步，2005年規劃「多才多藝的義工」成長活動，共辦理5梯次764人參加。2006年定名為「團隊精神與自我提昇」，同時安排簡報「2005年全隊活動圖像」，促進團隊凝聚力，共辦理5梯次782人參加。本館也安排館際交流與觀摩，2005與2006年各辦理一次，義工幹部40人分別觀摩高雄歷史博物館、高雄市立美術館以及新港文教基金會等機構。

本館由於義工的服務績效與健全的營運制度，榮獲內政部頒發2005年度全國績優義工團隊獎。此外，每年也定期辦理義工表揚，2005年榮獲本館最高榮譽—特級榮譽獎者16位，年度共表揚了633人次，2006年表揚優秀義工707人次。2006年萬維玲小姐榮獲中華民國志願服務協會第13屆志願服務三等獎章。

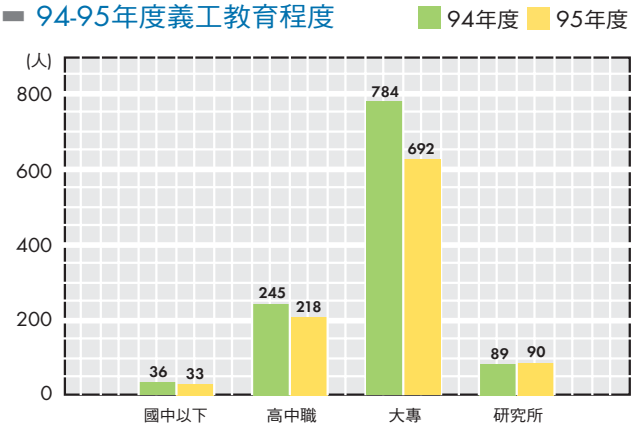
展望未來，義工人力的開發與運用，需配合館務需求保持更靈活的機制，此外，應著重建立民眾參與文教服務的互動平臺，建立終身學習的環

境，滿足義工在休閒、學習成長、社交、回饋社會與服務人群、國民參與公共事務等的動機與需求。

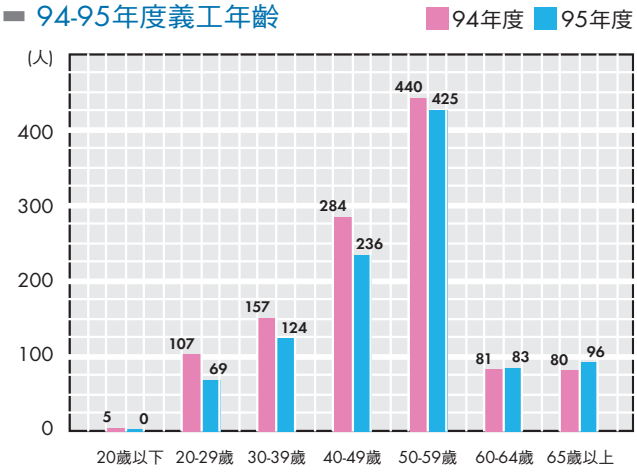
94-95年度義工性別



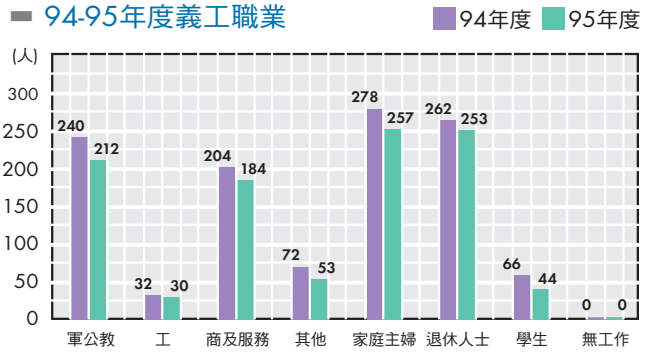
94-95年度義工教育程度



94-95年度義工年齡



94-95年度義工職業



兩岸文教交流

「岩壁上的精靈—艷紅鹿子百合」暨「重新發現臺灣獼猴」雙聯展，是以本館研究成果轉化之展示，基於推動生態保育觀念，並促進兩岸文化及教育交流，自94年度起展開中國各地巡迴。

於2005年7月巡展至中國福州科技館，本館科學教育組研究人員受邀於青少年科技教育研討會，以「博物館與學校的互動模式—以臺中國立自然科學博物館為例」為題發表博物館教育之經驗。

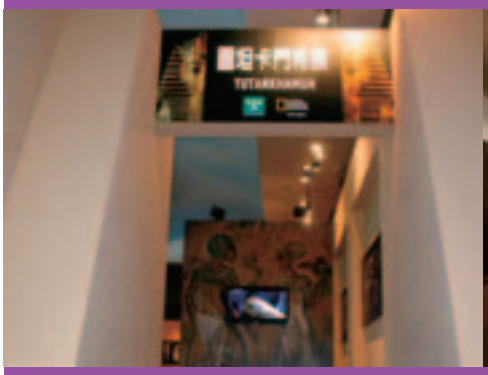
隨後於同年12月移展至江蘇省無錫科技館，並進行演講，就本館特色、各期建設的教育目標，以及學校利用本館資源的情形，與當地學校教師進行經驗分享。

配合「首屆九江市少兒快樂大本營系列活動」，此雙聯展於2006年6月起在江西省九江市圖書館展出，並與當地民眾分享本館與學校互動的情形。這是中國巡迴展的第八站，也是第一次與圖書館合作，互相交換彼此之經驗。

雙聯展在中國巡迴對提昇本館知名度極有助益，大多數博物館對本館的素質均表讚佩。中國近年來的博物館如雨後春筍般大規模更新及新建，並不斷培訓博物館從業人員，然對展示製作、科學教育、經營、行銷及服務等理念之建立尚待加強。本館多年來與學校合作與互動已建立良好基礎，此一模式在中國博物館界尚付闕如，在了解本館作法後，均表示值得學習。

2006兩岸中學生暑期自然探索夏令營 ▶

展示組



蛻變與困境

2005年是科博館的弱冠之年，除了元旦免費開放參觀之外，沒有特別的慶祝活動。對一個人而言，二十歲是容光煥發、渾身是勁的年紀；但對一個博物館而言，其常設展的年齡如在十年以上，恐怕是面目可憎了。

科博館的常設展乃在1986年至1993年之間分三階段製作完成。至今除了少數（例如「人類的演化」、「恐龍」、「物質的世界」、「天文、氣象」等）已更新外，其餘主題展最少已有13年了。因此，2005和2006年展示組的重點任務乃以「渾身是勁」的整備，在有限資源的支持下，設法煥發容顏，分別在生命科學廳改建完成「我們的身體——生、老、病、死」主題展示；在人類文化廳增建完成「大洋洲」主題展示，並發包更新「南島語族」及「農業」主題展示；在科學中心發包改建「天文氣象」主題展示。

我們也戮力完成地球環境廳「礦物」、「古生物」及「變動的地球」三個地質主題的展示設計，但因受限於建築法規，無法發包製作。這幾項重大的常設展建設乃在教育部「提昇服務品質計畫」項下進行，提供科博館改頭換面的機會。

既然常設展無法隨時更新，特展成為維持本館活力的主要活動。2005年的特展總主題是「結構與變異」(Structure and Variation)，由「角島鯨」、「咬牙切齒」、「雞既鳴矣」、「星空怪獸」、「這張臉、那張臉」、「蠕蜱」、「惠來男童」及「極地恐龍」等特展，組構出生命型式的變與不變，解析基本構造組成及其多樣性與演化的故事。此外，「失序的自然」、「故宮及奇美珍藏展」與「科學繪圖」則是在總主題的框架下延伸的展示課題，而「科博20聲影回顧」是將科博館作為一個生命體，其20年來活動紀錄的再呈現。「鄭和下西洋」、「2005科學季——探索物理」及「腦的美麗境界」屬於配合特殊事件或借入的巡迴展示。

2006年的特展總主題是「繁衍與生產」(Reproduction and Production)，原規畫「婚姻」、「欺騙的科學」、「好色有理」、「狗年特展」、「鍾愛新生命」及「你我獨一無二」等展示議題，詮釋生命歷程諸生命的生產與繁衍問題，也突顯演化與生命策略的有趣現象。由於本年度是「第一期提昇服務品質計畫」的最後一年，本組為全力完成既定常設展及更新計畫，調整部分特展計畫，延長「咬牙切齒」展，並引入「生命的律動」、「生物多樣性與人類」、「高鐵探索」、「暴龍蘇」、「兵馬俑Ⅱ」及「光與影的魔術師」，共同構成2006年的特展面貌，其中最特別的是「力鼓百合」展係與魯凱族合辦，揭示臺灣原生百合在魯凱族的榮耀象徵，于臺北與茂林巡迴展示之後，回到魯凱族的邦域化作常設展，成為文化傳承的橋樑。

為延續特展的生命，也囿於儲藏空間及人力，本組將保留下的10項特展推廣到各地進行巡迴展示，以嘉惠偏遠地區的民眾，甚至「臺灣獼猴」及「臺灣豔紅鹿子百合」兩項特展，還遠至中國大陸數個城市展出，宣揚臺灣及本館在物種保育上努力的成果，期盼海峽兩岸皆能重視自然保育的工作。

開館20年來，本組維修同仁時時刻刻專注展示品的保養與維修；劇場同仁努力以赴讓老邁的機具維持正常的運作，也不時選映最新的影片，堅持一貫的服務品質。

在歡慶20週年後，蛻變與成長將是本組最重要的課題。

1. 咬牙切齒特展
2. 角島鯨展——完整角島鯨骨骼
3.「雞既鳴矣——雞年特展」展場一隅

2005年特展

飛躍二十年
科博新紀元

創意的幻影 不朽的記憶——科博20・聲影回顧特展

- 2005.1.1~2005.6.12
- 第三特展室

為歡慶開館20週年，特就歷年來的視聽成品及活動海報，引領觀眾回顧曾與本館共同走過的足跡。

展覽區分為：科博元年區、不朽記憶區、影片回顧區、時空通關門、聲影雙語區及觀眾DIY等區。瀏覽這些自製聲影檔案的同時，也將發現20年來視聽科技的進展，悄然替換了數個世代。新生代的觀眾可能難以想像要先捲底片才拍照的過程，也可能從未見識過比CD光碟片大上好幾倍的唱片與唱盤、盤式錄音座、笨重的16mm放映機、Beta及3/4"規格的錄影帶、雷射碟影片，以及到晚近已不再出現的5.25"磁片等等。

影像凝塑著情境，音律悸動著心弦，回望歲月，原來持續的堅持，是一種執著，也是一種對生命的熱誠。

雞既鳴矣——雞年特展

- 2005.2.4~2005.5.1
- 蒐藏秘室前廊

本展示是十二生肖展之一，分「雞的多樣性」、「雞的育種」及「外來的環頸雉」等三大主題，以長26公尺、高4.7公尺的大型鳥籠中，展出紅原雞、白尾赤腰雞及紅尾赤腰雞等14種雉雞。同時，也結合展出中的苗人傳統民居建築—吊腳樓，模擬苗人在日常生活中樓底飼養牲畜的情景，展出北京油雞、烏骨雞和名古屋雞等育種雞。

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惠來男童特展——小來面相復原展示

- 2005.1.25~
- 生命科學廳一樓特展區

「小來」是本館人類學組於2003年9月30日，在臺中市惠來里挖掘出土的第一具男童遺骸，經中部觀眾票選而命名。「失落史前惠來人」特展介紹此遺址文化、小來及早期臺中地區居民生活狀態及形式的考古研究資料。

林健成先生根據小男孩頭骨測量數據，繪圖確認骨骼構成，加上肌肉及髮膚，小來的面部形狀終於整體構成，代表小來復原過程的三座塑像，配合從一四四號抵費地進行搶救發掘工作中所復原出土的陶器，為民眾解析惠來遺址的文化及重要性。

重要館藏特展 21世紀新發現的鬚鯨——角島鯨

- 2005.2.4~2005.4.30
- 第一特展室

近年來，國際鯨豚研究讓體型龐然的鬚鯨科家族喜添一名新成員，那就是2003年才被確認與命名的「角島鯨」，本館就擁有4件完整的骨架標本。本特展將角島鯨與小鬚鯨的骨骼一同展出以供比較，藉以推廣鯨豚教育。

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星空怪獸──蝙蝠傳奇特展

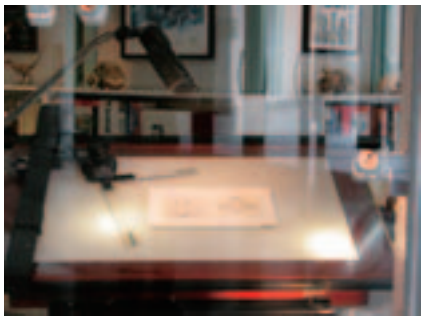
- 2005.2.4~2005.12.18
- 第二特展室

蝙蝠是唯一真正可以飛行的哺乳動物，約近千種，僅次於嚙齒目動物。中國人因「蝠」、「福」同音，視蝙蝠為吉祥物。西方人則因蝙蝠皮翼的神奇魔力及吸血蝠的特殊食性，而有鬼魅聯想，視之為恐怖不祥的代表。本特展目的在促使觀眾全方位地瞭解蝙蝠的豐富度與趣味性。特展主題包括：吉祥動物還是邪惡象徵、飛翼的魔力、蝙蝠的多樣化面貌與食性、蝙蝠與人類產製品的關係、蝙蝠的家與全球蝙蝠保育等項目。看牠們如何駕馭著鳥類和獸類的優勢，飛出一片屬於自己的繁榮新世界；如何緊密地與自然界的花、果、蟲、魚、蠍子、蜥蜴、青蛙、蛇之間交織出生命的動人樂章，創造著地球上生意盎然的驚奇與奧妙。

科學插圖展演

- 2005.3~
- 展演室

科學資訊的散播，除了文字敘述外，各種插圖實扮演重要的角色。插圖可以強調或突顯複雜系統中的關鍵結構，也可用來說明複雜機制中各因子的交互關係；更可把研究數據以不同類型的圖表呈現出來。科學插圖可以減少文字的字數和模糊不清的描述，更重要的是，圖像可以跨越語言的限制。本展演是由資深插畫繪圖人員針對不同類型的標本作現場的繪圖，並即時與觀眾互動，回答各種繪圖技巧的相關問題。



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1. 星空怪獸 蝙蝠特展
2. 科學插圖展演
3. 動物標本展出

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失序的自然──外來種特展

- 2005.5.15~2005.8.31
- 第一特展室

從人類數百年前各種航海探險旅程開始，到今天航空旅遊的便利性和農產品全球化的經濟活動下，各地的物種在人類的協助下，不必克服自然屏障，就可快速流通，有的外來物種藉著適應優勢，侵占了原生物種的棲地，使其族群大受威脅；又有可能經由直接捕食而將原生物種趕上滅絕之路。少數強勢的外來種改變了區域物種的多樣性，大自然物種的分布被擾亂了，失去了原有的秩序。

但本展示並未把外來種生物描述成面目猙獰的怪物，因為牠們的處境是被我們所製造出來的！所以透過這展示，喚起大家再次反省「人類」這個最大的外來種對地球永存的責任！

法老王──圖坦卡門特展

- 2005.6.10~2006.4.24
- 生命科學廳二樓

埃及法老圖坦卡門，自從1992年他的王陵被人發現以來，一直是全世界考古學家或科學家矚目的焦點。本展示介紹利用圖坦卡門木乃伊的電腦斷層掃描(CT Scan)法醫鑑識，試圖揭露三千多年前他離奇死亡的真正原因。觀眾在虛擬的環境中，不必解開包裹木乃伊的布條就能看到圖坦卡門法老木乃伊神秘的一面。

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鄭和下西洋特展

- 2005.6.30~2005.10.16
- 人類文化廳橢圓形廣場迴廊

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為了紀念鄭和下西洋600週年，陳信雄教授及龍村倪教授受邀為特展顧問，首次由解說員自己策劃本項展示。我們向陽明海洋文化藝術館商借寶船復原模型，以及近代航海所使用的「六分儀」、「磁羅經」，還邀請古船舶模型製作專家曾樹銘先生，實地製作原尺寸古代帆船的巨型絞車（張帆與收帆、拋錨使用），同時獲得收藏家呂惠齡小姐提供難得一見的「龍涎香」，並展出明代銅錢與瓷器。以淺顯易懂的文字內容及展示品，帶領觀眾瞭解鄭和的生平、中國的造船技術、航行科技、海上生活及各國貢品等等。

2005科學季──探索物理博覽會特展

- 2005.7.1~2005.9.2
- 第三特展室、陽光過道兩側及微觀世界前廣場

為響應聯合國推動的「世界物理年」學習主題，由國科會及教育部指導，中華民國物理學會承辦，在北中南三地同步展開。這是臺灣物理學界推動科學學習系列計畫的一部分，藉以改變民眾害怕物理的心理，引發參與物理科學研究的興趣，國科會向優秀的國內外物理專業團隊徵展，獲得近百件優質展品，民眾從親身參與中體會物理學習的樂趣，期盼提昇物理研究風氣。

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4. 圖坦卡門特展

5. 千噸級寶船

6. 探索物理博覽會

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這張臉・那張臉特展

- 2005.8.10~2005.11.10
- 第四特展室

人臉是我們與世界溝通的介面，其重要性可想而知。本展示透過科學、藝術兩方面探討人臉的相關議題，包括了：1.什麼是臉？主要是從生物演化角度介紹人臉的由來和從解剖學了解人臉的構造；2.人們如何解讀及辨識臉？從認知心理學介紹對人臉的記憶及辨識等，更從演化心理學介紹嬰兒長得像父親的重要性；3.為什麼要戴上面具？如果人臉是溝通的器官，那又為什麼要

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用面具隱藏起來，並試圖從戰爭、宗教儀式及娛樂等多面向介紹面具的意義；4.什麼是美，又美的真實意涵是什麼？美是不是只有「情人眼裡出西施」，還是科學可以有更客觀的審美標準？5.整容科技所追求完美的美所引的社會議題及 6.未來的臉，在數位技術進步的今天，我們如何辨識真實與虛擬的臉？

本展示是由本館與英國皇家藝術學院（Royal College of Art）的Sandra Kemp教授所合作。展品涵蓋了自然科學、人類學、當代藝術作品及最新的數位科技等多個領域的蒐藏。這種結合科學與藝術的展示，亦代表著自然史博物館在展示發展上的新嘗試。

1. 這張臉那張臉特展文宣海報
2. 這張臉那張臉特展
3. 穿越時空的天籟之音——戶外音樂會
4. 穿越時空的天籟之音——珍藏樂器展

穿越時空的天籟之音——故宮及奇美珍藏樂器展

- 2005.10.8~2006.1.8
- 第一特展室

在行政院中部辦公室及青輔會協助下，邀請國立故宮博物院、奇美博物館、國立臺灣美術館等單位共同合作，為中部地區籌劃一系列的人文藝術特展與活動。故宮博物院蒐藏罕見的翠玉小白菜及4件中國古代樂器在本展中輝煌登場；奇美博物館收藏的珍貴小提琴、歐洲自動樂器與留聲機等52件西洋樂器珍品，讓民眾驚豔與讚嘆。伴隨的多項大規模戶外音樂會是中部地區少有的系列饗宴。

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鍾愛新生命──子宮內日記巡迴車特展

- 2005.10.12~2006.2.19
- 西屯路廣場

「生、老、病、死」是人生必經之路，也是生命教育不能不談的議題。「鍾愛新生命──子宮內日記」巡迴車特展，是本館推動生命教育十年計畫中的第一項。參觀者可一窺孕育新生命的過程，更能感受新生命誕生的奧妙與意義。

蟎蜱特展

- 2005.10.21~2006.2.20
- 第三特展室

蟎蜱是一群無所不在而且十分多樣的小動物，例如寄生於蜜蜂氣管內的蟹蟎，可以小到0.09mm，而最大的為寄生於動物的一種真蜱，吸血後可以大到3公分以上。在分布方面，從海底6,000公尺深到5,000公尺的高山都可發現蟎，牠可能是目前活動領域最廣的生物之一。

蟎蜱是一個與人類生活息息相關卻被嚴重忽視的小動物，對人類的衛生及農業有很大的影響，本特展主要向觀眾介紹這鮮為人知的動物。

6 ▼

鏡頭下的鄭和傳奇──國家地理麥可・山下攝影紀實

- 2005.11.8~2006.2.28
- 演化步道

鄭和曾奉明永樂皇帝之命，於1405~1433年間，七次率領艦隊下西洋。這項壯舉造就了鄭和成為中國歷史上最偉大的航海家。鄭和下西洋屆滿600年的一刻，本館與國家地理頻道、臺北市政府文化局合作，在國泰航空公司的贊助下，同時於臺中本館演化步道與臺北華納威秀廣場推出此戶外影像展，以茲紀念。2005年，國家地理攝影師麥可・山下自中國啟程，追尋鄭和下西洋的足跡，沿途記錄與攝影，從中挑選40幅攝影作品展出。

7 ▼

5. 鍾愛新生命特展
6. 蟎蜱特展
7. 鏡頭下的鄭和傳奇

飛覽伊甸園──非洲空拍攝影展

- 2005.11.9~2006.5
- 二期戶外廣場

羅伯特・哈斯(Robert B. Haas)從空中記錄非洲大地的面貌，讓我們更能看出非洲雄偉的自然景觀，與動物和人類在非洲大地上生活的足跡。七十幅作品皆佐以攝影者的拍攝心得或非洲學者的介紹，讓參觀有親臨非洲大陸上空的感覺。

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1. 飛覽伊甸園──非洲空拍攝影展
2. 飛覽伊甸園──非洲空拍攝影展
3. 極地恐龍特展

腦的美麗境界特展

- 2005.11.18~2006.1.2
- 立體劇場前廳

當人們談及腦科學時，總認為這是專屬科學家及醫師們的事。「腦的美麗境界」讓大眾深刻體驗到生活中的大小事皆由腦來處理，從而充實腦科學知識，培養面對生活中各種事件與壓力的認知，保持精神層面的健康。

本特展深入淺出地介紹基本的腦結構與功能，清楚呈現腦功能障礙與精神疾病的原因，同時談及落實精神疾病的早期發現及治療的重要性。

極地恐龍特展

- 2005.12.23~2006.4.23
- 第四特展室

過去20年裡，在澳洲、南極洲、阿拉斯加和南美洲等地所進行的恐龍研究，改變了我們對恐龍生活的看法。本展示探討牠們是否只生活在熱帶的沼澤裡，是否可生活在靠近南北極地區，並能夠在每年長達3個月的黑暗中生活下來。

本展與澳洲莫納許科學中心合作，展出來自澳洲、南極、北美洲及南美洲的恐龍標本，伴隨展出植物化石、花粉及孢子的玻片標本及岩石標本，讓觀眾有機會建構當時孕育這些恐龍的環境。展示使用大量的照片、復原繪圖、模型、地景、影片等，也有多項互動式展示讓觀眾嘗試推論過去環境的情形。

3 ▲

2006年特展

銅縷衣修復展演

- 2006.1.13~2006.2.28
- 展演室

玉衣是漢代皇帝及諸侯王貴的喪服，有金縷、銀縷、銅縷、絲縷之差別。本館從收藏家手中，獲得1,300片中國漢代玉衣的玉片。經本館化驗得知玉片為蛇紋岩，即古人所謂的「岫玉」。從穿孔中殘留的銅線，確認本件為銅縷玉衣。本館用三個月的時間，以展演方式公開將玉衣修復，完成後陳列於生命科學廳「人類的生老病死」展示中。

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當狗遇上人——丙戌年狗年特展

- 2006.1.24~2006.5.14
- 第二特展室

本特展延續本館十二生肖系列展示，而狗在十二生肖中排序第十一；展示從狗的生物學開始，探索人與狗的互動歷史，分析狗在人類生活中的不同角色，例如神話傳說、宗教信仰、狩獵畜牧、看護家園，協助警務及視障朋友的導航者等。展示中有來自大陸河南漢代陶狗複製品及臺灣土狗等標本，以及各種狗模型、偶製品等，讓我們理解狗的形象的演變。清朝郎世寧的十駿犬、元劉貫道的元世祖出獵圖、清明上河圖、大陸浙江地區的「孩子們畫的狗」、臺灣藝術家黨若洪先生的油畫，與藝術家彭弘智先生的作品「小白：狗眼看人」都展現人與狗相互的重要性。

4. 修復後的銅縷玉衣
5. 當狗遇上人特展
6. 咬牙切齒特展

咬牙切齒——哺乳動物的牙齒世界特展

- 2006.2.~2006.11
- 第一特展室

本特展以哺乳動物的牙齒結構與功能為主軸，展品集本館近20餘年來所珍藏二百餘件重要的哺乳動物化石、骨骼與毛皮標本，帶領觀眾近距離觀察多樣化的哺乳動物頭骨、牙齒、骨架等結構特徵，及特化與食性關係，並經由操作機械模型，瞭解「咬牙切齒」的機械作用模式。本特展也舉辦一系列熱鬧有趣的科教推廣活動，讓本展示更加生色突出。

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「力鼓」百合──魯凱族霧台部落植物頭飾特展

- 2006.3.15~2006.6.19
- 第三特展室

「力鼓」（lrigu）百合的魯凱語意是「榮耀的百合」。臺灣百合（*Lilium formosanum* Wallace）是一種遍布於臺灣的原生種植物，佩戴在魯凱族的頭上，象徵著男子的狩獵豐碩及女子的貞潔。

特展內容包括：魯凱族的文化脈絡、植物頭飾的起源、頭飾的種類及佩戴方式、具有榮耀象徵之植物頭飾佩戴權的取得、頭飾的變遷與文化傳承等主題。本展示與協辦之國立臺灣大學生物資源暨農學院農業陳列館、原住民族委員會文化園區管理局、霧台鄉公所等單位輪流展出。

高鐵行動探索館展示

- 2006.4.1~2006.4.30
- 西屯路廣場

高鐵探索館係以高速鐵路為主題的小型科技展示，其生動的展示內容提供民眾瞭解高鐵這新鮮的交通工具，寓教於樂的行動展示，特別為學生所鍾愛。

1. 魯凱族霧台部落植物頭飾特展
2. 光與影的魔術師特展
3. 生命的律動特展

2 ▲

光與影的魔術師特展

- 2006.7.1~2006.11.30
- 第二特展室

「視覺」是人類感官中非常重要的一部份。但光譜中還有部份的色彩是人眼所不能看到的，本展示透過CCD或螢光顏料就可以把這些不易見的光變成非常有趣而且生活化的影像。其中「氣功大師」、「熱對流」、「魔鏡」、「每賭必輸」、「魔法走廊」、「換個眼睛看世界」等有趣的光學與視覺互動遊戲，為觀眾掀出生活中不為人知的原理。

3 ▼

生命的律動特展

- 2006.7.5~2006.9.10
- 第四特展室

自然界充滿了各種的節律，例如：日與夜的節律、半個月的節律、月節律、季節性的節律及生物的生命週期等。面對各種節律，生物在長期演化下發展出許多不同生活方式來適應，因此有了遷移的鳥、冬眠的熊等。

這是一個不以標本為主要訴求的展示，而是透過互動式展品導引觀眾主動探索各種律動。展場中充滿節奏感的背景音效，讓觀眾領受一個百分百「節律」環境。本展示原是英國倫敦的自然史博物館於2001年所製作，國立臺灣博物館於2004年引進，巡迴到本館展出。

4 ◀

生物多樣性與人類特展

- 2006.7.15~2006.9.23
- 第三特展室

地球的生物多樣性以史無前例的速度在消失中，科學家常把這波因人類活動造成物種消失的過程，比喻為地球的第六次大滅絕。無論從科學知識或實用價值面來看，太多人不知道自己損失了什麼！

法國的兩個非政府組織：諾亞保護協會與余洛自然與人道基金會提供30餘幅影像，分成十個主題來介紹目前生物多樣性所面臨的危機。嚴謹規劃的構圖，加上攝影作品流露的強烈張力，令人印象深刻。本項展示由本館與法國在臺協會合作籌劃。

知識宅急便系列特展

- 2006.10~2007.1
- 第三特展室

5 ▲

知識宅急便系列特展採用通用設計（或稱為無障礙設計），展出兩個主題：「認識我們的身體」學習箱，及「臺灣都會中常見的鳥類」學習袋。主要目的是希望以多元溝通管道的形式，用眼觀看的圖文訊息，用手觸摸的點字與剪影凸版資料及用耳聽的展示語音資訊，將展示教育訊息傳遞給所有的人，不論其有無知覺感官上的障礙。

4. 生物多樣性與人類特展
5. 暴龍蘇特展
6. 知識宅急便系列特展

暴龍蘇特展

- 2006.9.29~2007.1.7
- 第四特展室

自1990年被發現後，暴龍蘇就引起了很大的擁有權之爭，一直到1997年由美國芝加哥費氏自然史博物館在麥當勞與迪士尼兩大企業的贊助下，終於買下暴龍蘇，提供「她」最後落腳的家。費氏自然史博物館把修復後的「蘇」，鑄模複製發展成兩組巡迴展，隨伴著十多樣互動式展示，讓世人有機會認識「蘇」的故事。

本展示還加入多件首次展示的館藏品，包括暴龍在亞洲的近親「特暴龍」的鑄模標本，和2004及2006年先後在中國發現的「帝龍」與「冠龍」的1/2比例模型。這兩種新發現的恐龍都是暴龍家族的早期成員，體型都比暴龍小了許多。

6 ▲

劇場篇

1 ▼

無所不在的數位臺灣特展

- 2006.11.1~2006.11.29
- 陽光過道及立體劇場旁大廳

本特展由行政院科技顧問組、臺中市政府與本館合辦，內容為展現臺灣「高科技服務島」及政府致力推動數位化的成果及影響面。

「無所不在主題館」與「無所不在應用館」，分別展現「e化服務無所不在」、「臺灣e產品無所不在」及「數位e象」三個主題；以及未來數位技術的應用發展，共規劃四特區：e偵探、數位e廊、e視界及臺中行動城。

本館以「數位科博新鮮視」主題參展，包含多年來的典藏數位化計畫及發展數位博物館之代表性成果：1.知識多樣及加值多元的「自然與人文數位博物館」；2.兼具探索及趣味的「兒童數位博物館」；3.個人環境感知的「行動學習服務系統」。

太空劇場——太空劇場的臨場感是最受國人所津津樂道，這兩年本館慎選四支新影片，分屬地球科學、科學傳記、飛航及古生物學，其教育內容如下：

2 ▼

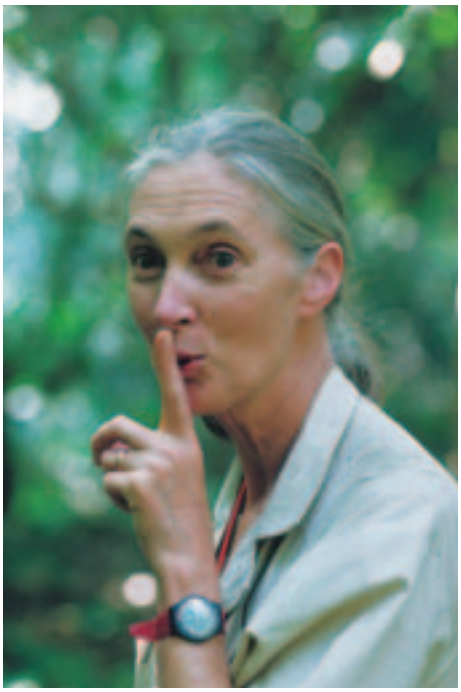
1. 大自然的力量

大自然原始的力量始終支配著我們，火山的噴發，地殼板塊的推擠、拉扯或錯動產生的地震，往往沒有徵兆，也無法準確的預測。本片記錄了加勒比海島嶼蒙特塞拉特島上的火山爆發、橫掃美國中西部大平原的龍捲風，以及夷平土耳其北部城市伊茲密的超強大地震。科學家披荊斬棘探索天然災害發生的原因，瞭解新的預測方法，期使大自然的傷害減至最低。

2. 珍古德與黑猩猩

本片記錄傑出的英國靈長類動物行為學家——珍古德博士（Dr. Jane Goodall），於1960年前往東非的坦尚尼亞，展開長達40年對黑猩猩族群研究的成果。

社交性的理毛行為是黑猩猩與同伴維繫感情與關係的重要方式，而黑猩猩釣食軍蟻的方法及工具，說明黑猩猩的學習行為是代代相傳的知識——文化。黑猩猩是瀕臨絕種的動物之一，最大的生存威脅來自棲息地的破壞及人類的捕獵。珍古德博士於1977年成立了珍古德協會，並陸續成立黑猩猩庇護所，提供黑猩猩孤兒的照顧及保育觀念的推展。她對靈長類的基礎研究，為我們推論與重建原始人類行為模式貢獻良多。



3 ▲

4 ▲

1. 無所不在的數位台灣海報
2. 太空劇場影片——大自然的力量
3.、4. 太空劇場影片——珍古德與黑猩猩

3.藍天鐵翼

飛行是一種興趣，也是一種傳承。戰鬥機飛行員約翰・史特拉頓對祖父的崇拜與懷念，牽引出祖孫兩代對飛行的熱愛與執著。本片有來自6個國家128架高性能飛機，藉由「紅旗演習模擬任務」，將戰鬥機飛行員的高超飛行技巧及飛機的高科技性能，表現得淋漓盡致，也營造逼真的實彈演習、模擬空戰畫面、炸彈組裝與吊掛、空軍失事人員的解救、空中加油及轟炸飛行任務。

5 ▲

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4.霸王龍──回到白堊紀

7 ▼

霸王龍（暴龍）是人們最為熟悉的恐龍之一，也是同類中最為兇猛的肉食性恐龍。牠生活在距今六千七百萬年前到六千五百萬年前的北美洲西部，最後消失在地球上。

片中著名的古生物學家唐納・海頓博士的女兒──愛麗，她一直對古生物學很感興趣。這一天，她來到爸爸工作的博物館，當面對著一隻20公尺高、15噸重的暴龍模型時，突然一股神奇的力量將她吸入，愛麗發現她竟然回到了恐龍的時代──白堊紀。愛麗穿梭在各型恐龍之間，體會被恐龍追逐、跟暴龍面對面近距離接觸的獨特經驗。當民眾看完「暴龍──蘇」的特展後再觀賞本片，最能體會這樣的經驗。這也是重演本片的主因。

立體劇場──只要看著大人小孩的手在場中滿場飛舞，就可以知道他們是多麼投入立體影片的情境中，今年五齣影片讓民眾樂翻天：

1. 疾速狂飆：2005.1.1~2005.12.31

內容描述一個吊兒郎當的賽車好手和他的團隊，參加一項奇特的立體大賽車。當他在千變萬化的立體賽車場中，因為屢遇險阻而體會到合群團結的重要，於是改變了原本散漫的態度和隊友團結合作，最後終於贏得了冠軍，全片強調團隊合作的重要性，而疾速畫面令人心驚膽顫，育樂兼容。本片是立高（Lego）玩具的相關產品。

8 ▲

2. 夢幻嘉年華：2005.1.1~2005.6.30

描述在如霧的雲層裡有一座糖果城，到處是甜美可口的甜點變成的樂園。有一隻叫「巴利摩」的豬，總是能出奇不意地做出讓人絕倒的美味甜點，也能適時化解糖果城所有發生的問題。

然而，老鼠軍團無不想盡辦法潛入糖果城作亂，最後，靠著一位小孩的智慧化解危機，全片強調遇事臨危不亂隨機應變的重要性。本片由臺灣的立體動畫公司出品。

9 ▲

5.、6. 太空劇場影片──藍天鐵翼

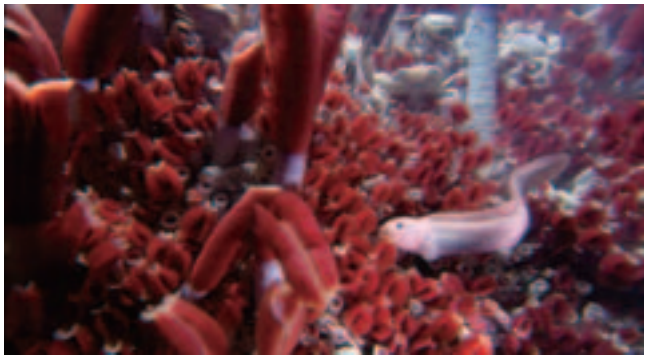
7. 太空劇場影片──霸王龍回到白堊紀

8. 立體劇場──疾速狂飆　　9. 立體劇場新片──夢幻嘉年華

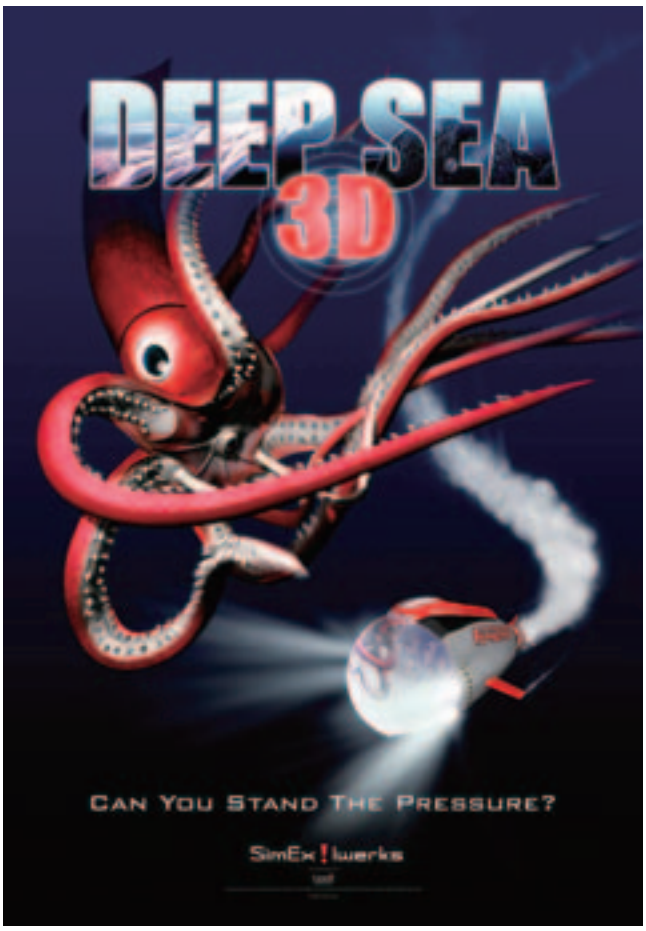
3. 飆火星：2005.7.1~2006.6.30

內容描述來自22世紀的太空兔「拉比」欲前往火星度假，卻陰錯陽差的穿梭時空來到古代明朝，巧遇小孩「王也」。為避免錯過度假時機，只好帶著王也一起飛向火星。當火星出現在眼前時，他們的驚異奇航探索了火星上赤紅的大地、巨大的奧林帕斯火山、大型的水手峽谷及難得一見的火星遊樂園及火星特殊交通工具。本片有溫馨、有緊張、也有理性，蘊含著豐富的太空無重力狀態、太陽黑子、日珥、彗星及火星地形等深入淺出的天文知識。

1 ▼



3 ▲



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4. 深海大進擊：2006.1.1~2006.12.31

結合真人與3D卡通，搭乘深海潛艇下潛600公尺深的海域，在黑暗的世界中，追蹤觀察抹香鯨追捕大王魷魚難得一見的精采獵食過程。接著潛艇下潛超過1,500公尺深的海底，驚險進入海底熱泉噴口，飽覽超熱海水由海底裂縫湧出的驚險畫面，以及一旁大型管蟲、蟹等難得一見的生態體系。

5. 樹與機器人：2006.7.1~2006.12.31

描述一個男孩和機器人原本居住在一片充滿綠意的美麗大地，但一場突如其來的戰禍，不但使兩人從此分隔兩地，也摧毀了寧靜的家園，使得地球自然生態環境完全被破壞，氣候也變得寒冷異常，不適合草木生長。機器人不畏艱難地尋找小男孩，他倆終於相遇那一刻，小男孩早已成為白髮斑白的老人，劇情中人與機器的努力與真摯，使被戰爭破壞的地球環境又重新獲得新生。

1.、2. 立體劇場影片——深海大進擊　3. 樹與機器人
4. 太空劇場影片——大自然的力量　5. 霸王龍回到白堊紀
6.「力鼓」百合——魯凱族霧台部落植物頭飾特展

劇場統計

》太空劇場

2005年：放映「動物大遷徙」、「深海火山」、「大自然的力量」、「珍古德與黑猩猩」四部影片，共計放映2,365場次，參觀人數為363,505人；另外，星象教學33場次，參觀人數為6,334人。合計2,398場次，參觀人數為369,839人。

2006年：放映「霸王龍──回到白堊紀」、「大自然的力量」、「珍古德與黑猩猩」、「藍天鐵翼」四部影片，共計放映2,395場次，參觀人數為354,230人；另外，星象教學25場次，參觀人數為4,566人。合計2,420場次，參觀人數為358,796人。

》立體劇場

2005年：放映「夢幻嘉年華」、「飆火星」二部影片，各放映1,078及1,097場次，參觀人數分別為151,573及185,040人。合計2,175場次，參觀人數為336,613人。

2006年：放映「深海大進擊」、「樹與機器人」二部影片，各放映1,078及1,113場次，參觀人數分別為142,088及173,721人。合計2,191場次，參觀人數為315,809人。

》鳥瞰劇場

2005年：放映「大自然的奧秘」、「生命的起源」兩部影片，共計放映2,013場次，參觀人數為115,163人。

2006年：放映「生命的起源」影片，共計放映1,925場次，參觀人數為95,030人。

》環境劇場

2005、2006年：放映「日夜的交替」、「四季的變化」、「生命的律動」三部影片，各放映1,790及1,946場次，參觀人數分別為64,022及73,937人。

館外推展

2005至2006年期間，有「入侵紅火蟻特展」、「火星大探險」、「花的前世今生」、「自然的形」、「深海火山」、「眼見未必為憑」、「剎那的永恆──鳥類生活攝影展」、「鳥類生態展」、「鯨豚影像展」、「力鼓百合──魯凱族霧台部落植物頭飾特展」等10項特展，並至臺北市立動物園、南瀛文教基金會、桃園縣自然史教育館、高雄縣茂林風景區管理處、宜蘭縣自然史教育館、臺灣省政資料館、臺北縣十三行博物館、金門縣文化中心、屏東航空站、臺南縣自然史教育館、彰化縣政府、國立臺灣博物館、埔里鎮農會、大鵬灣風景區管理處、國立臺中一中、澎湖縣文化中心、國立虎尾高中、國立金門高中、私立明道中學、國立臺東女中、私立屏榮高中、國立屏東高中、高苑科技大學、嘉義市立博物館、臺南市野鳥協會、國立中正紀念堂、國立臺灣大學醫學院、黑潮文教基金會、國立臺灣大學、臺灣原住民文化園區、霧台鄉魯凱族文物館等33個單位巡展；展示巡迴車外借予高雄縣茂林觀光風景區管理處、大鵬灣風景區管理處、恆春半島觀光客倍增產業聯盟、南瀛文教基金會、臺北市京華城等5個單位展示；科學教育巡迴車在921地震教育園區展示之後，轉往桃園縣文化局、廣達電子公司、中壢藝術中心、林口長庚醫院及臺南縣文化中心展出。

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— 2006　發展非制式科學教育資訊網教學資源之行動研究——以「科學探索教育資訊網」的建置為例　2006年電腦與網路科技在教育上的應用研討會　論文光碟B1。
— 2006　發展非制式科學教育資訊網教學資源之行動研究——以天文教育資訊網的建置為例　2006年物理年會暨學術研討會。

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植物學組

植物學組在組織結構上，分為維管束及非維管束二個學門，分別推動本組之蒐藏與研究工作，並支援本館展示與科學教育工作。此外，本組負責本館植物園的經營大任。二年來積極拓展與館外相同學域的接觸與交流，讓外界看到臺灣，也讓臺灣看到科博館。

重要動態

2005年3月22至4月3日本組同仁參加於北京召開的國際數位化資訊會議，會議後前往香港進行植物考察與採集。2005年5月10至19日前往荷蘭蒐集球根花卉相關資訊。

中華民國真菌學會為紀念陳瑞青教授對國內真菌學的貢獻，於2005年8 月23日陳教授逝世兩週年，假本館舉行「真菌、天、地、人」學術研討會暨陳教授學術成就回顧。他退休後將數千號真菌標本捐贈給本館，陳師母於出席研討會並接受本館致贈感謝狀後，也決定將陳教授的藏書捐贈本館，經過整理篩選後已納入收藏。

兩岸真菌學術交流自1992年在臺中霧峰舉辦第一屆學術研討會後，即每兩年易地舉辦一次，到2005年已是第七屆了。2005年8月23~25日，在本館及溪頭連續辦理兩項真菌學術研討會，是真菌學會二十年來規模最大的盛會，吸引了兩百位同好參加。有14位中國真菌學者參加研討，另協助安排10位中國真菌學者來臺進行參訪考察，他們都準備了不少中國的真菌標本複份贈予本館，共同促進了雙方多面向的學術交流。

2005年7月，同仁赴奧地利維也納出席國際植物學研討會，向國際植物園保育小組報告本館植物園發展歷史與園區科教展示規劃策略，受到國際的矚目；2006年3月，國際植物園保育協會派亞洲代表Dr. Junko Oikawa等來臺參訪，對於本館植物園蒐藏與科教展示的結合、造紙特展活動及參觀熱潮深表讚佩，受邀參與撰寫東亞植物園特刊，及積極參與國際間植物園保育活動和學術交流。2006年3月22日至4月4日參加大陸「國際茶花育種會議」，並蒐集山茶科植物及茶花品種。2006年5月19至26日同仁至菲律賓進行植物調查採集。2006年8月20~25日獲得國科會補助至澳洲參加第八屆國際真菌會議，並發表論文2篇。2006年7月3~6日前往新加坡參加2006國際薑科植物研討會，瞭解目前薑科植物的重點發展，以及分類與保育等方面的研究報告，有助將來薑科植物蒐集的規劃與發展；此外，並參訪新加坡植物園剛開展的薑園，除學習薑園的活體植栽與展示模式外，也接洽活體交換單位，包括新加坡植物園、中科院華南植物所及中科院西雙版納熱帶植物園等重要薑科相關植物蒐藏園。

基於本館植物園的活力，國立臺中高農為擴展其教學資源，願與本館合作經營其既有的園地，同時解決本館植物園腹地不足的困擾，雙方簽訂合作備忘錄，就臺中高農之第一、二、三校區進行規劃與建設，其中第三校區占地近百公頃，將會是全臺灣重要的低海拔丘陵植物演替教學植物園。

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1. 爪哇肉盤菌
2. 古茶花
3. 邱創煥前院長等率臺灣代表參加國際茶花育種會議

重要紀事 • 2005～2006年

2005年

- 台灣木生型擔子菌類生物多樣性資源調查。
- 本館澳洲植物區「瓦勒邁杉」 (Wollemi Pine)引種。
- 杉林溪藥用植物園植物名錄調查。
- 本館生命科學廳植物演化園更新。
- 本館真菌種源全面檢測及更新（2005.3~2006.2）。
- 臺灣黃唇蘭出瓶馴化。
- 無菌播種臺灣原生蘭——梵尼蘭。
- 執行國科會計畫前往雲南採集真菌標本並前往上海參加「第五屆國際食藥用菌研討會」並發表論文。
- 受邀前往北京參與「第一屆海峽兩岸生物多樣性資訊管理研討會」並做口頭報告。
- 秋海棠 (*Begonia*) 夏季移地馴化。
- 「武威山茶」復育。
- 辦理「真菌、天、地、人學術研討會」。
- 辦理「第七屆海峽兩岸真菌學術研討會」。
- 前往筑波及夏威夷熱帶植物園進行研習。
- 前往英國邱園（RBG, Kew）並查對標本。
- 臺中高農合作事宜。
- 移植夏威夷攜回發芽種子及後續照顧。
- 參加「2005自然物標本與生物多樣性資料庫整合國際研討會暨species2000亞太地區論壇」。
- 植物園種原庫的種子發芽測試。
- 與臺大農業陳列館合辦「阿祖的生活——臺灣民族植物展」，並於展覽期間發表「臺灣原住民的藥用植物」專題演講。
- 辦理「植物駭客——入侵種植物特展」（植物活體展覽、攝影展、學術研討會及植物畫研習二梯次），其中入侵種植物攝影展並移展至國立臺灣大學及國立中興大學。
- 執行國家典藏數位化博物館計畫。
- 執行國科會「國蘭健康種苗生產體系」計畫。
- 執行國科會「臺灣產婆婆納族系統分類研究」計畫。
- 執行國科會「臺灣產當歸屬（繖形科）分類研究」計畫。
- 執行國科會「臺灣肺形草屬的系統分類研究」計畫。
- 執行國科會「臺灣肉盤菌科的研究」計畫。
- 執行「玉山國家公園楠梓仙溪流域上游地區森林永久樣區設置及調查計畫（2）」。
- 執行「楠梓仙溪流域中海拔地區常綠闊葉林與落葉林推移帶永久樣區設置及調查計畫」。
- 臺中高農第三校區大肚山植物調查。

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2006年

- 繼續進行臺中高農國際植物園合作案。
- 北京師大聯繫芸芸眾生東北虎區的展品更換事宜。
- 參與山茶花育種會議。
- 接待「國際級植物園保育協會」（BGCI）亞洲地區及日本區負責人來館參觀。
- 地衣標本吸收光譜檢測合作研討。

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- 進行秋海棠 (*Begonia*) 稀有種類人工授粉，果實採收集及無菌播種。
- 赴新加坡國家蘭花園觀摩學習經營及種原維護相關事宜。
- 前往新加坡植物園，參加世界薑科研討會並參訪薑園。
- 前往澳大利亞凱恩斯參加第八屆國際真菌學研討會。
- 赴大陸參加植物園會議並介紹臺灣植物園。
- 赴蘭嶼進行達悟族民族植物田野資料蒐集。
- 無菌播種菲律賓、越南、大陸、夏威夷秋海棠11原種。
- 執行國家典藏數位化計畫。
- 執行國科會「臺灣肺形草屬的系統分類研究」計畫。
- 執行國科會「臺灣肉盤菌科的研究」計畫。
- 執行「玉山國家公園楠溪流域上游永久樣區蔓藤生態之調查計畫」。

1. 入侵種植物特展記者會
2. 澳洲國寶活化石植物瓦勒邁杉捐贈儀式──臺北會場
3. 日本東京科學博物館植物部部長暨筑波植物園園長加藤雅啟博士訪問本館
4. 現代方舟，種子收藏於低溫長期保存庫

蒐藏、研究及科教展示成果

一、重要蒐藏成果

截至2006年底，臘葉標本共蒐藏23,528份，其中較特殊的是里龍山肺形草的模式標本，而鴨跖草科的鞘苞花(*Cyanotis axillaries*)於1934年採於高雄縣大樹鄉後，直到1999 年才再次發現於屏東縣泰武鄉萬安村親水公園，我們的紀錄應是目前所知第二個分布點。石竹科的皺葉繁縷 (*Stellaria monosperma* var. *japonica*)（或稱獨子繁縷，種子僅有一枚），為目前植物誌所遺漏，也是少有的採集紀錄。謝光普所捐贈的綠島植物標本，也是少有的完整紀錄。交換自中國北京植物研究所的大陸標本，日本自然史博物館、千葉大學的日本植物標本，以及來自美國密蘇里植物園的非洲標本都是較難得的標本。2006年4月完成所有臘葉標本總的清點。

至2006年底，海藻標本共登錄5,499筆，苔蘚植物標本17,708筆，地衣標本4,157筆，合計標本總數共27,364筆。其中除自行採集外，尚包含購自中國、交換自日本，以及各學術機構與個人捐贈之標本。至2006年底前，真菌標本蒐藏已超過兩萬號，是臺灣最具規模的真菌標本蒐藏庫。真菌菌種蒐藏兩千多號，約近一千種。

植物園近年來積極拓展合作據點，與國立臺灣大學溪頭森林遊樂區合作成立「蕨類植物園」，與杉林溪森林風景遊樂區合作牡丹的蒐藏與展示，以增加蒐藏的廣度。至2005年9月30日止，植物園活體蒐藏共2,180種（包括亞種、變種、型及園藝栽培品種），隸屬於207科、899屬，其中蕨類植物34科、68屬、191種，裸子植物7科、12屬、15種，被子植物166科、819屬、1,974種。植物園於2005年初建立種原種子庫，蒐集臺灣原生植物種子，以供保育、研究及交換；截至2006年，共蒐藏約380種原生植物，其中超過200種來自野外蒐集，目前正進行種子活性測試。加強與中央研究院生

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二、重要研究成果

物多樣性中心合作，進行東亞秋海棠的種原蒐集，目前收集活體種約120種，除以傳統繁殖方法及組織培養方式，在無菌環境保存40種原生秋海棠，並有5種秋海棠種子以超低溫長期保存，經實驗檢測均可保持一定的發芽率，植株並可正常的發育成長，未來將逐一以現有材料進行保存實驗，研究安全、經濟的超低溫保存技術是未來的工作重點。持續與臺中市忠明國小合作進行「臺灣原生植物繁殖計畫」，其中有大量稀有物種，未來將持續進入校園，讓校園成為保育的場所，也讓原生植物成為學習的教材，目前繁殖約50種各式原生植物約2,500株苗木。本土性特稀有水生植物的收集與育苗方面，於2005至2006年間，針對大型木本水生植物風箱樹（臺灣的野生族群已經完全消失），以及水社柳（臺灣特有物種，野生植株只剩百餘株）進行扦插育苗，頗具成效，並多次提供各級學校或研究機構等，作為生態教學園區素材或教學的活教材。2005年12月已出版「國立自然科學博物館植物園植物名錄」，將活體蒐藏按植物分類系統進行統整。

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龍膽科肺形草屬植物系統分類研究，這類植物均為臺灣山區植物，特有比例高，適合作為臺灣特有植物種化的題材。經研究後，共處理臺灣產種類7種，其中5種為特有種，包含最近發現的新種——里龍山肺形草（*Tripterospermum lilungshanensis*），形態上與臺北肺形草較相似，但卻相隔中央山脈，呈現南北間隔分布；此新種分布限於臺灣南端中海拔山區，族群數量不多，是特稀有種類。

桑寄生植物的持續調查研究，提出蓮花池寄生的重寄生新證據及解析。針對森林動態研究，參與永久樣區的調查與長期研究，特別是中海拔地區常綠闊葉林選定楠梓仙溪林道的櫟林帶，與臺灣生態學會、靜宜大學合作，於2006年完成9.2公頃樣區劃設與每木調查，目前是臺灣前四大而中海拔地區最大的永久樣區，研究成果不僅可與國際大型永久樣區比照，也是東亞高山島特殊森林生態研究的重要基礎，更是玉山國家公園長期保育研究的成效。此外，於永久樣區進行蔓藤植物的生態研究，深入調查蔓藤在森林生態系中的多樣性和分布，進而分析以瞭解其在森林演替中所扮演的角色，將成為臺灣第一個森林生態中結合蔓藤調查整合分析的重要學術研究。

臺灣產鼠李科植物形態與分子親緣關係研究，在花粉粒特徵觀察方面，可將臺灣鼠李科花粉依外層雕紋形態分為三種類型：Sageretia-type、Phylica-type、Rhamnus-type。木材解剖特徵方面，如多為散孔材、導管獨管孔或徑向排列或形成管孔團，分布型為斜向或樹枝狀排列、單一穿孔；導管間紋孔互生，具緣。木纖維具紋孔，無螺旋加厚紋；木質線不疊生、異型；多數不具鞘細胞；木質線薄壁細胞與導管間紋孔互生，與導管間紋孔同型。同屬間木材特徵同質性高。DNA序列方面，核基因組ITS含或不含5.8S片段在所建構的分子親緣關係具一致性。葉綠體基因組在屬間及屬內種間親緣關係的解析力不及核基因組ITS片段。果實的種類與DNA序列所建構的樹狀圖有密切的關係。2005至2006年總計發表了三種新歸化的植物，分別是柔毛牻牛兒苗（*Geranium molle* L.）、假澤蘭（*Austroeupatorium inulifolium*(Kunth) King & Robinson）及印加孔雀草（*Tagetes minuta* L.）。

熱帶物種一向是植物園的發展重心，熱帶原生稀有物種的種原保存自然成為研究與工作的焦點，2006年發表產於臺灣蘭嶼稀有植物腰果楠的組織培養論文，提供該稀有植物區外保育另外一條途徑。

經過十多年的野外調查，在臺灣低海拔熱帶、亞熱帶地區及雲南西雙版納的月橘屬活植物莖或枝上發現皮殼菌（corticioid fungi）新屬新種，即梨形棕殼菌

（*Brunneocorticium pyriforme*）。該新屬的獨特地位及分類屬性亦經過細胞核大亞基（LSU rDNA）分子序列分析研究確認過，梨形棕殼菌就形態而言雖是皮殼菌，但其分類地位卻屬於真傘菌類（euagarics clade）。梨形棕殼菌子實體扁平形、白色、邊緣棕色，具雙系菌絲，生殖菌絲有扣子體，骨骼菌絲量多明顯，棕色。薄壁囊狀體存在。雙孢型擔子。擔孢子梨形。該新屬新種已投稿《Mycologia》並獲得接受。

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三、展示及科教成果

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2005～2006年共舉辦下列19項特展：蕙蘭特展（2005.1.28~2005.2.28、參觀人數11,333人），恐龍記憶中的杉林——瓦勒邁杉傳奇再現特展（2005.2.25~2005.5.28、戶外參觀人數不予列入），花開富貴——春之天香「牡丹特展」（2005.4.1~28、參觀人數14,030人），仙履蘭月例巡迴展（2005.4.22~24、設於溫室參觀人數不予列入），慈母心．遊子情「萱草特展」（2005.5.5~29、參觀人數4,010人），植物駭客——入侵種植物特展（2005.6.10~2005.8.28、參觀人數13,262人），植物駭客——入侵種植物攝影展（2005.7.5~2005.10.31、設於溫室參觀人數不予列入），荷蓮變辯辨（2005.7.1~2005.9.30、戶外參觀人數不予列入），太陽花傳奇——向日葵特展（2005.9.9~2005.10.20、參觀人數9,440人），冷韻幽香——秋海棠特展（2005.11.11~2006.2.19、參觀人數12,253人），曼陀羅花戌犬年新春展山茶花特展（2006.1.20~2006.2.19、參觀人數12,140人），仙履蘭月例巡迴展（2006.2.22~26、參觀人數2,970人），仙履蘭特展（2006.2.28~2006.3.26、參觀人數6,643人），Made in Taiwan——形塑臺灣特展（2006.2.14~2006.3.30、設於溫室參觀人數不予列入），植物驚奇——來自國立自然科學博物館植物之手工紙藝品特展（2006.3.31~2006.4.30、設於溫室參觀人數不予列入），王者牡丹——牡丹花特展（2006.4.4~30、參觀人數10,256人），母親節花卉展（2006.5.5~29、參觀人數3,579人），臺灣本土的水生植物選展（2006.7.1~2006.9.30、參觀人數10,733人），清心品菊——菊花特展（2006.12.15~2007.1.7、參觀人數14,074人）。

2005～2006年期間也辦理各項科學教育，支援各項解說導覽活動如下：年節壓花DIY活動，自然我來了——自然觀察，花花世界——兒童創意花藝設計活動，草間精靈——天然素材創意勞作，年鄉惜遇——自然遊戲，童話植物園，人間山水，蕙蘭特展——達摩狂想曲，杉林溪牡丹一日遊，慈母心遊子情——萱草活動，森林爺爺，小小木匠師，積木堆堆樂，植物與美術，壓花DIY，六週年慶，葵花寶典，冷韻幽香——秋海棠， 山茶花花卉特展活動——紙偶DIY製作活動，寒假研習活動——童遊植物園（1.現代魯班——木工教室、2.娃

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1. 2006年發表的新種——里龍山肺形草
2. 2006年發表的歸化植物——假澤蘭
3. 秋海棠特展教學活動
4. 牡丹

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娃看世界——立體紙偶、3.童畫秋海棠——瓷板美術創作、4.元宵的秘密——旺旺燈籠），植物・紙工作坊，王者再現——杉林溪賞牡丹活動，母親節花卉展活動—彩繪積木製作，水生秘密花園親子活動，植物園七週年慶活動——「七彩繽紛」花木嘉年華（1.彩色立體紙偶製作、2.彩繪木片DIY、3.彩繪昆蟲系列、4.拓印大自然、5.「花」現植物園、6.童顏趣味文物展）。

此外，植物Q&A在本館植物園研究教育中心或特展室舉行，特別聘請業界專家或學者作深入淺出的介紹，尤其偏重於實務，期許聽眾都能實際操作，美化家庭或解答大家在種植上的問題。2005～2006年共舉辦15場次，主題如下：開花與昆蟲、從植物名看植物、樹木常見的病蟲害防治、生活的綠精靈——如何利用植物點綴我們的生活、健康有機生活——居家有機蔬菜DIY、草坪的維護與管理、柑橘類的維護與管理、家庭園藝的維護與管理、香藥草植物之永續利用、春節應景球根花卉之栽培管理、水生植物的栽培與管理、樹木的移植方法、屋頂陽台花園的施工與管理、室內觀葉植物的維護與利用、養蘭不難。

1. 外來種毛西番蓮
2. 荷
3. 睡蓮
4. 萱草

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動物學組

本組分無脊椎動物、昆蟲、兩棲爬蟲、鳥獸四個學門，目前有研究人員9人，技工3人，約聘技術員1人，共計13人。在未來2年，我們將招募2位博士級研究人員，專長分別為無脊椎動物、獸類或鳥類。現階段的工作重點為臺灣及東亞地區的動物標本蒐藏及研究。目前累積的動物標本約53萬件，占全館的2/3，各類別均非常豐富，質與量也都是全國之冠。因為研究人員有限，我們將透過國內外博物館間的合作或利用國科會補助，爭取各門類的研究人員作短期的研究，以妥善利用這些珍貴的標本，也歡迎國內外各研究機構的動物學家到本館交流及合作。

重要紀事 • 2005～2006年

2005年

- 「異蟻份子——入侵紅火蟻特展」分別巡迴至桃園縣自然史教育館、宜蘭縣自然史教育館、高雄縣茂林國家風景區管理處展覽。
- 陸棲無脊椎動物標本大量增加。匈牙利籍的馬陸分類學者Dr. Zoltán Korsós到館訪問一個月，使我們對於陸棲節肢動物的採集、處理、鑑定與保存有較深入的瞭解，更使館藏馬陸標本種類由原本的5種不到20件增加至10目19科30種，約200件左右。其他如蜈蚣、鞭蠍等標本也都有增加。
- 邀請德國慕尼黑動物標本館學者Mr. Wolfgang Schacht協助鑑定館藏雙翅目標本，約25,000件鑑定至科級，對後續標本之歸位及資料鍵入電腦管理系統助益極大。
- 「蟎蜱特展」開展。
- 赴日本名古屋佐藤正孝教授家中整理與包裝，運回第二批昆蟲標本64,000件，累計佐藤教授捐贈本館之標本共達117,000件。
- 協助自然學友之家、小小動物園、幼兒園、兩爬標本展示與鑑定約100件。
- 2005~2006年共收到彰化縣政府捐贈重要蛇類標本約150件。

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2006年

- 配合自然學友之家重新開幕，無脊椎動物學門特別推出「棘皮動物與貝類」、「棘皮動物門的海膽」主題展，除規劃及製作了團體教案外，也搭配交換自新加坡的國外海膽乾標本，以及地質學門蒐藏的海膽化石標本共同展出。「貝類」主題展延續了現生標本與化石搭配展出的特點，並完成多次與學童及民眾互動式的講演。
- 於展場推出無脊椎動物標本科學繪圖現場演示，讓參觀民眾瞭解標本的繪製過程，同時也累積重要標本類群的手繪圖稿。
- 與陽明山國家公園管理處進行昆蟲標本合作保存管理計畫，協助其整理解說標本四套，另2,970件存放於本館並登錄為館藏標本。
- 佐藤正孝教授因病逝世，佐藤夫人代為捐贈未製作標本7,300件。
- 向荷蘭書商購買之1864~1965年《動物學紀錄》（Zoological Record）期刊到館。
- 深海無脊椎動物標本採集。2005~2006年持續與中央研究院及國立海洋大學深海底棲生物研究團隊合作，分別搭乘國科會海研一號及水試所水試一號研究船，出海進行臺灣附近深海之底棲無脊椎動物研究採集。成功作業水深已達4,400公尺，採得包括馬刺彎錦蛤、黃金豆莢蛤、深海銀錦蛤、乳帶玉米捲管螺、圈心蛤、皇冠海膽及真蛇尾等深海無脊椎動物標本，其他持續累積的深海新紀錄種與新種標本，有待各領域的分類學家協助鑑定、發表及利用。（2005.8~2006.8）
- 進行臺灣藤壺動物誌與共生性深海藤壺之研究，與新加坡大學博物館蔡奕雄博士合作，進行臺灣產藤壺動物誌的研究撰寫，可望將原先不到40種紀錄的藤壺，迅速增加至超過70種。同時提供大量附生在深海「刺柄頭帕」海膽刺上的花籠藤壺標本，與中央研究院生物多樣性研究中心的陳國勤博士合作，進行花籠藤壺的生殖週期與生物學研究，以及另一種深海大型茗荷類藤壺——「司氏鎧茗荷」的食性研究分析。（2005~2006）
- 獲日本豐橋市自然史博物館長谷川道明先生捐贈二對天牛副模式標本4件、鞘翅目學者益本仁雄捐贈鞘翅目正模標本6件、李奇峰博士捐贈之大吸木蟲科模式標本6件、Dr. Heiko Gebhardt 捐贈象鼻蟲科副模標本2件。（2005~2006）
- 2005、2006年共收到來自中華鯨豚協會捐贈的3件中喙鯨骨骼標本，使得喙鯨科蒐藏總數達12件，其中「朗氏中喙鯨」為全世界的第9件樣本。
- 2005、2006年協助人類學組進行考古遺址中的動物骨骼標本鑑定與整理，共進行了約一萬五千號標本的初步分類與鑑定，並完成約八千號標本的編目工作，動物骨骸以野生鹿、豬等為主，還包括狗獾、棕蓑貓、狗、鼠、鳥、龜、鯨豚、蛙、魚等。
- 配合研究展示，兩生爬蟲門特別推出「長尾南蜥親代照顧」小型主題展。除規劃及製作電腦動畫外，也搭配活體展出。並配合自然學友之家活動完成多次與學童及民眾互動式的講演。
- 協助臺中海關及郵局標本鑑定包括鱷蜥、眼鏡王蛇、鱷魚等約30件。

蒐藏與研究成果

一、佐藤正孝教授昆蟲標本捐贈紀事

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1. 運回標本中含德國商人漢斯梭德來臺採集之標本
2. 佐藤教授協助挑選與整理欲捐贈之昆蟲標本
3. 博物館同仁協助處理運回之佐藤教授捐贈標本
4. 於佐藤教授家中逐一將昆蟲標本以蟲針固定
5. 佐藤教授於本館展場前留影

為增加館內昆蟲標本蒐藏量，2004年透過李奇峰博士介紹而與佐藤正孝教授結識，佐藤教授原為日本名古屋女子大學教授，於2003年退休，曾發表五百餘篇學術論文，為國際知名鞘翅目分類學者，經常至世界各地採集並與各國學者合作研究。他希望歷經40年採集所得的標本能存放在保存環境良好的機構，因此力邀佐藤賢伉儷來館參觀昆蟲蒐藏相關設施及管理流程，最後他願意將其蒐藏之昆蟲標本存放於本館，本館基金會也因此協助其圓夢，分別捐贈五十萬元給日本及臺灣昆蟲學會。

2004年12月至佐藤教授家中運回第一批標本五萬三千件，其中鞘翅目即占約五萬件，包括牙蟲、龍蝨和螢火蟲等至少50個科甲蟲。除鞘翅目外，尚包括半翅目、蜻蛉目和膜翅目等19個目，涵蓋區域從日本、臺灣、中國、寮國、菲律賓到歐洲等地，內容多樣而豐富。除了標本外，佐藤教授也慷慨將其所有著作、標本箱、甚至採集工具都捐給本館。

同年12月30日舉行「甲蟲緣、佐藤心」特展及召開記者會，並再度邀請佐藤教授及其夫人參加。雖礙於準備時間匆促與展場狹小，無法將所有標本展出，卻已讓社會大眾初步瞭解佐藤教授捐贈標本之多樣性。

2005年12月再度前往日本整理並運回第二批標本六萬四千件，該批標本仍以鞘翅目居多，除多數為佐藤教授採集外，也包括許多日本著名昆蟲學家採集之標本和與各國學者交流之標本，其中還發現不少德國商人漢斯梭德(Hans Sauter) 於1902~1912年來臺採集之標本。此行尚獲得豐橋市立自然史博物館研究人員長谷川道明先生贈送其所發表的臺灣產毛細角瘦天牛(*Pseudocalamobius pubescens*)和新里氏毛細角瘦天牛(*P. niisatoi*)副模標本各一對。

佐藤教授於2006年8月9日早晨逝世，令人感到震撼與不捨。他在2月被檢查出得到胰臟癌後，即過著與癌症搏鬥的日子，五個月後仍敵不過癌症的摧殘而辭世，令人惋惜。

佐藤教授贈予本館之十一萬七千件標本中，已製作標本部分全數經冷凍除蟲處理，並積極進行分類鑑定、編目及標本資料輸入，已吸引不少國內外昆蟲學者前來檢視與借用，待製作標本部分則持續進行標本製作中。每件昆蟲標本都是無價之寶及歷史的物證，也記錄著採集者及標本處理者的辛勞。

日本昆蟲學界已為佐藤教授舉辦大型紀念會，以感念他對昆蟲學的偉大貢獻，本館也預計在其逝世周年推出紀念特展，再一次將佐藤教授的成就與捐贈標本更完整地呈現。我們永遠懷念佐藤正孝教授對昆蟲學界的付出，也感謝他願意將畢生蒐集的昆蟲標本存放於本館。

二、深海無脊椎動物標本的採集與研究

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2005~2006年間，持續與中研院及國立海洋大學深海底棲生物研究團隊合作，分別搭乘國科會之海研一號及水試所之水試一號研究船，出海進行臺灣附近深海之底棲無脊椎動物研究採集。主要負責節肢動物甲殼類及藤壺以外的所有無脊椎動物標本的採集與整理工作，目前最深的成功作業水深已達4,400公尺，成功採得馬刺鸞錦蛤、黃金豆莢蛤、深海銀錦蛤、乳帶玉米捲管螺、圈心蛤、皇冠海膽及真蛇尾等深海無脊椎標本。

經過初步整理鑑定後，登錄至標本管理系統的深海無脊椎動物標本，已達1,700件左右，其中主要以軟體動物的腹足類（螺類）、雙殼類（蛤類）及象牙貝類為主，另外包括一些深海的軟體動物頭足類（中興大學盧重成教授捐贈）、棘皮動物海膽類及浮游的節肢動物，如端足類、等足類與介形類（海螢）等，2005～2006就已累積約850件標本。這些深海軟體動物標本在臺灣而言，本館幾乎都是唯一的蒐藏研究單位，即使是中研院生物多樣性研究中心、海洋大學、中山大學、臺灣大學等機構，也都欠缺這方面的標本蒐藏。這些初步整理登錄的標本中，我們累積了不少種類的藤壺標本，搭配歷年採得的潮間帶與淺海藤壺標本，已有足夠的標本與中研院生物多樣性研究中心的陳國勤博士合作，目前不僅完成了科普著作《臺灣的藤壺》一書初稿，另一篇關於附生在深海海膽棘刺上的花籠藤壺生殖與生態學研究也正積極纂寫中。

除了這些已整理登錄的標本外，尚有多達上千件待鑑定的深海無脊椎動物標本，例如較原始的海綿類，刺絲胞動物門的單體珊瑚類、海筆（海鰓）類、海葵類、管水母類，櫛板動物門的燈水母類，環節動物門的多毛類，節肢動物門的浮游性端足類、等足類、介形類（海螢），毛顎動物門的箭蟲類，尾索動物門的海樽類等。其中，已與中研院生物多樣性研究中心陳昭倫博士合作深海海綿類與單體珊瑚類，計劃2007年邀請國外的相關分類學者來臺進行研究合作，協助鑑定及發表此類標本。

另外，棘皮動物門的五大綱，包括海百合類、海星類、蛇尾（陽燧足）類、海膽類及海參類，都已累積了數量可觀的標本，其中包括許多的新紀錄種，甚至新種，都陸續積極整理研究中，預計在未來5年內，配合國科會的標本數位典藏計畫，一方面將各類標本整理發表，一方面把已發表種類的相關資料，包括標本採集、分類、生態及影像等逐步數位化並上網公布，以充實臺灣本土的網路學習資料及鄉土教學資源；其他門類持續累積的深海新紀錄種與新種標本，也將陸續設法將其影像資料等公布在網站上，以吸引國內外各領域的分類學家來訪，協助我們鑑定、發表及利用。

1. 農委會海洋研究船水試一號
2. 深海頭足類——鞭魷 (*Mastigoteuthis* sp)
3. 史尼氏小鮅是具有觀賞價值的原生種魚類
4. 存放魚類標本的浸液標本庫房
5. 俗稱洞穴魚的宜山金線鮅
6. 斑點長翻車魨

三、魚類標本蒐藏

本館最早典藏的魚類標本始於1991年詹見平先生捐贈的一批大甲溪魚類標本。由於並無魚類學領域研究人員編制，標本在編好臨時標本號後就被放置在標本庫的一角。2002年秋天，在大陸執行兩爬動物調查及標本採集時，帶回一批當地的淡水魚標本，由於數量相當且不乏具有特色的樣本：例如沒有眼睛的盲鰍、俗稱洞穴魚的宜山金線鮀等，具有學術研究與展示教育的價值。為了妥善保存及管理維護，需要一套魚類標本蒐藏的典藏制度，在前任館長李家維博士的指示下，開始了魚類標本的蒐藏工作。

參考了兩棲爬蟲標本的蒐藏模式，以及國內其他魚類標本庫房的格局，決定以臺灣淡水魚類為蒐藏的主軸；淡水魚的體型通常較小，處理上比較不需太多的人力物力，加上臺灣淡水魚家族擁有多種特有種，相對於海水魚類，或許更具地區代表性。除野外調查採集，也藉由合作採集、購

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買、接受捐贈或交換等模式獲得。除了淡水魚外，也進行海洋魚類標本的蒐藏，但受限於經費及人力，無法進行大規模、高技術性的採集工作。常在執行其他標本採集時「順便」取得魚類標本，例如在漁港下雜魚堆翻撿無脊椎動物標本時，也同時挑選其中完整的魚類標本。

至2003年底已得兩百多號標本，總件數達680件（隻）。我們回應中央研究院生物多樣性中心（當時為動物研究所）的邀請，將魚類標本典藏資料公布於「臺灣魚類資料庫」網站

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（http://fishdb.sinica.edu.tw），與國內其他魚類學領域的資料庫連結，以整合全國的魚類標本資訊。

魚類標本蒐藏是新的工作，單靠己力難有豐碩的成果。我們廣泛與其他魚類愛好者建立關係，進行資訊交流、標本捐贈交換等，有一部分標本來自釣客、學校師生、田野調查人員的慷慨捐贈；這層關係使博物館的觸角得以深入這塊土地，詳盡地記錄這一時空的自然史。另外，2004年8月與日籍學者渡邊勝敏等人一同進行本島淡水魚調查研究。渡邊博士專攻東亞地區鮠科魚類分類及演化研究，比對他擁有的日本、大陸地區的鮠科魚類樣本，就能對臺灣鮠科魚類的系統分類及分化模式進行更深入的探討；這樣的合作模式能彌補人力不足，增加標本蒐藏量，協助館內標本的鑑定工作，引進技術及觀念，修正我們的蒐藏思維及方向。其他合作對象包括逢甲大學環工系、特有生物研究保育中心、東部海洋生物研究中心等，彼此間或進行標本交換、鑑定協助，或調派人力聯合採集。

大陸與臺灣本島的淡水魚類有很深的關連，在討論臺灣淡水魚類的分類、分布及演化時樣本常有不足，需要鄰近地區的標本加以比對。我們曾與中國中科院水生動物所、浙江自然博物館等單位合作，進行了幾次臺灣本島以外地區的魚類標本採集，包括金門、浙江及東北地區、日本琵琶湖河系及北海道南端。

目前魚類的典藏達1,500號，約4,800件。相較於其他館所，還有很大的成長空間，因為仍處草創階段，在標本及資料管理上可達比較嚴格的要求。我們每季更新網站標本資料，每號標本儘可能建立完整採集資料及標本照，便於透過網路瀏覽。比較特別的標本除了前述外，還有來自東南海域的斑點長翻車魨、龜山島海域的擬鰻鮫、雪霸國家公園捐贈的櫻花鉤吻鮭、淡水溪流中發現的海龍等；而多種淡水原生種或特有種，如臺灣細鱗、飯島氏麻魚、史尼氏小鮀、

陳氏鰍鮀、臺灣鮴、臺灣櫻口鰍、臺灣白魚、菊池氏細鯽、短臀鮠等，或多或少都保留了一些樣本，以供魚類學者研究參考。

6

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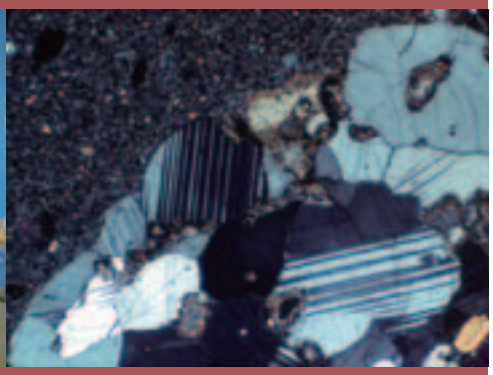
地質學組





重要紀事 • 2005～2006年

2005年

- 執行國立社教機構服務升級計畫，進行地質廳展示內容規劃及展示標本購置
- 規劃「咬牙切齒——哺乳動物的牙齒世界」特展
- 執行國家典藏數位化計畫地質學子計畫之無脊椎動物化石及變質岩兩項子計畫。
- 赴美執行「2005年土桑礦物標本年度購藏計畫」。
- 程延年博士與日本Sato等人在國際知名《科學》期刊發表竊蛋龍體內成對硬殼卵論文，深獲熱烈迴響。
- 赴中國四川、雲南進行古動物群更替調查及採集研究。
- 赴南沙群島太平島進行珊瑚礁地質調查。
- 赴中國山西、河北、內蒙古進行新世代火山岩及地函包體採集。
- 赴中國西秦嶺地區採集岩石標本。
- 現生短吻鱷骨骼標本製作與組合裝架。

2006年

- 執行國家典藏數位化計畫地質學子計畫之沈積岩及植物化石兩項子計畫。
- 赴美參加「2006年土桑礦物化石展」執行化石標本年度　　購藏計畫，並考察自然史博物館地質相關展示。
- 執行「咬牙切齒——哺乳動物的牙齒世界」特展展出及協助相關科教活動規劃。
- 程延年博士於德國《自然科學》期刊發表全球首度發現海棲的原始型初龍類化石：混生黔古鱷(*Qianosuchus mixtus*)。
- 領航鯨骨骼標本製作。
- 進行澎湖鱷魚化石之固化與清修。
- 赴中國雲貴地區進行中生代雙孔類古爬行動物採集研究。
- 參與竹山車籠埔斷層槽溝保存館主題展示規劃事宜。
- 安排並接待日本學者高橋啟一教授來館學術交流及野外地質考察。

▼ 2006咬牙切齒——哺乳動物的牙齒世界特展

蒐藏與研究成果

一、重要蒐藏成果

（一）岩礦學門

截至2006年底，兩年共登錄89批、2,733件岩礦標本，分別透過同仁採集、赴美購買及館外專家學者與民間人士捐贈等方式取得。

在採集部分，除持續蒐藏臺灣本土岩礦標本外，並執行年度中國採集計畫，其中以蒐集中國大陸前寒武紀及新生代晚期岩礦標本近800件為最大宗。地球誕生初期40億年間（前寒武紀）的大陸地殼演化，一直是科學家深感興趣及迷惑的問題，必須從前寒武紀岩石標本中尋找蛛絲馬跡，以探討事實真相；而新生代晚期的火山岩及經由岩漿帶至地表的各類包體，乃是探討近期火山活動變遷及地球深部特性的重要物證。因此，在參與國科會祁連山大型整合計畫和執行年度中國採集計畫之際，採集青藏高原北緣所出露之前寒武紀岩石標本和華北地區之晚新生代火山岩及地函包體，以期增進標本蒐藏質量並與其他博物館進行標本交流。

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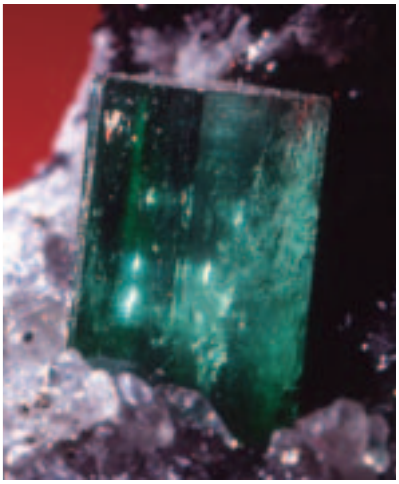

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在購買部分，除零星添購寶石標本外，亦派員參觀美國土桑礦物化石展，針對本館尚缺之種類、產狀和形態的標本，做為優先購藏的目標。共計採購博物館級礦物標本80件，其特色為：1.展現礦物顏色之美者；2.呈現礦物形狀之美者；3.符合晶體化學分類之代表性礦物，以呈現礦物的豐富度與完整性；4.表現礦物的成長過程與形成環境者；5.寶石或半寶石礦物；6.大型標本(Main pieces)：展示效果佳且具代表性者，以作為礦物的焦點展示。

在捐贈方面，諸如：成大楊宏儀教授捐贈世界各地岩礦標本百餘件；成大蔡金郎教授捐贈臺灣地區變質岩標本200餘件；臺大陳汝勤教授捐贈片麻岩薄片標本44件；黎隆興先生捐贈5件寶石及矽化木標本；M. F. Makki先生捐贈33件印度所產的礦物標本；美國Trusdell博士捐贈4件夏威夷火山熔岩標本；東華大學黃士龍教授新命名的六方水鋁石(Tohdite)薄片也捐贈本館典藏。（何恭算、董國安）

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1. 赴中國採集之前寒武紀岩石標本
2. 產自哥倫比亞的祖母綠
3. 94年赴美購藏之大型巴西水晶晶洞，高約 2公尺
4. 土桑礦物化石展一景
5. *Illaenus taurikornis* (牛角斜視蟲) 俄羅斯 奧陶紀
6. 於德國《自然科學》期刊 (Naturwissenschaften) 發表的混生黔古鱷化石標本，成為封面故事
7. 美國《古脊椎動物學報》(Journal of Vertebrate Paleontology) 發表的李氏雲貴龍化石標本，成為封面故事

（二）古生物學門

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除了針對館藏缺少的化石加以蒐集外，近年來也致力於建立蒐藏特色；自2003年起，陸續蒐藏了多件中生代海生爬行動物的大件化石精品，包括魚龍、幻龍、滄龍、海龍及鱷化石等，2006年底又將原本館藏三段森林鱷化石組合復原，成為一件極為壯觀的大型標本，為未來的海生爬行動物特展提供了絕佳展品。

2006年初，派員前往美國土桑礦物化石展購置地質標本，共得化石標本135件；包括大型的乳齒象頭骨、古鱷化石、恐龍複製模型等標本。另外，有鑒於本館三葉蟲化石質量的不足，於精挑細選下，購得產自不同地區的三葉蟲化石共百件，其中包括非常稀有難得的種類。

2006年4月，自澎湖縣政府接手一件出自澎湖中新世地層的鱷全身骨架，這是臺灣地層中所挖掘最完整的鱷化石，經過專業人員處理後，已完成固化及大部的清修工作，相關研究也已在進行中。（單希瑛）

二、重要研究成果

這兩年我們的研究團隊成功地結合了加拿大國家自然博物館(CMN)、日本國立科學博物館(NSM)與北京中國科學院古脊椎動物與古人類研究所(IVPP)的研究人員，持續進行中生代古爬行動物化石的研究，包括了牠們的系統分類、生殖生物學與個體發育及演化等議題，初步成果受到國際學術界的重視。

2005年刊登於《科學》(Science vol. 308, 15 April 2005, p. 375)期刊的竊蛋龍體內成對硬殼卵論文，受到舉世關注。這是首度發現獸足類恐龍生殖策略的直接證據，是介於原始型初龍類與進階型鳥類間的一個失落環節！我們接續正進行竊蛋龍成窩蛋的孵育與親子照應行為，預期將再次造成科學界的重視。

2006年的兩篇論文，很幸運地都成為專業期刊的封面故事，引起科學界的極大迴響。第一篇描述中國三疊紀海棲初龍類化石，我們命名為混生黔古鱷(*Qianosuchus mixtus*)，發表於德國《自然科學》期刊(Naturwissenschaften 93: 200~206, 15 March 2006)，這是全球首度發現海棲的原始型初龍類化石。另一篇描述貴州省西南叉河地區的蛇頸龍祖先型化石，我們命名為李氏雲貴龍(*Yunguisaurus liae*)，發表於美國《古脊椎動物學報》(Journal of Vertebrate Paleontology 26(2):100~105, June 2006)。這是中國首度發現純信龍類(pistosauroids)的標本，也是全球迄今所發現最完整的單一個體化石。進一步詳細的描述正在進行中，預期2006年底完成初稿。在蛇頸龍基幹群的探究上，這項成果將提供最重要的訊息。（程延年）

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重要動態

一、學術研究報導

（一）澎湖群島基性粒變岩包體之岩石學與地球化學研究

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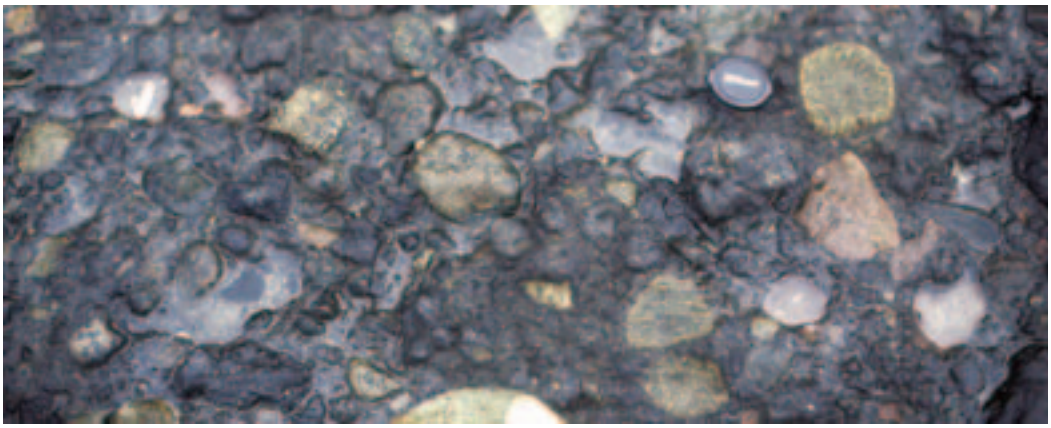
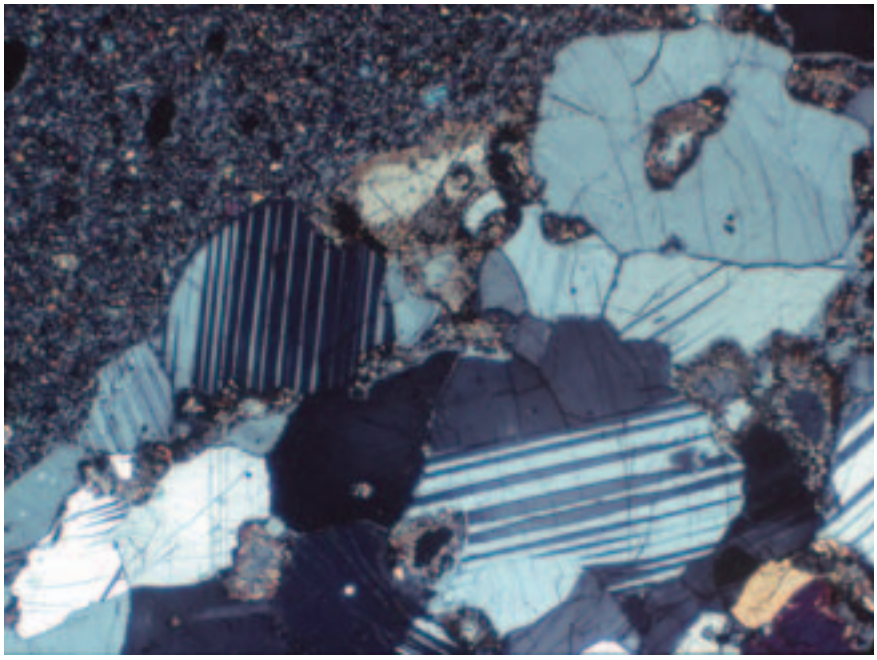


我們對地球內部的瞭解主要藉由直接和間接兩大方式，前者是採取鑽井的方法，但僅及表層淺處，至於地球深處的訊息主要藉由間接的地震波、重力、磁力和地熱等地球物理方法。另外，經由岩漿捕獲而來的包體，也提供有關地球內部組成、性質及一些深部地質作用的相關訊息。

臺灣及澎湖地區新生代晚期噴發的玄武岩中，有超過30多處出現源自上部地函和下部地殼的包體，其種類包括橄欖岩、輝石岩和粒變岩三大類。一般而言，各地的包體大小並不一致，大者可達40公分以上，小者卻只有幾毫米；包體外形雖然變化多端，但以渾圓狀至橢圓狀居多，主要是包體被岩漿帶出地表的過程中，由於兩者在成分和溫度上的差異，包體外緣常被高溫岩漿熔蝕的緣故。

針對澎湖地區之粒變岩包體進行研究，發現可分為二輝粒變岩和石榴子石粒變岩兩種，並具有變質火成岩至變質粒晶狀的岩石組織。二輝粒變岩是由直輝石、斜輝石和斜長石，以及少量的鉀長石、橄欖石和鈦鐵氧化物等礦物群所組成，它們具有基性但全岩化學成分並不均質，主要、微量元素和鍶–釹同位素比值與晚新生代華南玄武岩者類似；因此，我們認為它是由底附玄武質岩漿經結晶、變質作用所形成。石榴子石粒變岩含有斜輝石、石榴子石、斜長石、填隙型角閃石和（或）綠色尖晶石，從化學成分的證據可知，它可能是矽質苦橄質岩漿在高壓環境下結晶的產物。由於兩種粒變岩之鍶–釹同位素比值有明顯的差異，顯示兩者並沒有成因上的關係。二輝粒變岩的平衡溫度為800~975℃，而石榴子石粒變岩為1,000~1,180℃。根據前人所推演之澎湖古地溫研判，前者係源自下部地殼，後者可能來自上部地函。因此，澎湖群島北部出露的二輝粒變岩包體，能夠提供華南陸緣下部地殼之特性與成分的相關訊息，同時澎湖群島之莫荷不連續面底下有一過渡層，該層主要由石榴子石粒變岩、輝石岩和尖晶石二輝橄欖岩或斜方輝橄岩所組成。（何恭算）



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1. 澎湖東吉嶼集塊岩內含有各類捕獲包體
2. 澎湖目斗嶼粒變岩之顯微照相

（二）澎湖火山口相玄武岩柱狀節理多樣性成因探討研究

3 ▶ ◀ 4

澎湖火山頸多樣性柱狀節理與低平火山口保存完整，為世界上火山地區極佳的例子，應妥為保護與宣傳，此為極珍貴的自然襲產。

臺灣及鄰近區域依火山活動之先後順序、地體構造與地理區而劃分成西部、東部和北部三大火山區。在兩千多萬年前的中新世時代，中國南海之擴張方興未艾，在陸緣地區形成許多由正斷層所構成的半地塹構造。由於南海擴張所引發的熱力與裂隙作用，在臺灣西部麓山帶與澎湖列島引發了一系列的火山活動。澎湖玄武岩分布十分廣泛，除花嶼外，遍及澎湖諸島嶼。分布面積最廣，保留相當完整，可說是臺灣西部火山區的代表。

柱狀節理是火山岩一項特有的景觀，岩漿噴出地表或貫入岩層後，溫度逐漸降低，岩體因冷卻收縮而形成柱狀節理。火山爆發時岩漿經由裂隙孔道傳輸至地表，這些通道常由岩漿凝固而成，質堅硬抗風化，故可留存甚久。澎湖員貝嶼等地均有典型火山頸構造之柱狀節理存在。火山頸底部基座常以一圓形小火口為中心，呈水平輻射放散之柱狀節理排列，而火山頸主體之柱狀節理型態，常取決於岩漿道之口徑、溢出熔岩流厚度、岩漿組成與原始地貌等因素。澎湖玄武岩火山頸地貌多變，為鄉土科學教育極佳素材，深具地質意義與保存價值，勿過度開發並應妥善保護。

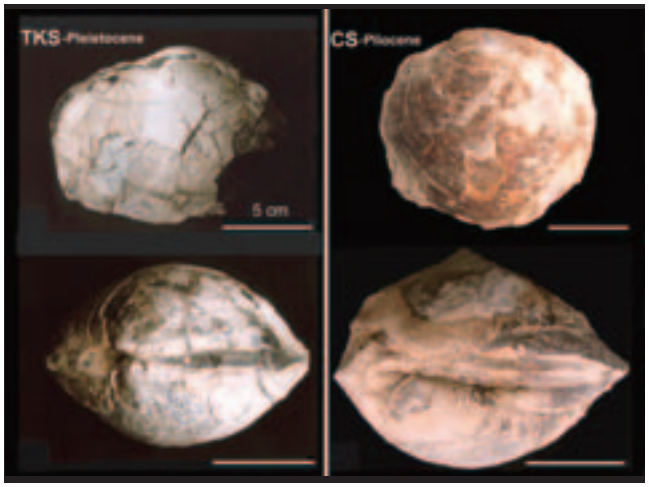
本研究闡述澎湖玄武岩火山頸六大柱狀節理系統：1.線性岩脈式具水平至微傾斜之柱狀節理（頭巾嶼為代表）；2.圓錐體柱狀節理（北雞籠嶼為代表）；3.圓弧A字形柱狀節理（金嶼、東吉嶼為代表）；4.瓜皮式柱狀節理（西嶼池西為代表）；5.百褶裙式柱狀節理（員貝嶼為代表）；6.羽狀柱狀節理（鳥嶼和貓嶼為代表）。員貝嶼、鳥嶼、貓嶼和西嶼池西之柱狀節理火山頸規模雖不大，但搭配其基座所呈現於海蝕平台上，以小火山口為中心而呈輻射放散之水平柱狀節理排列結構來現出，此火山頸主體、基座與低平火山口之系列組織架構十分完整，不但可媲美美國懷俄明州魔鬼塔，更可說是大自然鬼斧神工火山頸之佳作與範例。建議政府主管單位加緊地景保育工作，輔導成為一觀光景點，免遭人文破壞，亦可籌劃為澎湖玄武岩地景旅遊地標，邁向建立火山地質公園，或更進而結合七美之南島文化古石器工廠，爭取列入聯合國教科文組織世界文化與自然襲產名錄。（莊文星）

3. 澎湖火山頸多樣性玄武岩柱狀節理形成示意圖

4. 火山頸側視與上視意圖

（三）臺灣西南部珊瑚礁在矽質碎屑古環境中最初發育機制之探討

1 ▶



2 ▶

臺灣西南部的更新世珊瑚礁，分別發育於上新–更新世前陸盆地中，由逆衝斷層與背斜所形成的幾個構造高區之上。2005~2006年的研究係持續對大崗山、小崗山、半屏山及鳳山等地，探討由深海相泥岩基底向上突然轉變為珊瑚礁石灰岩的現象，期望由此瞭解各珊瑚礁在矽質碎屑古環境中的最初發育機制。野外工作主要位於17個開挖剖面，並使用石灰岩礦場中鑽透化石珊瑚礁與基底泥岩交界處的岩心43口；進行其過渡帶岩石組成與垂直方向的岩相遞變觀察，以及碳酸鹽標本的穩定碳、氧同位素組成分析。研究結果，除於各化石珊瑚礁基底泥岩頂部地層中，辨識出與甲烷逸出有關的「冷泉碳酸鹽岩」之外，並綜合岩相觀察的結果，建構臺灣西南部更新世珊瑚礁與基底泥岩接觸關係的沉積相模式；其中，在基底泥岩快速淺化過程中出露的塊狀冷泉碳酸鹽岩，成為不穩定地體構造背景中造礁生物在矽質碎屑古環境中最初生長的硬底質。以此研究結果，於95年7月通過國立臺灣大學海洋研究所博士論文審查。（王士偉）

1. 高雄甲仙四德巷上新世鹽水坑頁岩中的冷泉碳酸鹽岩（以黃線標示）
2. 高雄大崗山（TKS）與甲仙（CS）冷泉碳酸鹽岩中的巨帶蛤（*Loripes golith* Yokoyama）化石

（四）中國西北龍首山地區片麻岩之SHRIMP研究

利用本館所蒐藏3件中國西北龍首山地區片麻岩進行SHRIMP（高分辨率二次離子探針質譜儀）得出龍首山岩群年齡。比對碎屑鋯石的年齡頻譜和周圍古老地塊岩漿岩必小於1724±19Ma的年代，顯示其物質本源為阿拉善和塔里木兩地塊，阿拉善和塔里木兩地塊親緣性較強，在早–中元古代時為一個統一的陸塊。另利用本館所蒐藏中-南祁連地塊前寒武紀基底，5件具代表性岩石標本研究所得的鋯石年代資料表明，中–南祁連地塊前寒武紀基底岩石的年代廣泛分布在元古代，明顯與華北地塊在中-晚元古代時為一穩定地台不同，而與揚子地塊年齡頻譜相似。再加上釹同位素模式年齡(TDM)、地層學及古生物生態的證據，推論中-南祁連地塊並非由華北地塊裂解出來再拼貼回去，而是與揚子地塊有較強的親緣性，在新元古代時同屬岡瓦納大陸的一部分，大約在震旦紀末從岡瓦納大陸裂解出來，形成當時原特提斯大洋中的陸塊，於早古生代時隨古祁連洋的閉合，與阿拉善地塊聚合形成北祁連褶皺帶。古祁連洋其實就是原特提斯洋的一部分，北祁連蛇綠岩屬原特提斯蛇綠岩。（董國安）

二、重要學術交流

近二年針對臺灣地區第四紀哺乳動物的起源、發展與演化進行相關研究。並持續進行臺灣地區第四紀化石的發掘與採集，包括恆春四溝地區鯨類化石之挖掘，以及臺南縣菜寮溪流域生物地層調查與化石採集，參與執行臺南縣菜寮化石館化石之鑑定與分析工作。在國際合作研究方面，與日本琵琶湖博物館古脊椎動物研究室，進行臺灣與日本第四紀哺乳動物相對比研究，探討冰河時期氣候的變化、海平面下降等因素對動物群所產生的種群結構、特徵變異的影響。2006年與日本學者共組研究小組，進行新化丘陵古生物地層初步調查與化石採集，並規劃長期性合作研究，進行系列性與系統性調查。此外，持續進行澎湖水道第四紀哺乳動物化石群之研究，探究化石之分類特徵，並比對鄰近地區（中國、日本、東南亞等地）化石的差異與演化親緣關係。2006年，與美國洛杉磯自然史博物館古脊椎動物研究學者合作，針對澎湖水道食肉目哺乳動物進行研究，探討其分類特徵，並比對中國食肉類化石材料，以追溯其起源與發展特色，第一年完成臺灣第四紀最後斑鬣狗之研究，並陸續於相關研討會及國際學術期刊發表。（張鈞翔）

三、出席國際學術會議

2005年6月，出席菲律賓Romblon國際地質研討會，又於同年11月邀請菲律賓科技部副部長Graciano P.-Yumul-JR博士來臺參訪，並參加東亞地體動力與環境國際會議暨第五屆臺法地球科學研討會。2006年7月為促成臺菲地球科學合作，與國內其他學者共同赴菲律賓與科技部、菲律賓大學等機構商討臺灣──菲律賓地球科學合作研究事宜。另於2006年8~9月參加於日本福岡舉辦的2006年國際沈積學大會，積極參與國際間地球科學學術交流。（宮守業）

四、出國考察

2006年1月程延年博士與單希瑛小姐參加美國亞利桑那州土桑市舉辦之「土桑寶石、礦物及化石展」，除執行標本購藏任務外，並赴加州自然史博物館(Natural History Museum of Los Angeles County)及瀝青坑博物館(Page Museum-La Brea Tar Pits)考察地質相關展示。深刻體認到一個博物館展示的背後，需要有豐富的藏品支持。

五、典藏數位化執行成果

經歷廿餘年的標本蒐藏，目前已累積了四萬多件地質標本，地質典藏數位化計畫即針對這些藏品的類別與特性，分年分段逐步執行。該計畫除繼續充實、更新並校對原有地質蒐藏管理系統外，每一個次項子計畫都篩選出具代表性的典藏品，並就相關基本解說資料及圖像予以數位化典藏。待數位化資料庫完整建立後，再利用多媒體技術予以整合、管理及維護，並透過網際網路讓國內外民眾瀏覽、查詢及參考使用，有助於地質學領域之教學、研究及教育推廣。

截至2005年底，地質學典藏數位化計畫已先後完成了礦物、脊椎動物化石、無脊椎動物化石、火成岩、變質岩、地質鑽探岩心等子計畫，建構了677筆知識單元，並完成數位化標本3,070件，多媒體影像達7,278筆。2006年仍持續進行沈積岩及植物化石兩項子計畫，年底完成為期五年的第一期典藏數位化計畫。數位化整體成果已連結於本館「數位博物館」網頁。

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人類學組



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人類學組包括民族學、考古學、體質人類學等三個分支學門，通過共通的文化概念與方法論，綜攝人文學、生物學與社會科學的基本性質，結合為博物館人類學。

博物館人類學最重要的志業在於：以區域的整體性與系統化之收藏與研究為職責，掌握當代文化研究(cultural studies)的知識趨勢及其成就；呈現文化的多樣性及其互動關係，傳遞各種生態適應的獨特方式，保護被威脅之社會遺產，促進並塑造文化保存和進步的環境。臺灣博物館人類學，需要具備「將廣袤的世界文化、湮遠的過去，再現臺灣原住民面前」的能力。

博物館是一個社會文化表徵，具體而微的社會文化現象，亦是一個各部分密切相關的整體。除了蒐藏與研究，博物館人類學的論述範疇，更包含展示與教育的溝通場域。事實上，本館生命科學廳與人類學（南島民族、中國人的心靈生活、大洋洲）廳的相關「常設展示」主題，便引導當前人類學組的人員進用與蒐藏政策。

目前人類學組主要的蒐藏品分為三大類：第一類為南島民族（臺灣、新幾內亞）、中國西南少數民族的民族誌標本。第二類為臺灣及閩、粵漢人之建築構件、宗教器物、手稿、圖畫、錄音帶、宗教儀式錄影帶等。第三類為中國、東南亞與臺灣出土之考古學標本。

在前述基礎上，以東南亞、中國與島嶼東南亞為對象之近期發展計畫，區分為下列幾項：

一、臺灣搶救考古學、「民族考古」與「舊社考古」之研究。
二、中國古人類學之研究。
三、臺灣中部考古學原住民區域民族誌與科際整合研究。
四、臺灣漢人工藝蒐藏與研究。
五、中國西南少數民族之民族誌標本蒐藏。
六、臺灣南島民族、東南亞之民族誌資料庫系統之建立。
七、博物館之人類學研究。

雖然自然物與人為之物的妥善管理與運用，是博物館人類學工作首要的科學任務。然而，博物館人類學更具有能自我反省的人文特質。在生態、社會與人性的倫理基礎上，我們探索博物館「如何」存在與經營的普通法則；更要思考「為誰」與「為什麼」存在與經營之理由。這個人類學實用主義的性質，使人類學專業得以親近博物館學，並服膺知識的政治實踐之職志。

現階段的臺灣本土蒐藏與研究，是人類學組的基本關懷。我們雖建構完整的博物館人類學之理想（例如，按世界各洲地理與文化劃分為幾個區域，成立專責於各區的部門；設立完整的物質文化研究之實驗設備），唯受限於既有之編制與經費，需廣泛的尋求各公、私部門社會資源的支援；更需主動與國內、外相關大學、藝術院校、博物館及其他研究機構，持續進行有計畫的交流與合作。

人類學組二大學門在數位典藏及研究工作之外，也積極支援科學教育組特展前的現場講解人員訓練、自然學友之家現場演示、簡訊撰稿及巡迴展演講系列。館內常設展示廳中，不但提供了珍貴的展品及其背景資料，也參與更新計畫及簡介的撰稿工作。近年來，研究人員主動參與大、小型特展之策展、蒐集標本及數位加值動畫展示。

1. 達悟船屋
2. 田野有教室──林德牧先生示範陶器復原
3. 惠來遺址145號地搶救發掘

重要動態

1. 惠來遺址小來及木乃伊面部復原。
2. 協助「失落史前惠來人」標本維護及更換。
3. 執行數位典藏計畫「臺灣中部考古學之數位子計畫」2005及2006年度工作。
4. 執行「臺中縣沙鹿鎮南勢坑遺址搶救挖掘工作」計畫。
5. 執行「東西向快速公路漢寶草屯線過溝與崩坎遺址探坑試掘工作計畫」。
6. 執行「玉山國家公園西北園區史前史及民族學研究」計畫。
7. 協助「我們的身體——生老病死」展之布展。
8. 執行「中洲遺址考古試掘計畫」。
9. 執行「新港戶外博物館展示計畫」。
10. 協助行政院文化建設委員會舉辦高中生認識臺中的考古遺址。
11. 協助「這張臉、那張臉」、「蝙蝠」、「大洋洲」特展之布展。
12. 協助三義木雕博物館穿越古今的展覽。
13. 協助李梅樹美術館標本做冷凍除蟲等事項。
14. 協助北投王家原住民標本清理及蒐藏。
15. 執行「生老病死」展銅縷玉衣之修復計畫。
16. 執行「銅縷玉衣之現場修復」展示。
17. 協助自然學友之家布置考古學標本展示。

▲ 南勢坑遺址的探坑發掘

重要紀事 • 2005～2006年

2005年

- 規劃織物等新庫房。
- 新庫房的苗族臨時展示。
- 發掘臺中縣沙鹿鎮南勢坑遺址。
- 發掘南投縣草屯鎮過溝遺址。
- 發掘南投縣南投市崩崁遺址。
- 策劃天籟之音——故宮及奇美珍藏樂器大展。

2006年

- 執行臺中七期重劃區新市政中心環評計畫。
- 執行國科會委託「數位典藏中部考古子計畫」番仔園、臺中公園及河南路出土牛罵頭標本數位化。
- 執行國科會數位加值計畫。
- 策劃「中國農業廳」更新計畫。
- 執行144號抵費地及惠民段145號地考古發掘。
- 發掘臺南縣中洲遺址。
- 策劃「秦代新出土文物大展——兵馬俑特展Ⅱ」。

蒐藏與研究成果

1. 惠來遺址出土考古標本收集、登錄與複製。
2. 臺中市新市政中心預定地試掘期中、期末報告。
3. 2005年登錄考古標本8,279件。
4. 2006年登錄考古標本5,628件。
5. 大洋洲的標本。
6. 劉寧生捐贈新幾內亞標本及劉其偉的影像捐贈。
7. 達悟陶壺等一批。
8. 苗族文物一批。
9. 非洲文物一批。
10. 東隆宮捐贈宗教文物。
11. 鹿港施式源先生捐贈宗教文物一批。
12. 鹿港文德宮的雀替構件一批。

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阿里山考古新發現

日據初期的森丑之助在曾文溪上游的六個地點分別發現了打製石器、磨製石器和陶器，其中五處為當時鄒族的聚落所在。一九三〇年代臺北帝大土俗人種學教室（臺灣大學人類學系的前身）的大規模高砂族調查中，發現地表隨處可見打製斧鋤型器，這批材料包含了九個屬於阿里山鄉的遺址。

1941年鹿野忠雄於鄒族舊社Vuyio和Yingiana進行發掘，他在Vuyio發掘到數具石板棺，兩處出土的陶器都附有網形印紋的紅色陶片和黑色陶片、無紋而含有石英粗粒的厚陶片；石器除了薄型打製石斧外，還有磨製扁平偏鋒石鋤、細型石鑿、磨製石鏃等。他認為這些遺物即是鄒人祖先所使用的。

光復後沉寂許久的阿里山地區考古工作於1993年再度展開，中央研究院歷史語言研究所的研究人員在曾文溪上游進行了系統的考古調查工作，又發現了15處遺址，並重新在Yingiana遺址進行發掘。自1997年以來，本館人類學組研究人員多次於阿里山地區進行調查與試掘工作，確認的遺址有40多處，經過試掘的只有樂野村Veiyo（鹿野忠雄1941年發掘的Vuyio）邊緣一處稱為Daimaeyayan（鄒語拼音為Tamayayana）。自2002年至2003年，為了確認阿里山地區史前文化的層序，考古學家們先後在達得安3號、新美村Niahosa等三處遺址進行大規模的發掘。首次確認阿里山地區的史前文化內涵，主要可分為以細繩紋紅陶為代表的Yingiana下層文化遺存（距今約3,800年），及以素面粗砂紅褐陶為代表的Yingiana上層文化遺存（距今900~200年）。

Yingiana遺址的下層（第二文化層）文化內涵可以代表阿里山地區最早的人類文化，以新石器時代中期的細繩紋紅陶為主，根據碳十四定年，其年代距今約3,800年。這說明大約從距今4,000年開始，繩紋紅陶文化的主人即自沿海階地向內陸擴散，他們除了占據丘陵、淺山外，也到達了高山內陸河階，對於臺灣史前人的島內擴散研究具重大的文化史意義。

素面粗砂紅褐陶的主人與周圍族群一直有著密切的互動。在新石器時代晚期的Veiyo遺址中，除了出土和Yingiana上層相同的文化遺存外，還有東部卑南文化系統的玉玦和玉管珠，新美村Niahosa遺址也出有非中央山脈西部地區出產的蛇紋岩質石鏃，由這些證據看來，新石器時代晚期阿里山地區的素面紅褐陶主人就與東海岸地區文化有了頻繁的互動關係。

1. 中洲遺址出土的清代漢人墓葬
2. 阿里山遺址出土石板棺
3. 惠來遺址145號地（市政路與河南路口）出土的繩紋陶罐

臺中市史前文化新發現——惠來遺址

1 ▲

臺中市惠來遺址行政區屬西屯區，地理區屬臺中盆地西側，海拔約70公尺左右，西側遠眺大肚臺地及南屯區。人類學組於2002年起陸續在市政路與惠來路交叉口衣蝶百貨商場大樓旁、市政路與河南路交叉口144號抵費地進行考古發掘與調查，發現遺物的內容包括距今三千五百年前的牛罵頭文化、二千多年前的營埔文化及一千三百多年前的番仔園文化。惠來里遺址範圍內有新光三越及老虎城等著名消費中心及未來的新市政中心預定地，發現遺物的面積至少150,000平方公尺。

惠來遺址分布在筏仔溪附近，河南路惠來厝段抽樣發掘顯示牛罵頭時期聚落人口眾多且定居長久。2004年在新市政中心預定地，發現了代表營埔文化的玉環及陶片，玉環材料來自花蓮的蛇紋岩。144號抵費地出土番仔園期大量的石製工具、石材、石錘等，生產工具如石刀的出現顯示當時雖已進入金屬器時代，但鐵器的使用並不普遍。遺址內灰坑、獸骨、炭化粳稻以及至今廿三具俯身葬人骨的出土，顯示一千年前的大聚落是以農耕為主，並以漁獵採集為輔。這些發現對於瞭解臺中盆地，尤其是筏仔溪一帶距今三千至一千年先住民的生活方式提供了第一手資料。

惠來里考古挖掘出土的動物標本，經鑑定有烏龜、兔、鹿、羌、野豬、狗獾、食蟹獴等，其中狗獾是目前臺灣已絕跡的鼬科動物。

古臺中盆地是否為湖泊沼澤區？為解答這個疑題，未來將繼續進行深度考古調查並採集古生態環境相關訊息，以釐清惠來遺址群文化內涵及時空分布，再探討牛罵頭文化與北部及南部地區紅色繩紋陶文化之間，以及營埔、番仔園文化與鐵器時代的淵源關係。

惠來遺址自91年陳聖明同學發現以來，其中涉及中央及地方教育文化權責機構、特定的人員如市長及其候選人、文化局、其他單位的考古工作專業人員、民意代表、里長、市民大眾、國小、國中、高中、大學生。地方文化資產承辦人員、報社、雜誌社、電視台平面及電子媒體記者及考古團隊的每位成員等，實可做為現今「考古在城市」的有趣案例。

挖掘期間為了增加民眾對文化遺產的認識與欣賞，進而引以為傲，陸續推出「失落的史前惠來人」與「古早臺中人特展」，及臺中尋根之旅、終身學習認識過去——考古班教育活動。透過各項課程了解考古學的內容與臺灣的史前文化，藉由參觀考古遺址把知識化為實際的經驗。期待將珍惜文化資產的觀念向下紮根，讓大眾認識維護考古遺址的重要性，以達到傳遞文化資產薪傳理念。

小來的真面目

「小來」是本館於2003年9月30日在惠來里發掘出土的第一座墓葬，碳十四年代距今1,250±40BP，在「失落史前惠來人」特展時，小來經中部觀眾票選而命名。

林健成先生是知名的創意藝術家及蠟像雕塑師，首次嘗試復原考古遺址中出土的人骨，特別是六歲的小來。他根據小男孩頭骨測量數據，繪圖、確認骨骼構成、加上肌肉和軟骨、添上腺體脂肪組織、特徵細部修飾、皮膚紋理構成、整體細部修飾、取模、成形、植髮修飾髮樣、眼眶內安上眼球、植上眉睫毛樣、膚色表面質感處理、整體構成並未添加服飾，終於大功告成。小來的真面目經由國內媒體的大肆報導後終於亮相。

1. 惠來遺址第二具墓葬出土
2. 惠來男童小來的復原三部曲
3. 銅縷玉衣

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銅縷玉衣擬原

本館於2005年底，從收藏家手中，購得一批漢代玉衣的零散玉片，經化驗得知玉片為蛇紋岩，即古人所謂的「岫玉」；而穿孔中殘留的金屬線為銅絲，因此確認為銅縷玉衣。本館用三個月的時間將玉衣修復。

玉衣是漢代皇帝及諸侯王貴族的喪服，有「金縷」、「銀縷」、「銅縷」之差別。根據《後漢書．禮儀志》記載，皇帝死後使用金縷玉衣，諸侯王、列侯始封、貴人、公主使用銀縷玉衣，大貴人、長公主使用銅縷玉衣。不過根據考古發掘出土的證據，這個等級制度大概到東漢才確立；西漢時期的中山靖王劉勝與竇綰夫婦使用金縷玉衣，南越王使用絲縷玉衣，都與後漢書的記載不符。

以玉衣為葬服，可能在戰國時代已有其雛型。考古發掘出土的戰國末期墓葬中，發現有些死者臉上覆有綴玉的面幕，身上穿有綴玉的衣服。這可能就是《呂氏春秋》裡所謂的「含珠鱗施」，也有可能是漢代玉衣的前身。漢代貴族使用玉衣埋葬的原因，可能是相信玉衣能保持死者的屍骨不朽，進而追求永生。但從考古發掘出土的情況看來，這個目標顯然無法達成，穿著玉衣下葬屍體還是會腐朽。玉衣制度流行於兩漢，直到魏文帝曹丕禁止使用後才終結，也從來沒有在漢代以後的墓葬中發現。

根據考古發掘出土的資料，玉衣的製作是把玉石精工琢磨成長方形、方形、梯形、三角形、多邊形等不同形狀的小薄片，並在四角上穿孔，然後用金、銀、銅或蠶絲等質料的細線編綴而成，而且是在生前量身訂做的。一件形制完備的玉衣，是由臉蓋、頭罩、上衣前後片、左右袖筒、左右手套、左右褲筒、左右鞋等十二個部分組成；型式比較簡單的玉衣只有臉罩、手套與鞋。每一部分都可以單獨裹覆在屍體上，穿脫非常方便。

從玉質、顏色、工藝技術與保存情況判斷，本館所購確為漢代玉衣的真品，且屬於同一套玉衣，並不是以來源分散的零星玉片雜湊而成。但因這批玉片並不是考古發掘出土，所以各玉片的確實位置已經無法得知，而且玉片也保存得不完整，有許多缺片，所以修復過程比較困難而繁複。除了盡量蒐集相關文獻外，還到國立歷史博物館、光隆博物館及奇美博物館參觀，觀察展出的玉衣。大致上說，修復包括以下步驟：

1. 黏合與修補破片

由於這批玉衣片中有許多破碎的，所以一開始需先拼湊及黏合破片，再以環氧樹脂填補缺損的部分。有些玉衣片的局部為白色，那是經過修補的部分。

2. 編號測量與登錄

在每一塊玉片背面寫上流水編號，並測量其長、寬、厚、重，將測量數據與屬性資料填寫在資料表，並進入典藏系統登錄。最後總計有1,434片玉片，其中完整的共1,086片，黏合後完整的55片，經修補的165片，黏合並修補的41片，殘缺（無法復原的）87片。這批玉片雖然看起來大同小異，實際在形狀與尺寸上，每一片都有微妙的區別。

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3. 製作珍珠板模型

裁切珍珠板，替每一塊玉片製作一片形狀相同的模型，並寫上與原本玉片相同的編號。

4. 製作人體模型

以保麗龍切割成一具可以隨時修改的人體模型，包括頭部、軀幹、雙臂、雙手、雙腿、雙腳等部分，外表糊上一層紗布。由於手部為握拳的形狀，不容易切割得很準確，所以翻製真人手部的石膏模型代替。

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5. 拼湊珍珠板模型

參考考古出土資料，試著為每一片已編號的珍珠板模型，在人體模型上找到最合適的位置；再裁切珍珠板片，補足缺少的部分，每一片也給流水編號。經過多次調整，初步製成一套珍珠板衣。

6. 拼湊玉片

根據珍珠板模型的編號排列玉片，再根據每一玉片的形狀、尺寸、穿孔位置等，調整玉片至最適當的位置。這個步驟像是拼圖，但卻更為困難，往往要經過再三修正才能確定位置。似乎仍有少數玉片的位置不很恰當，尤其是面罩、手套和鞋這些形狀比較複雜的部位，玉片特別難以安置妥貼。

7. 缺片仿製

以摻了石粉並調色的樹脂，製成大片的仿玉板，再裁切成小塊，大小與形狀仿自補足空缺的珍珠板，經打磨、鑽孔及表面噴砂處理後，做成900多片的仿玉片。質感相當近似但比較透明，仔細看還是可以分辨。

8. 連綴玉片

將確定位置的玉片和仿玉片，用銅線穿入四角的小孔，將玉片連綴起來，同時縫在內襯的紗布上。大部分的樹脂仿玉片，都安排在背後或看不見的死角部分，看起來比較美觀。以銅線連綴也是一件繁瑣的工作，花了二個月的時間，打了幾千個結，才將所有玉片連綴完成。

9. 綢布滾邊與製作內襯

每個部位連綴完成後，必須用綢布滾邊。以製作錦盒使用的錦布，包裹在玉衣的邊緣，花色典雅古樸非常美觀。同時為了避免玉衣塌陷，將保麗龍人體模型的形狀，用樹脂翻製，作為玉衣的內襯。

玉衣修復完成後，展示於「我們的身體——生老病死」展廳中，與古埃及的木乃伊比鄰而居，同樣是希望屍體不朽追求永生的目標，古埃及人與漢代人在做法上有何異同？從玉衣珍貴的材質及繁瑣的製造過程，可以體會當時貴族奢華的生活，與嚴格的階級禮儀制度。

苗家吊腳樓

吊腳樓是苗人傳統民居建築，其特色是就地取材，占地少，寬敞、美觀、冬暖夏涼；盛行於貴州、湖南、川東等苗族山區。

本館的這一棟吊腳樓來自貴州錦屏縣平略鎮彰化寨斗寨村，屬歇山式穿斗挑梁木架干欄樓房，屋齡大約十多年，分為三層，總坪數約八十五坪。最底一層作為牛欄、豬圈、雞舍、堆肥、放柴等。中間一層為人居住，是三進式的格局，正中間是堂屋，設祖先牌位，家庭祭祖、宴飲、接待客人多在此舉行。堂屋兩邊的兩大間則按需要隔成睡房、客房、烤火間、存物間、通道等。頂樓為閣樓，存放穀子及用來曬衣。吊腳樓內部附設的家具繁多，如吊籃、木床、木櫃、竹籃、方形打穀桶等。

該房子原本修建在斜坡上，修建時先挖出一個上下兩級梯形的平臺，梯級堡坎用鵝卵石砌成堅固的保護。有了這約一百坪的兩級平臺，整幢房子的支撐立柱便安放在上面。從側面看，最外面的一根柱子懸空而掛，同上面一級屋基持平形成了「吊腳」，俗稱「吊腳樓」因而得名。

屋頂使用杉木片，可保護主樓外壁不受日曬雨淋。而吊腳的部分有金瓜雕飾以增加美觀。吊腳樓在堂屋前面留出一個別緻的空間，簷柱中裝上空花曲欄長靠凳，俗稱「美人靠」；苗人最愛在此歇息小坐憑欄遠眺，客人來到也多在此接待暢談。

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新增苗族蒐藏

2004年民族學門為了補強中國西南少數民族館藏，特別購進苗族一千多件的織品、服飾及一棟吊腳樓。苗族藏品涵蓋了湖南、廣西、貴州、雲南、四川、海南等地區，但以貴州東南的蒐藏最為豐富，該區域為苗人主要的聚居地。貴州東南地處雲貴高原東部，為長江流域與珠江流域的分水嶺，水域簡單的區分為北邊的清水江流域與南邊的都柳江流域。早期的蒐藏以清水江流域居多，約有四百多件的蒐藏，以施秉、台江、丹寨、雷山等為主，尤其施洞地區的繡片非常豐富。2004年新入藏的標本，除了增加都柳江流域的服飾與織品，也補足了黔南、黔西北、黔東北、雲南等地的服飾。

這批新入藏的苗族服飾，是以1985年民族文化宮的分類方式，將苗族服飾區分為八十幾個式，每個式至少有一至二件標本，而式的命名以行政的鄉、鎮等名稱。該分類法是以苗語為劃分的基礎，不同地區的苗將自身的認同鮮明表現在婦女服飾上；然而不同的式之間在其他文化相貌上的關連性、或式的界定與形成等相關的議題都亟待解決。相較於早期入藏的四百多件苗族標本，是以村寨為描述的主體，雖然免除了分類的窘境，但仍有待未來更詳盡的資料補充。

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民族學門蒐藏的吊腳樓，堪稱臺灣博物館苗族蒐藏的第一與唯一。因水庫的營建工程已進行中而必須遷村，所以願意將房子交由本館收購。

不論是織品、服飾或吊腳樓、器物等，都彰顯出本學門在蒐藏業務上作泛文化研究的意圖。苗的物質文化呈現傳統和現代生活模式中的重要部分，當中所蘊含的符號系統，不但體現苗人的思考與文化邏輯，這批美麗豐富的文物不只是藝術，也記錄苗人歷史長流中遷移的歷史。

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1. 銅縷玉衣修復展演
2. 吊腳樓
3. 吊腳樓
4. 苗族服飾

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典藏管理組



喜悅豐收的紀元

過去我們曾經強調，博物館的重要性不在建築物而是藏品，沒有藏品與知識，等於沒有博物館的存在；因此，蒐藏與研究共構了博物館的核心產能，而標本蒐藏量的快速擴充，即某種程度地反應上述的意義。

本館歷年標本入藏量大約維持在每年三、四萬件的成長，近年來均超過六萬件，截至2006年底館藏標本已達832,277件，其中2005年為113,116件，2006年為67,628件，成長件數接近歷年平均量的兩倍。其中佐藤教授捐贈的昆蟲標本，陸續登錄於2006年館藏，彰顯本館昆蟲標本的規模和完整性，整體而言，可說是邁入喜悅豐收的新紀元！

館藏標本顯著成長的績效，是全體蒐藏研究部門共同努力的成果。達成成果的流程策略，是透過蒐藏研究學組召開五組協調會，共同商訂當年的目標總量及各學組的達成量，各學組依其特性和權責分配各學門登錄量標準，每個月由典藏管理組納入登錄統計表，提供達成量進度供作參考，每季並透過五組協調會檢討進度；整體而言，可說是積極自我挑戰、自發性及協調性的目標管理結果。

重要動態

一、典藏管理系統升級作業

隨著館藏數量逐年成長、館際交流頻繁、典藏業務量與日俱增，要落實蒐藏品管理，唯有加強藏品數位化管理機制。於2005年8月啟動典藏管理系統升級計畫，強化線上申辦登錄、異動作業流程權限控管及使用便利性，提供各式作業智慧型操作介面，加強系統安全及資料輸入驗證功能，新增借出標本催還、續借機制，盤點及各項查詢、統計功能。為了掌握館藏數量及借出情形，提供web查詢功能隨時取得所需資訊。本系統於2006年底正式上線使用。

二、自然物標本數位典藏綻放奇葩——與中研院生物多樣性研究中心共同舉辦國際學術研討會

近年來西方先進博物館在典藏管理上已呈現一種新趨勢，稱為「看得見的蒐藏」，讓蒐藏標本適度而親切地呈現給觀眾。本館在展場走道角落闢出工作展演櫥窗，研究人員帶著標本在裡面工作，觀眾可以一覽無遺並可與之對話；近年來13個學門的重要代表性典藏，已建立數位典藏資料庫，提供社會大眾瀏覽查詢，具有積極呈現的意義。

為了體現這項發展成果，促進下游加值產業與文化教育應用的發展，「2005自然物標本與生物多樣性資料庫整合國際研討會暨Species 2000亞太地區論壇」於本館舉行，國內外自然科學界從事數位典藏資料庫工作的研究菁英，展現豐富的工作內容成果，提供國內相互觀摩的機會。

國內數位典藏工作已累積成果豐富的典藏資料庫與工作經驗，這些資料庫

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是數位內容加值產業發展的上游材料，是臺灣本土文化教育知識資訊傳播的核心產能，將來提供社會大眾或與資訊產業界合作，無論是教材或遊戲軟體的內容設計，都有無限的發展空間。本館累積的標本已超過82萬件，分13個學門建置了數位典藏資料庫，可提供社會大眾瀏覽。

數位典藏資料庫的建立，意味著標本不再長駐象牙塔，而是國家社會的公共文化財，為了體現這項理念，典藏管理組主任周明也在會中發表一篇論文，強調知識分享社會的使命與重要性。

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三、蒐藏庫裝設溫濕度感測記錄系統

統籌規劃裝設全館18間蒐藏庫溫濕度感測記錄系統，提供即時監測及顯示功能，當庫房溫濕度出現超限狀況即會發出警訊，以便進行處理，避免蒐藏品因溫濕度異常而損壞。透過網路即可掌握庫房溫濕度變化，系統並提供測量資料記錄、查詢、報表列印等功能，便於日後追蹤及資料分析。

四、舉辦博物館典藏政策及其現代性研討會

何謂博物館典藏政策？博物館典藏政策如何形成？是否一成不變？應該體現什麼樣的精神和價值取向？本館訂定的蒐藏政策面向廣泛、鉅細兼具，惟「蒐藏政策」詞義的界定和功能，學術界尚少形成議題探討。省視內外環境脈動，是否有具體而優先的目標，可作為蒐藏工作階段性的行動指引，如何融入本館既有蒐藏政策之中？

故宮博物院興建南院，蒐藏將從華夏擴充到亞洲，原有代表華夏文化保存和法統繼承意義的蒐藏政策，不再適用於南院，調整其蒐藏政策是必然性的；國立臺灣博物館掙脫日據殖民後，近年來在人事、制度、蒐藏空間等的提升，對其蒐藏政策賦予新義，有助於現況及未來的發展；國立臺灣史前文化博物館積極爭取卑南文物回歸，政策取向似乎也回應社會的脈動…，相關的訊息值得參考與省思。

2006年12月舉辦的「博物館典藏政策及其現代性」學術研討會，探討典藏政策在博物館發展過程中所扮演的角色與影響，以及觀察國內博物館因館舍擴建、館藏增加或因時代背景而調整建館宗旨，對於典藏政策策略制訂與實際執行面向的回應，省思現代博物館館藏特色之典藏策略建構，及如何回應社會發展動向之時代意義。

1. 博物館典藏政策及其現代性研討會
2. 2005自然物標本與生物多樣性資料庫整合國際研討會中英文版論文集
3. 國內外與會專家學者於本館戶外庭園合照
4. 博物館典藏政策及其現代性研討會中講師薛燕玲女士演講情形

五、參與特展

配合年度各檔特展負責以下業務：依據展品的材質與特性，規劃運輸方式及路線，提出保險需求建議，提供策展人展示環境與安全規劃及文物維護相關諮詢，統籌監辦展品包裝、運輸、點交及安全維護等工作，展覽期間展品狀況檢視及清潔維護，並完成展品異動登記作業。2005年參與「六百年前的海上交響曲──鄭和下西洋特展」及「極地恐龍特展」；2006年參與「當狗遇上人──丙戌年狗年特展」、「咬牙切齒──哺乳動物的牙齒世界特展」及「兵馬俑─秦代新出土文物大展」。

六、研修蒐藏管理作業

2005年

1. 修訂「國立自然科學博物館標本審議辦法」。由本館標本審議委員會兼珍貴動產評審委員會負責審查珍貴動產之認定、取得、保管、減少等事項，使審查機制更為完善。

2. 與科教組共同推行「科教用實體標本」之登錄管理作業，將科教標本清點建檔，逐步納入典藏管理機制。

2006年

為落實借出標本管理，修訂館藏品借出相關規定及借出契約，以為日後執行借出作業的依據，逾期未還者按規定積極催還，以杜絕久借未還。

七、榮獲第六屆從事兩岸專業交流科技體育類績優團體獎

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本館長期戮力於生態保育研究，為彰顯研究成果，曾於2004、2005年製作「豔紅鹿子百合特展」與「重新發現臺灣獼猴特展」，普獲各界佳評。為進一步推廣及提升臺灣生態保育之成就與形象，促進兩岸博物館交流，遂提供上述展覽面板與模型，委託本館基金會與大陸適合展出之單位合辦巡迴展，自2004年11月迄今，先後於大陸北京、天津等地主要自然史與科技類博物館巡展。

藉由推廣雙巡迴展，提升了本館在大陸博物館界的知名度，同時建立了良好的口碑，尤其是搭配雙巡迴展所辦理的科學教育演說，將20多年來辦理博物館教育活動之經驗與大陸博物館及中小學教師分享，深獲與會者的認同。

雙巡迴展結束後，接著是教育活動方面的合作，在本館與基金會規劃安排下，北京與福州市科學技術協會派員來臺參訪博物館；又，「2005兩岸中學生暑期自然探索夏令營」，係兩岸博物館首次針對中學生交流所合辦的活動；2006年，臺灣的中學生組團到大陸進行野外自然探索活動。使兩岸學生得以了解彼此成長的環境，學習互相尊重與關懷。

「人類不分種族、領域及國家共同研討發展，促成科學與人文知識的交流與融合，可使生活文明產生不斷進步的原動力與互蒙其利的效益。」對於今日兩岸科技教育也同樣適用。本館辦理兩岸交流活動之目標，與設立宗旨、館所屬性及任務息息相關，在結合研究、展示、教育等各專業人員與基金會成為一交流團隊後，近兩年來兩岸交流活動已更為活絡積極。

1. 榮獲第六屆兩岸專業交流績優團體獎　2. 2005年兩岸中學生自然探索夏令營研習
3. 2005自然物標本與生物多樣性資料庫整合國際研討會會場
4. 英國Timothy Ambrose等四位博物館學者與本館科教組同仁討論情形
5. 2006兩岸中學生科技文化夏令營大陸學員抵達中正機場合影

重要紀事 • 2005～2006年

2005年

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- 「岩壁上的精靈：豔紅鹿子百合」與「重新發現臺灣獼猴」特展赴中國北京自然博物館、天津自然博物館、大連博物館、福州科技館、南通科技館、無錫科普館、紹興科技館、九江圖書館、浙江自然博物館及北京植物園巡迴展出。(2005~2006)
- 與本館基金會、北京自然博物館共同舉行「2005年兩岸中學生暑期自然探索夏令營」，邀集北京以及臺中市中學生進行10天的臺灣自然探索活動。
- 與中研院生物多樣性研究所辦理「2005自然物標本與生物多樣性資料庫整合國際研討會暨Species 2000亞太地區論壇」，邀集國內外相關機構發表數位典藏相關論文。
- 由本館規劃，北京市科學技術協會及北京地區相關機構組團來臺參訪國立故宮博物院、國立科學工藝博物館等單位，體驗臺灣博物館的經營理念。

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- Timothy Ambrose等四位英國博物館專家來館參訪。
- 中國自然科學博物館協會常務理事孫祥潤等到館參訪。
- 與本館基金會、北京自然博物館共同舉行「2006年兩岸中學生暑期自然探索夏令營」，帶領臺中市中學生前往北京、長白山等地，與北京市中學生進行大陸自然探索活動。
- 與本館基金會、紹興科技館共同舉行「2006年海峽兩岸中學生科技文化夏令營」，邀集紹興地區及臺中市中學生進行10天的臺灣自然探索活動。
- 福州市科學技術館與福州科技館組團來臺參訪，進行相關博物館之經營考察。
- 榮獲陸委會頒發「第六屆從事兩岸專業交流科技體育類績優團體獎」。
- 辦理「博物館典藏政策及其現代性研討會」。

典藏標本統計

■ 2005年標本典藏登錄統計表

ACCESSION	動物學組	植物學組	地質學組	人類學組	總計
採集	29,181	3,988	2,542	7,953	43,664
購買	246	6,035	234	1,599	8,114
捐贈	51,889	1,794	724	14	54,421
交換	278	4,554	0	0	4,824
其他	605	23	53	28	709
合計	82,191	16,394	3,553	9,594	111,732

植物切片標本	3種	178片
植物浸液標本	7種	11瓶
植物活體標本	282種	
真菌菌種標本	95株	
孢粉玻片標本	1 種	50片
木材標本	4種	0塊
種子標本	161種	
其他標本總計	777	

・2005年新增標本蒐藏數量總計112,509

■ 2006年標本典藏登錄統計表

ACCESSION	動物學組	植物學組	地質學組	人類學組	總計
採集	37,817	7,877	2,499	8,151	55,832
購買	543	960	202	5	1,710
捐贈	2,049	2,681	317	43	5,090
交換	72	3,765	0	0	3,837
其他	3,131	0	0	0	3,131
合計	43,612	15,283	3,018	8,199	70,112

植物切片標本	62種	2,790片
植物浸液標本	106種	891瓶
植物活體標本	3種	

真菌菌種標本		87株
孢粉玻片標本	242種	2,050片
木材標本	0種	67塊
種子標本		95種
動物液態氮組織	294種	1,306份
動物酒精組織	101種	1,298份
其他標本總計		8,587

・2006年新增標本蒐藏數量總計78,699

■ 本館截至2006年12月底典藏標本統計表

ACCESSION	動物學組	植物學組	地質學組	人類學組	總計
採集	339,257	68,307	16,937	61,630	486,131
購買	55,589	55,133	7,948	8,987	127,657
捐贈	124,601	28,617	19,298	2,908	175,424
交換	2,082	29,189	4	0	31,275
其他	5,218	203	1,633	3,133	10,187
合計	526,747	181,449	45,820	76,658	830,674

植物切片標本	1,004種	24,097片
植物浸液標本	1,581種	8,190瓶
植物活體標本		2,219種
真菌菌種標本		2,151株
孢粉玻片標本	867種	7,194片
木材標本	343種	1,025塊
種子標本		439種
動物液態氮組織	294種	1,306份
動物酒精組織	108種	1,298份
其他標本總計		47,919

・本館截至2006年12月底典藏標本總量878,593

蒐藏與研究成果

一、雞既鳴矣——雞年特展（2005.2.4~2005.5.1）

由典藏管理組策劃並首次擔任特展策展人。本特展沿著橢圓形廣場迴廊外側搭建長26公尺、高4.7公尺的大型鳥籠，以混養方式展出14種各式美麗雉雞。此外，結合展出中的苗人傳統民居建築——吊腳樓，模擬苗人在樓底飼養牲畜的情景，展出9種逾30隻的育種雞；並搭配館藏雉雞標本，探討雞的多樣性、雞的育種及外來的環頸雉等三大主題，以迎接金雞年的到來。

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二、接受太平市委託協助建立自然生態館——太平市自然生態館志工培訓及永續經營機制建立計畫（2005.6~）

延續2004年接受臺中縣太平市公所委託，完成太平市自然生態館「館藏研究」計畫及「經營管理」研究規劃報告，為落實研究規劃內容，該館積極籌備開館基礎工作及永續經營策略方案，2005年再度委託本館執行志工培訓及永續經營機制建立計畫，執行團隊包括典藏管理組、動物學組、科學教育組及本館資深義工。

按照委託需求規劃「志工培訓」與「永續經營機制」課程，分兩梯次進行，除課堂講授外並安排現場觀摩及實作體驗，期收理論與實務經驗相互印證。課程內容涵蓋理念、制度建立、經驗方法傳授、演練示範、實地觀摩及座談等。

整個計畫於2005年9月完成，整體而言，受訓成員能夠吸取本館的營運經驗，導入實務工作流程及方法，成為未來營運種子人才，達成經濟有效的「典範轉移」。

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1. 十二生肖系列特展：「雞既鳴矣——雞年特展」展場一隅
2. 周明主任於太平市自然生態館計畫專題報告「經營管理策略規劃」
3. 詹美鈴老師實地示範昆蟲標本製作
4. 佐藤教授已將大部分標本仔細分類並完整記錄
5. 臺灣民間信仰文化教材電子書

三、豐收的喜悅──開館以來最大數量的捐贈案（2005.12）

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繼2004年底從日本名古屋佐藤正孝教授家中運回5萬餘件昆蟲標本後，第二批標本也在2005年12月30日運抵本館。前後兩批都由典藏管理組與動物學組合作，遠赴東瀛審慎包裝固定標本後護送回館。佐藤教授所捐贈昆蟲標本總數高達11萬7仟件，是本館開館以來數量最大的捐贈案。

其中的標本仍以鞘翅目居多，除多數為佐藤教授採集外，也包括許多日本著名昆蟲學家如中條道夫、有田豐、大林延夫和石原保等人，於四〇至六〇年代採集及佐藤教授與各國學者交流之標本。

四、國科會數位典藏創意加值應用計畫──臺灣民間信仰鄉土文化電子書（2006.6~2007.5）

(一) 計畫緣起

本館加入並推展數位典藏國家型計畫有年，數位典藏資料庫內容提供產學各界加值應用，達到知識分享並促進數位內容產業蓬勃發展，內容尤其適合開發數位展示、多媒體數位教材及遊戲等。典藏管理組周明主任長期累積臺灣民俗藝術及民間信仰研究的興趣與素材，爰選擇典藏臺灣民間信仰神祇與文物，研發加值應用鄉土文化電子出版品。此項計畫於2005年11月通過國科會審查，12月正式提送計畫書申請，2006年6月通過審查並核定計畫清單後，開始執行電子書研究及製作計畫，預計於2007年5月完成。

(二) 計畫目的

推廣「臺灣民間信仰」科學與文化認知，以破除迷信，實踐知識分享社會使命。利用數位典藏上游素材開發加值應用，提供數位內容產業合作契機，作為產業與典藏機構合作開發數位典藏加值應用的參考案例，連貫典藏內容與加值應用相輔相成的計畫環節，建立知識文化教材設計研創與應用推廣的經驗模式，增加數位內容產業發展的想像空間。充實臺灣鄉土文化數位學習及數位出版內容，展現電子書多元形式，增加學習的興趣與動機。

(三) 計畫產出形式構想

能同時融合「翻書」和多媒體影音感官享受的趣味性設計，突破坊間對電子書的刻板印象。產出的形式上，仍有「書」的傳統感官意義，且可以利用滑鼠或手指觸控來翻書，保有閱讀的樂趣和書香的質感，而在冊頁中又設計影音多媒體的嵌入，讓讀書有聲光動畫閱聽的享受與新奇感，「書」與讀者達成交融互動，呈現真正名副其實的「立體書」。預期會有超強的吸引力，如同俗話所稱的「放電」效果，產品暫名為「臺灣民間信仰FUN電書」。

5 ▼

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許美蓉、陳慧玲　2006　臺英博物館界交流　國立自然科學博物館簡訊　第221期第2版。

九二一地震教育園區

1999年9月21日清晨1時47分，臺灣南投、臺中縣一帶發生芮氏規模7.3的強烈地震，造成2,415人死亡、29人失蹤、11,305人受傷，財物損失估計約新臺幣三千億元，為臺灣百年來最大的地震災難，為了紀念在災難中死傷的同胞，並提醒政府與民眾反省、重視天然災害的預防及救災措施，經中央與地方政府邀集相關學者專家前往震央地帶勘查後，於臺中縣霧峰鄉光復國中操場之斷層隆起災區現址規劃改建為「地震紀念博物館」，以保存地震原址並記錄地震史實，提供社會大眾及學校有關地震教育之活教材。後經教育部於2001年2月召開跨部會協調會議，定名為「九二一地震教育園區」，以彰顯其紀念及教育意義。

園區主要目標為──普及地球科學及地震知識、保存地震遺址及共同記憶、喚起國人注重防震救災的意識、協助我國地震研究等，透過自然科學、人文、歷史紀錄等面向的展示和教育活動，讓觀眾在踏進地震教育園區時，能從認識地震的自然現象開始，瞭解大自然力量造成的災害，以建立正確的防災觀念，知道如何保護自己及幫助別人，進而瞭解地震與人類的關係，在承受巨大的自然災害後，能為生命和生活找到出口。



導覽解說

園區讓觀眾親身體會車籠埔斷層所造成的震撼，學習如何尊重大自然並與其和諧共存，透過導覽解說觀眾能認識設置園區的意義、展　理念與內容，達成地震科學與防災教育的宣導功能。2005、2006年間，除接受學校及一般團體導覽解說預約外，並視人力狀況安排導覽解說服務，依照參觀團體性質、人數及停留時間，以規劃導覽方式及行程，讓觀眾在有限的參觀時間裡，對展示能有具體且深入的認識。2005年辦理3,513場次，329,525人參加；2006年辦理3,458場次，264, 309人參加。

2005科學教育活動

地震教育園區以推廣地震科學教育為主，藉由互動式展示、地震遺址及多媒體影像，結合民眾日常生活相關主題開發教育活動，以寓教於樂的方式，讓民眾體驗大自然的力量，建立未來防災觀念；同時運用社區、學校及相關團體機構等社會資源，以合作模式推廣地震科學教育。2005年舉辦科學教育研習活動計12場次，460人參加；推廣地震科學教育活動計582場次，50,731人參加。

1.「認識海嘯」教師研習會

2004年底發生「南亞大海嘯」，台灣雖未遭遇類似衝擊，卻亟需藉此警惕並居安思危，建立正確完整的海嘯知識及防災救災觀念，以防範於未然；藉由相關研習課程，讓各高中（職）、國中、國小教師、軍訓教官及防災相關單位人員暨本館解說人員、義工等，深入校園傳授海嘯相關知識，並能普及於各階層民眾，建立國人未雨綢繆的觀念。

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2.「地震週」活動

配合終身學習活動，讓民眾認識地震科學，體驗大自然的力量，建立未來防災的觀念，提升社區民眾社會關懷動機，提供正面看待災變人生的態度與認知，以寓教於樂達到民眾親子共同學習的目標。活動內容包括：(1)「搖擺義大利麵屋」競賽：藉由參與製作義大利麵屋競賽遊戲，從製作模型屋過程學習結構抗震的觀念，舉辦28場次，256組參加。(2)「地震規模與震度體驗」互動遊戲：藉由受震基座板跳躍製造振動，利用精密儀器測量振動之大小，並即時予以分級，以體驗地震震度分級之依據及原理，舉辦15場次，4,813人參加。(3)「土壤液化現象」科學演示：以現場展示介紹液化現象的成因及預防，藉由模型試驗使民眾瞭解土壤液化發生的機制及災害，以落實全民防災，辦理15場次，4,866人參加。(4)「樓房與地震」科學演示：說明不同軟硬程度的地盤受到相同地震時，對同一種建築物的影響及損壞情況也不相同，辦理15場次，4,949人參加。(5)「地震體驗車」：以地震體驗車模擬不同震度的地震，藉由體驗車之震撼效果，讓觀眾對地震有更深一層的認識。(6)「地震防災教育芝麻開門」問答遊戲：將地震防災教育觀念設計為問答式遊戲，讓觀眾在遊戲中建立正確的地震防災觀念。

3.「2005年921生命教育系列講座」

為協助受難者勇敢走出陰霾，學習如何心存感恩回饋社會，將創痛記憶轉化為反思與積極學習生命課題。系列講座包括(1)、身心靈DIY——921地震受災戶經驗談；(2)、把心打開、讓希望進來——談重大創傷後遺症之諮詢輔導；(3)、從地震閱讀人生——創「心」人際溝通學等課程。

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4. 921地震教育園區開放週年暨集集大地震六週年

九二一地震震醒國人的防災意識，藉由週年活動以紀念災難的經驗，透過各項活動吸引民眾參與，教育民眾重視災難的預防、應變與救護，期能廣為傳播以深植人心。活動項目包括：

・非常搖擺義大利麵屋全國競賽活動

利用義大利麵條、棉繩、厚紙板和熱熔膠等材料，應用簡單工具製作一棟兩層樓之結構模型，並於小型振動台進行模擬地震測試，讓觀眾學習結構抗震的觀念，初賽及決賽分別在北、中、南、東舉辦，同一時間進行模擬地震測試，各地決賽均取前三名分別頒發獎金。

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・地震知識王有獎問答活動

透過地震知識問答，加強民眾對地震的認識。利用團體導覽解說及假日進行，答對觀眾依其意願進行下一階段挑戰，依挑戰成功之題數給予紀念品或獎勵品。

・U19 (Under19) 藝術創作活動

配合文化總會推展青少年藝術創作活動，利用地震教育園區第二期工程之安全圍籬牆面，以「沿延園緣」為主題，提供19歲以下青少年及兒童自由創作空間，表達感言也留下一份圓滿的緣分，所有參與觀眾共同合作完成藝術作品。

・重建社區文化創意產業觀摩會

六年前的地震重創中臺灣，地方文化產業不但沒有消失，反而更積極的重建和開發。在6週年的活動中，展示各地方災後重建的文化創意產業，讓民眾對災區重建與臺灣的生命力有更深刻的認識。

・救難犬示範表演暨敏捷犬競賽活動

救難犬在921地震救援行動中發揮其靈敏的嗅覺，協助尋找拯救災區受難者，訓練精良的救難犬是救援行動不可多得的幫手，特別邀請中華全犬種協會進行救難犬示範表演暨敏捷犬競賽活動，讓民眾近距離觀看這些出生入死協助救人的狗英雄，增加對救難犬特性及技能的認識。

1. 海嘯教師研習課程
2. 六週年活動——非常搖擺義大利麵屋全國競賽活動初賽：
   傷腦筋傷腦筋，遠道而來的外國朋友為使房子更抗震，傷透了腦筋哩！
3. 六週年活動——救難犬示範表演暨敏捷犬競賽活動
4. 六週年活動——地震知識王有獎問答

2006科學教育活動

為持續推廣地震科學教育的廣度與深度，特別擴大以往活動的參與層面，並積極開發各項動態有趣的活動，以吸引更多觀眾的參與；同時開辦戶外地質探索活動，由學者專家帶領高中生及中小學教師，到夏威夷進行深入的科學知識之旅，以及由國內地質專家帶領實地探訪石岡水壩、埤豐橋、三義斷層露頭（四號隧道）、霧峰鄉921地震園區乾溪車籠埔斷層露頭等特殊地質景觀。2006年舉辦科學教育研習活動計　19場次，932人參加；推廣地震科學教育活動計3,297場次，79,402人參加。

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1. 來自地心的訊息——夏威夷科學探索活動

為帶領民眾走向國外並開拓視野，本館以積累多年的博物館經驗，20年來首次推出「海外科學之旅——夏威夷科學探索活動」，由國內著名的生命科學、天文物理及地球物理科學家，引領25名高中生及中小學教師前往夏威夷，探訪這「世界演化的櫥窗」及全世界最大的天文觀測站、夏威夷國家火山公園、Mauna Kea天文台及太平洋海嘯預警中心，實際進入自然探索的世界，體驗大自然的生命及力量。

2. 地震闖五關

活動內容為認識地震、防災及急救，參加觀眾索取活動闖關卡並到五個關卡定點，由定點活動人員（關主）協助觀眾完成闖關遊戲，關卡內容包括地震基本訊息知識搶答；地震DIY比一比，誰能製造預設的過關震度標準；急救與包紮，學習急救與包紮的基本常識；我們的板塊住哪裡，藉以認識板塊；我的地震包，學習逃生較需攜帶的物品，過關者得到精美的小禮物。

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3. 親逢對手921地震教育競賽

提供親子共同參與寓教於樂的趣味性活動，從活動中學習地震防災常識。首先是大自然的拼圖活動，由父母親輔助子女將每一塊分離的拼圖在規定時間內完成組合，優勝組可進階地震知識王競賽問答，透過親子協力合作爭取榮譽，促進親子間感情交流。

4. 921萬花筒

為了紮根地震科學教育，運用簡易的模型或實物，誘發學習地震科學知識的動機，針對斷層保存館現有展品加入動手做的小實驗，以定點、定時的科學演示，讓觀眾容易理解展示內容。921萬花筒活動用生活化的語彙帶領小朋友認識地球七大板塊，介紹火山類型及其對人類生活的影響、海嘯形成的原因、土壤液化和房子的關係、樓房建築和地震的關係、斷層的現像和斷層的種類，配合展品儀器製造震度並介紹中央氣象局如何得知地震資料、地震波的種類及其旅行的途徑、臺灣島嶼形成的歷史及地震在世界各國的傳說。

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1. 來自地心的訊息── 夏威夷科學探索活動
2. 地震闖五關
3. 與普林斯頓小學合作
4. 大自然的拼圖──原來地球上每一塊板塊都有自己的名字喔！我要幫每一個板塊圖上美麗的顏色。
5. 921萬花筒

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5. 2006年地震科學與防災教育種子人員研習

本研習活動邀請學者講授相關課程，內容包括第一階段學理性課程——地球科學基本知識，以及第二階段實務性課程——地質地震災害及防震減災，並安排地質野外考察，實地觀察各種地質的形成。藉由培訓中小學教師及相關領域義工，在學校、社區及其他社教機構發揮紮根的作用，使學習走入社會，推廣「全民地震防災教育」。

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6. 921地震教育園區開放二週年暨集集大地震七週年

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以防震救災為主題，將地震相關知識化為簡單易懂的活動，增加民眾對地震科學及地震文化的了解，提高地震災害的危機意識，增加防災逃生的知識，強化保護自己、幫助別人的能力。2006年活動內容包括：

・救己助人——認識防震救災工作

藉由闖關遊戲、影片、面板、相片及產品展示，讓觀眾了解防震、逃生及救災的原則與方法，強化自救救人的觀念，也邀請參與921地震救災工作的勇士分享救災經驗與心得。

・哈日姐姐地震傳說開講

在日本，傳說地震是由於鯰魚暴動所引起，因此在江戶時代發展出鯰繪的普羅藝術。以投影及看板展示鯰畫，透過解說員的精采解說，讓觀眾了解地震對日本人生活及文化的影響。

・熱力四射：街頭藝人表演秀

雖然受到921地震的打擊，臺灣依舊展現出旺盛的生命力，來自臺灣各地的街頭藝人，吟唱一段浴火重生的故事。

・地震知識競答

透過地震知識問答，加強民眾對地震科學及地震防災知識

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1.、2. 2006年地震科學與防災教育種子教師研習

3. 921地震教育園區開放二週年暨集集大地震七週年——哈日姐姐地震傳說開講

4. 921地震教育園區開放二週年暨集集大地震七週年——熱力四射：街頭藝人表演秀

5. 地震科學到校服務

的認識。

・動手玩科學：簡易地震儀製作教學

透過解說及簡易地震儀的製作，讓學生了解地震儀的原理及地震與地震波的關係，完成作品後以震動台測試其記錄功能，並比較不同震度所留下的振幅變化。

・防災良品大集合

為幫助民眾建立隨時做好避震防災準備的觀念，自日本進口數十種人氣創意防災用品，並於斷層館展示，例如：適合家中使用的「地震包」；確保災後飲用水安全的「吸管式淨水器」；阻絕火源與空氣接觸的「滅火毯」，平時可在廚房當擦手巾，又可水洗50次內不影響滅火效果；長期保存食品…等。讓觀眾了解地震時需要哪些保命用品，並引導思考常見的物品是否可做為防災用品，學習如何具體落實防災準備工作。

・異想天開：防震救災用品創意點子大募集

請觀眾發揮天馬行空的想像力，以文字或圖案寫出地震發生前、發生時或發生後可派上用場的用品，在創意燈泡卡寫上或劃上創意防震救災用品，並掛於活動牆上。觀眾看完所有展示的創意點子後，在其喜歡的點子上蓋戳記以表支持，藉由相互腦力激盪深化防災意識。

7. 地震科學到校服務

為了增進國小學童地震知識，特別辦理「到校服務」活動，藉由參與義大利麵屋抗震競賽活動及地震知識王問答競賽，學習結構抗震觀念及地震科學的知識，加強學童對地震的認識以建立防災的觀念，本年度計到八所國小服務，參與師生達600人。

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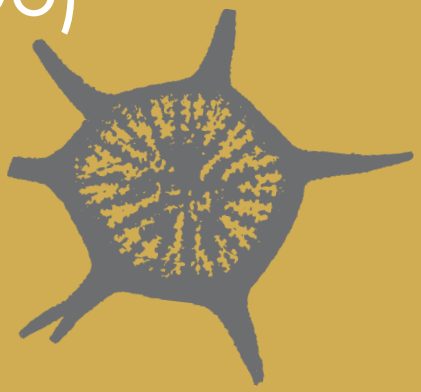
Biennial Report of the National Museum of Natural Science (2005~2006)



Director's Foreword

By Tzong-Shyan Lin
Director of the National Museum of Natural Science

Natural science is a discipline that explores the natural environment, the evolution of life and the interaction between the two. Life preserves its genetic message in its DNA and its evolution has continued over the past 3.8 billion years; but it needs to interact with the natural environment for the exchange of substance and energy.

Today, the world's population continues to grow at an astonishing rate, the gap widens between rich and poor, and the ecological system is being damaged by human actions, resulting in a rapid decrease in biodiversity. Over-consumption of energy has led to skyrocketing oil prices and the excessive emission of CO_2 which causes global warming and climate change. Faced with these problems we wonder what we can do: Is it possible for us to co-exist with other lives and the environment in harmony? These are issues with which people must concern themselves.

When we were preparing to establish the National Museum of Natural Science, having evaluated the needs in Taiwan and consulted with curators of other museums of natural history around the world, we decided that the tasks of this Museum should include research, collection, exhibitions and education about natural phenomena and objects of the natural sciences, with a special focus on the zoology, botany, geology and anthropology of Taiwan. In addition to its exhibitions and educational programs on the life sciences, astronomy and human culture, the Museum has also tried to construct the natural history of Taiwan so we might develop a better understanding of the 'mystery' of life, of our natural environment, of the relationship between life and the environment, and of how our attitude towards the environment where we inhabit.

Collection, research, exhibition and education are the four major missions of the Museum. Of these missions, collection and research are the basis for our exhibits and educational programs; and it would be wise for the Museum to embark on specific projects, the results of which we could share with the world. Through permanent and special exhibitions, important themes in the natural sciences can be imaginatively and realistically presented and some of these exhibits, which are sent to other museums both in Taiwan and abroad, enhance the visibility of our National Museum.

Educational programs in the form of lectures, speeches, demonstrations or hands-on activities also help the Museum present our collections, research results and the knowledge thus gained to a wider audience. Even though our visitors are, for the most part, elementary and junior high school students, our exhibitions and educational programs are suitable for every age group. We also make a special effort to serve the needs of people from remote areas and of minorities.

Thanks to the efforts of our outstanding researchers and administrative staff, who always complete their tasks with enthusiasm, and the funding we received from the Ministry of Education, the National Science Council and other organizations, 2005 and

2006 were particularly fruitful years for the Museum's research, collection, exhibition and educational projects. Professional researchers at the Museum have devoted themselves to collection and research and their research results have been published in international academic journals. They have also worked to enhance international exchange. I would also like to thank Professor Sato Masataka for donating to the Museum the over 120,000 precious insect specimens that he collected over his lifetime.

The implementation of the Ministry of Education's initiative to elevate service levels has also allowed the Museum to update some of its permanent exhibitions which were over 10 years old. In addition, we have tried to improve our educational activities to make them more interesting, dynamic and diversified and hope that they will further the progress of and interest in the natural sciences here in Taiwan. These activities were designed not only to help students with their studies, but also to enhance the life-long learning of the general public.

Due to the efforts of our staff and support from the community, the Museum has become increasingly important for cultural tourism. We are honored that the Museum has won the Service Quality Award for two consecutive years and that in 2006 we also received the Award of Comprehensive Service Quality from Executive Yuan.

Twenty years have passed since the Museum was established and we are grateful for the pioneers who laid its foundation and for our staff who through their hard work ensure its smooth operation. I sincerely hope that we can continue to work together to realize our vision of nature exploration, special collections, diverse exhibits, dynamic science education, environmental protection and social service. Let us share our enthusiasm, respect and care for the Museum with our many visitors to ensure that their visit is a pleasant one and that they will be eager to come again.

Departments Activities 》

Science Education Department

Number of Participants in Science Education Activities

Item	2005	2006
Guided Tours	274,127	310,190
Science Demonstrations	84,074	83,525
Science Education Seminars and Workshops	1,739	5,517
Educational Activities for Special Exhibitions	2,467	8,213
Outreach Programs in Outlying Islands		9,743
Science Educational Activities at "Children's Discovery Room"	45,473	50,636
Educational Activities to Explore Natural Ecology	12,175	10,315
Classroom Theater Programs and Thematic Activities	126,500	114,328
Subsidizing Elementary and Junior High Schools in Central and Remote Areas of Taiwan to Visit the Museum	5,628	5,893
Astrology Teaching and Hands-on Science	15,745	11,780
Drama and Musical Performance	10,154	36,865
Outdoor Activities and Astronomical Observations	1,622	332
Contests and Award Presentations	3,910	2,039
Other Thematic Activities	41,887	100,722
Schools Outreach	31,899	31,168
Public Lectures	3,888	3,121

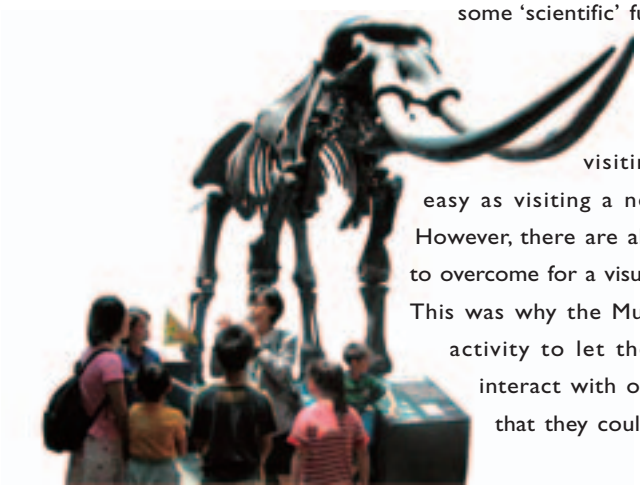


Introduction

In 2005 and 2006, science education activities at the National Museum of Natural Science (NMNS) entered a "mature" stage. In addition to the regular interpretive service, hands-on activities, demonstrations, classroom theater programs and kids educational activities, we also renovated the Naturalist Center as a place to share the Museum's achievements in collection and research and where visitors could immerse themselves in natural exploration. The Center celebrated its grand re-opening in January 2006 and welcomed nature lovers both young and old.

Our educational activities for the "Children's Discovery Room" and the guided tours became more creative, thanks to the contribution of our volunteers who joined with our staff in planning and carrying out these activities. For instance, the puppet show in conjunction with the special "Rhythms of Life" exhibition was made possible by our volunteers and staff working together to write the script, make the puppets and learn how to perform on-stage. This refreshing new event was enthusiastically received by museum visitors in the 2006 summer.

Although most visitors to the Museum are students or family groups, in this aging society senior citizens also need places for recreational activities. To this end, the Museum organized special activities to celebrate longevity during the Double Ninth Festival in 2006. Senior citizens were invited to enjoy some 'scientific' fun and expand their view about nature and humanity.



For most people, visiting a museum is as easy as visiting a next door neighbor. However, there are all kinds of obstacles to overcome for a visually-impaired person. This was why the Museum organized an activity to let the visually-impaired interact with ordinary children, so that they could share experiences and learn from each other.

Taiwan is considered a rich island, but the distribution of resources is different. To enhance communication between urban and rural areas, the Museum arranged an activity for 20 children from the town of Shueilin in Yunlin County to stay with ten host families in Taichung City. During the three-day visit, children from the countryside and from the city learned to look at the Museum from the others' perspective.

The Museum also invited children for Museum adventure parties on New Year's Eve in 2005 and 2006. As the young students walked along the prearranged route in the quiet and darkened exhibition galleries, which were known to be busy and bright during the day time, they not only enjoyed the night-time view but also delighted in the exciting night-time adventure.

In the 2005-2006 biennium, the Museum continued to "deliver knowledge" by bringing interesting teaching aids and materials of science education to schools in central Taiwan. Besides, our outreach programs including hands-on activities, classroom theater programs, demonstrations, shadow puppet shows, astronomical observations and workshops were brought to people in Kinmen to celebrate the grand re-opening of the Kinmen Naturalist Center after it was moved to Jin Cheng Junior High School in 2006.

In 2005 and 2006, two special exhibitions, "The Fairy on the Cliff: Special Exhibition of *Lilium speciosum* var. *gloriosoides* Baker" and "Rediscovering the Formosan Rock Monkey" traveled around China. The Museum also shared its experiences in science education with museums in Fuzhou, Wuxi, Jiujiang and other places as the museum community in China, having seen the success of our collaboration with the schools, believed that it was worth learning from our experience.

Guided Tours

An unexpected encounter enabled the Museum to track a Malay Night Heron (*Gorsachius melanolophus*) in our garden and discover its nest. A camera was installed near the nest to record how the Malay Night Heron raised nestlings and how the nestlings grew. The film was broadcast on the Museum website so people could watch every movement of this visitor to our garden. This was a great example for demonstrating how science education can be combined with information technology.

Our science education staff members always try to keep up-to-date and work to connect the Museum's functions of exhibition, collection and research in practical ways. For instance, the theme exhibition, which was updated quarterly in the Naturalist Center, was a way for professionals to present the Museum collections. The special exhibition, "Cheng-Ho's Expedition," was prepared by the science education staff to celebrate the 600th anniversary of Cheng-Ho's expedition and to tell stories of ship-making, voyage and trade.

Someone once said that "Life is full of choices. The important choices often 'linger' in our mind for years, as if they are waiting for an inexplicable wind." However, science education activities cannot wait as they need to be updated all the time. Hence, we expect ourselves to be "sensitive and humble observers" and always stay on the front-line.

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1. Guided tour: "The Lost Prehistoric Hui-Lai Man"
2. Guided tour: "Cheng-Ho's Expedition"
3. Guided tour: "Dinosaurs of Darkness"
4. Guided tour: "Dog Meets Man"
5. Science demonstration

Guided tours serve as a bridge between exhibits and visitors because they allow visitors to understand the features, concepts and contents of an exhibition. The Museum takes reservations for guided tours from schools and groups; and guided tours for other groups or special guests are also available if manpower permits. Guided tours can be adapted according to the nature and purpose of the visit, giving visitors a specific but thorough tour within their schedule. Usually a guided tour for 20 people or over lasts about half an hour and any school or organization may make a reservation in advance. It is also possible to arrange for a guided tour after arrival if staff are available. In 2005, the Museum provided 3,606 guided tours of the permanent exhibitions attended by 109,509 visitors; and in 2006, 5,505 tours were offered to 159,377 visitors.

The Museum also offers guided tours in conjunction with special exhibitions, holidays and events. These tours center on special exhibitions and give visitors a greater insight into the

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exhibition which allows them to acquire more knowledge about different fields of the natural sciences. In 2005, there were 4,342 guided tours of special exhibitions with 110,644 participants; and in 2006, there were 5,120 guided tours with 113,686 participants.

Topical guided tours in conjunction with holidays and events showcase the Museum's landmark or unique collections, and in 2005 there were 797 such guided tours attended by 24,632 visitors; while in 2006, 635 tours were offered to 13,940 visitors.

A wide variety of science education activities are offered at the Museum so people can participate in those that are of particular interest to them. On the other hand, by combining different activities, the Museum is able to interest a wide variety of people in one particular event. For instance, the holiday science educational activity, "Get to Know NMNS," combines a guided tour with science demonstrations, classroom theater programs and exploring the Naturalist Center. When programs are modified in accordance with the themes of different special exhibitions, the Museum can offer more interesting and dynamic topical tours. One topical tour was designed for each month and the tours were advertised in advance to arouse the public's interest. In 2005, a total of 654 topical tours were offered, attracting 29,342 participants and in 2006, a total of 568 topical tours were offered, attracting 23,187 participants.

Science Demonstrations

In conjunction with the Museum's exhibitions, a variety of science demonstrations are held using simple specimens, models and devices to demonstrate interesting scientific theories and phenomena. In total, there were 5,851 science demonstrations attended by 84,074 people in 2005; and 5,474 demonstrations with 83,525 participants in 2006.

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Astronomy Teaching and Hands-on Science

1. Astronomy Teaching and Hands-on Science

With the aid of simple materials and concise lectures focused on one specific science topic, participants are able to understand scientific concepts through hands-on activities which inspire an interest in science. In total, there were 719 astronomy and hands-on science programs attended by 15,162 people in 2005 and 649 programs with 9,367 participants in 2006.

In conjunction with the Life-Long Learning Festival of the Ministry of Education, the Museum made some changes to its hands-on science programs. In July 2006, the Museum prepared 9 workshops of "How Is the Weather Today?" attended by 357 people; in August, 44 workshops of "Play with Science" attracted 1,770 people; on Saturdays in September, the five hands-on programs of "Original Stone House" were attended by 147 people; and on Sundays in September, the four hands-on programs of "Shocking Earthquake" were attended by 139 people. In total, 62 such programs were offered and attracted 2,413 people.

2. Master of Musical Instruments

In conjunction with the "Exhibition of Musical Instruments from the National Palace Museum and Chimei Museum," the Department organized an activity where participants learned about the making of a musical instrument, as well as about the scientific theories relating to sound, and tried to make a simple musical instrument (panflute). In October and November of 2005, eight such activities were held with 276 participants.

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In conjunction with the special exhibition, "Cheng Ho's Expedition," we organized ten hands-on activities called "The Secret of Boats" on Saturdays in July 2005. After introducing relevant scientific knowledge and the history of boat cultures in different areas, the Museum had a contest in which participants had an opportunity to design their own boats, and so learn more from the activity. In total, 307 people participated in this activity.

1. Hands-on science: "Changes of the Moon"
2. Hands-on science: "Shocking Earthquake"
3. Master of Musical Instruments
4. Hygiene teaching event

Science Education Activities at "Children's Discovery Room"

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"Children's Discovery Room" provides a unique learning space targeted at preschoolers and young children aged 3-8 years old. It creates an environment that combines science demonstrations and activities for families to interact with each other. In coordination with the teaching of pre-school institutions, the Museum offers group guided tours of the permanent exhibitions, the special exhibitions, collections and the latest activities during the semester.

Every year, from March to June and from September to December, the Museum holds a series of events to help children cultivate good hygiene and teach them to appreciate their body and value life. The events include group activities, drama and thematic lectures. In 2005 and 2006, the Museum co-organized these activities with Chung Shan Medical University. Fourteen such activities were held for 1,175 children in 2005, and 1,235 children in 2006.

From March 2005 to January 2006, in conjunction with the special exhibition "The Red Imported Fire Ant," we held a family reading activity called the "Story of the Ant" along with several lectures, such as "Shrimps and Crabs" and "The Beautiful Butterfly." A total of 7,415 children took part in the 232 activities. From March to December 2006, the activities were held 191 times in conjunction with collection and special exhibitions in the Museum and attracted 5,662 children.

To encourage more holiday volunteers to join and plan the programs with our staffs, the Museum organized a series of activities including "Science DIY," "Science Treasure Box," "Exploration Matters" and "Discover Science" during the winter vacation in 2005. A total of 315 children participated in the 16 activities. During the summer vacation, ten activities were held in conjunction with the permanent exhibitions and outdoor garden and attracted 422 children. We also developed a booklet of hands-on science named "A Closer Look at the Earth." During the winter vacation of 2006, eight activities of "Between Concave and Convex," "Puncturing, Shearing and Grinding," "I Can Calculate" and "Bean Painting of Dogs" were held with 241 children participating; and in the summer vacation of 2006, twelve activities of "Light and Shadow," "Rhymes of Life" and "Time Machine of Human Body" were held with 513 children participating.

To increase the diversity of volunteer services, volunteers in the Museum no longer work only at the information desks, but also assist with the guided tours or demonstrations. Also, starting from the winter vacation of 2005, science activities during holidays were changed to "thematic activities" which were very popular with both adults and children.

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In 2005, the Museum organized 216 weekend science activities for preschoolers and young children, which had 5,284 participants. In 2006, there were 171 such activities with 5,275 participants. The biggest benefit of these changes was that our holiday volunteers were given different duties which helped them increase their confidence in designing lesson plans and activities. In addition, the Museum held three small family activities on Wednesday afternoons from February to April 2005, with 66 participants. Such activities were held four times from May to June 2006, with 95 participants. From September to October, in conjunction with the Life-Long Learning Festival of the Ministry of Education, four "Plants in the Autumn" programs were held, with 120 participants.

Community special services offered by the Museum included activities for Women/Children's Day, teacher-training workshops, special activities for the Life-Long Learning Festival and the New Year's Eve Party. In April 2005, to celebrate Women/Children's Day, 24 pre-school institutions, as well as women and children protection units from the police force, were invited to the Museum to participate in the activity "A Resonant Learning Environment: Between NMNS and Kindergartens." Also, to celebrate Women/Children's Day and to raise public awareness of children's welfare, the Museum organized the activity "Health, Life, Victory" in March 2006, with 2,000 participants from 19 institutions. This activity taught pre-school institutions and parents where and how to look for information and assistance. At the same time, pre-school institutions used the opportunity to exchange ideas and share experiences. In 2005, for the Life-Long Learning Festival, the Museum held 8 activities of "The Magic of Puncturing, Shearing and Grinding: The Re-appearance of Ancient Compass Cart" with 132 participants. In 2006, the activity "Walk into the World of the Austronesian Totem" was held 44 times with 1,360 participants. On December 31st, 2005, in conjunction with the New Year's Eve Party, the Museum organized "Night Adventure in the Museum" for the first time and attracted 150 people.

For children to have more diversified experiences, we also presented the list of hands-on activities. In 2005, 1,420 such activities were held with 30,514 participants; and in 2006, 1,198 activities were held with 36,135 participants.

1. 、2. Group guided activities at: "Children's Discovery Room"

3. Interaction occurred in the classroom/theater

Classroom/Theater Programs and Thematic Activities

In the Classroom/Theater of the Museum, multimedia technology, specimens, models and experiment devices are used in an entertaining yet educational manner. With a well-designed environment and outstanding lectures and descriptions by the speaker, the audience has the opportunity to learn through easy-to-understand, substantial and diverse programs.

For 2005, the Classroom/Theater designed a variety of new programs, including the "Electromagnetic Show." "Save Energy," "Disasters, Worries" and "The Mystery of Rex." In total, there were 5,386 programs with 100,364 participants. New programs in 2006 included "Explore Energy," "Source of Life" and "Current." In total, there were 6,767 programs with 106,449 participants.

In 2005, the Museum presented monthly "The Amazing Journey of Colorful Theater," a holiday family activity combining interesting topics with different hands-on activities for the audience to learn new knowledge through the games. In total, there were 396 such activities with 22,565 participants in 2005; and in 2006, 82 such activities were held with 7,380 participants.

"Science Club Tour" was a diverse program that integrated the Museum's exhibitions, educational facilities and teaching resources. The program also included outdoor activities, making it a 'camp' for diversified learning. In the summer vacation of 2005, six programs were held with 215 participants; and in the summer of 2006, six programs of "Following Energy" were organized with 228 participants.

In addition, in 2005, in conjunction with the special exhibition "The Red Imported Ant," the Museum organized a program to educate people about ants. Twenty-six such programs were held in schools in remote areas of the five counties in Central Taiwan, with 1,906 participants. In 2006, science education activities relating to disaster prevention were held at the Fire Bureau of Taipei County and Taichung Girls' Senior High School. The science education programs relating to "The Red Imported Ant" were held in the General Association of the Scouts of China.

The Museum organized two teacher-training workshops on "Soil Conservation" in May 2005. From July to October, the Museum cooperated with the Taiwan Farmers' Association to organize twenty "Science Kaleidoscope" programs with 670 participants. Then, in April and September in 2006, the Museum organized two workshops to encourage more people to cultivate the spirit of scientific exploration and innovative thinking. These two workshops: "Scientific Exploration and Innovative Thinking" and "Modern Science and Innovative Teaching of Environmental Education" attracted 271 people.

The Museum also presented the science demonstration "Feel the Electricity" in June 2005 to explain simple electromagnetic energy to help the general public understand the basic principles of electricity, i.e., electricity can convert to magnetic force and magnetic force can convert to electricity. This activity attracted 780 people.

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Naturalist Center

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Along with exhibitions and educational activities, the Museum also has well-equipped collection and research departments. In order to share our resources with the public, the Naturalist Center was re-opened in 2006 with a brand new look. After the completion of certain required procedures, new specimens and research resources were hurriedly introduced into the Naturalist Center and useful resources continually accumulated in the Center, so people who want to know more about nature can find a way into the world of scientific research.

All the specimens, artifacts, publications, information and simple devices in the Naturalist Center are separated into four different fields: zoology, botany, geology and anthropology. Each field has its representative specimens and categorized specimens or artifacts stored in specimen cases. Visitors can choose which specimen they are interested in and use relevant devices or books to observe the specimen or conduct research.

"Specimen identification" has always been a public service provided by the Museum. The Naturalist Center is responsible for receiving the specimens for identification and we encourage visitors to come here and practice specimen identification, as our researchers will help them verify their identification. Twenty-seven specimens were identified in 2005, and twenty-five in 2006.

To guide the general public into the different areas of scientific research, theme exhibitions centered on specific sorts of specimens or particular artifacts were prepared quarterly in the Center. Curators would teach visitors how to improve their observation skill and explore nature using scientific methods. In 2006, four theme exhibitions were organized, including "Echinoderm," "Fossil Echinoderm," "Shellfish" and "Minerals in Life."

The Center also organizes lectures, demonstrations, hands-on activities and science stories for each theme exhibition so visitors can better understand the exhibits and the work studied by curators. In 2006, the Center organized twenty-one lectures of "A Dialogue with Specimens" and nine of "Who Will Be the Storyteller?" which attracted 1,285 people.

Our volunteer teachers, each with their own specialty, used specimens in the Naturalist Center to develop five lesson plans. From March to June, three lesson plans coordinated with the school schedule were opened. Schools were able to make reservations on-line and fifteen school groups and 437 students took part in the activities.

In conjunction with the 2006 Life-Long Learning Festival, the Center used "Shellfish" as the theme and taught visitors about various shellfish and their ecology. "Workshop of Scientific Drawing" was held at the same time. In total, 110 groups with 155 people participated in these activities.

Touch exploration activities were held primarily for visually- and/or hearing- impaired students. A story script was written based on the book "Privileged Hands: A Scientific Life" for participants to get to know the life and struggle of Greeat Vermeij, the author of the book. This famous shellfish evolutionist was visually impaired, but by using all his other senses he was able to conduct field investigations and scientific research. Gradually he became confident and skilled enough to use his sense of touch to identify different shellfish.

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Subsidizing Museum Visits for Elementary and Junior High School Students from Central and Remote Areas of Taiwan

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1. Subsidizing Museum Visits for Schools in Central Taiwan

To encourage elementary and junior high schools in central Taiwan to make use of the Museum's exhibits and educational resources and enrich their field trips, student groups that plan on spending more than four hours in the Museum can make a reservation in advance for programs and activities related to their subjects on the field trip. The admission charges are waived and the Museum also partially subsidizes their transportation expenses to the Museum. For the biennium of 2005-2006, the Museum subsidized visits for 41 and 42 schools, respectively, for a total of 3,869 participants.

2. Subsidizing Museum Visits for Schools in Remote Areas

To encourage elementary and junior high schools in remote areas in other counties and cities to choose the Museum as their field trip destination, the Museum partially subsidizes their transportation, accommodation and food expenses to help bridge the difference between urban and rural schools. Requests for a subsidized visit can be made to the Museum from March to November every year, and the Museum will arrange staff to guide the visit according to individual school needs. In 2005, the Museum subsidized 92 schools with 3,794 participants; and in 2006, 86 schools with 3,858 participants.

1. A dialogue with specimens
2. Touch exploration activity for visually impaired
3. A guided tour for school students from remote areas

Science Education Seminars & Workshops

The Museum organized a variety of science education seminars and workshops in 2005 and 2006 to provide students, teachers and other people interested in studying natural sciences with access to the Museum's resources and the opportunity to learn from the practical and teaching experience of scholars and experts.

1. Youth Workshop on Technical Innovation

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This youth workshop combined the Museum's exhibitions of "The Fantastic World of Matter" and "Exploring Science" with the curriculum of "Living Technology" to stimulate participants' interest in technical innovation. With thematic teaching style and hands-on activities, the workshop targeted elementary and junior high school students and encouraged students to develop their creativity and problem-solving skills. The workshop also helped to promote "Power Tech." an annual youth technical innovation contest. The twenty workshops in 2005 attracted 574 participants; and in 2006, sixteen workshops attracted 442 participants.

2. Workshop for the Special Exhibition "Puncturing, Shearing and Grinding: The Diversity of Mammalian Teeth"

In conjunction with the special exhibition "Puncturing, Shearing and Grinding: The Diversity of Mammalian Teeth," the Museum held a workshop targeted at elementary school students. With thematic teaching style, lectures, demonstrations and hands-on activities, the workshop helped to introduce the essence of the special exhibition and inspire young children to explore a topic on their own. The seven workshops attracted a total of 192 participants. For elementary and junior high school teachers, the Museum also organized a workshop that combined lectures and hands-on activities to introduce the essence of the special exhibition and to show teachers how to combine teaching activities in the exhibition gallery with their teaching activities at school. A total of 22 teachers participated in the workshop.

3. "Life as a Rukai" Camp

In conjunction with the special exhibition "Irigu: The Sacred Lily," the Museum organized a camp in May 2006 for elementary and junior high school students to experience the life and culture of the Rukai. The two camps attracted 55 participants.

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4. Agilent Fun Science Workshop

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In conjunction with the special exhibition "The Magic of Light and Shadow," the Museum invited students from three Family Helper Projects in Taichung, Changhua and Nantou to participate in a workshop named "Agilent Fun Science Workshop." Teaching aids such as time shadows and periscopes donated by Agilent Technologies were used along with interpretive guided tour and hands-on activities for participants to see that natural science is both amazing and interesting. A total of 274 people took part in the six workshops.

5. Life Science Camp for Senior High School Students

To introduce concepts of life sciences to senior high school students and to encourage them to enter this field of study, the Museum held a workshop to help participants explore various areas of life sciences, including molecular biology, bio-technology, biomedical science, ecology, taxonomy, biological evolution and biophilosophy. In addition to attending lectures, participants also visited the collection room of the Museum and conducted experiments. The workshop was held once a year during the winter vacation.

6. Teacher-Training Seminar for "Meet Our Bat Friends"

A teacher-training seminar targeted at elementary and high school teachers was held in March 2005 to introduce the Museum's special exhibitions and the concepts of ecological conservation that can be useful for teaching in class. Biologists specializing in bat research were invited to the seminar. As they shared their achievements and experiences with the participants, participants were made aware of the importance of bat conservation and ecological conservation in Taiwan. The workshop attracted 52 teachers.

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7. Teacher-Training Seminar for "Drawing Plant of Exotic Species"

The Museum organized two teacher-training seminars in December 2005 in which teachers of natural science learned about exotic plant species and the ecology of Taiwan. They also learned the skill of scientific drawing which acquired the knowledge of both science and art. In total, 70 teachers took part in the two seminars.

1. Youth workshop on Technical Innovation
2. 、3. "Life as a Rukai" camp
4. Agilent Fun Science workshop
5. Seminar for "Drawing Plant of Exotic Species"

8. Teacher-Training Seminar for "Reading about Life"

In conjunction with the renovation of the exhibition hall, "The Journey of Life," the Museum organized two seminars in June and July of 2006 in which teachers were given an overview about medicine, humanity and other life-related information through a guided program. Scholars and experts were invited to discuss issues relating to life and to share their experiences in the promotion of life education. A total of 193 teachers participated in these seminars.

9. Award Presentations for "Teachers of the Year" and Workshop for "Science Teacher of the Museum"

Every year, the Museum selects one or two "Teachers of the Year" who receive "Teacher of the Year" certificates and an 'honor card' which allows them to enter the Museum 1,000 times, free of charge. At the award ceremony, guests from the Education Bureau present the awards and past "Teachers of the Year" send their best wishes. Award-winners share their teaching experiences with everyone and the newly joined "Science Teachers of the Museum" learn about Museum activities and the resources available for basic science education. The workshop theme for 2006 was "Sound and Light" science demonstration with 131 participants.

10. Workshop for Student Group: "Dinosaurs of Darkness"

The Museum organized four workshops in April 2006 to guide student visits to the special exhibition "Dinosaurs of Darkness" and to introduce other relevant exhibitions. Skeletons of T. Rex were provided for the groups of students to assemble. In total, there were 94 participants.

11. Natural Science Workshop for Senior High School Students

The Museum cooperated with twelve senior high schools in central Taiwan to organize a series of workshops. Through teaching and hands-on activities, participants gained a better understanding of how professional scientists at the Museum conduct experiments and research. In 2005, a total of 240 people participated in these workshops; and in 2006, a total of 192 people participated.

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1. 、2. Natural science workshop for senior high school students
3. Legend of Fish
4. Secrets of Bugs
5. Legend of Fish
6. Secrets of Bugs

12. Winter Camps: "Legend of Fish" and "Secrets of Bugs"

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The Museum organized four workshops in January and February of 2006 for participants to learn more about fish and insects as they visited the exhibitions, observed specimens and listened to lectures by Museum professionals. It was our hope that the workshops would inspire the participants' interest in the natural world and would motivate them to acquire scientific knowledge by personal experience and natural exploration. At the same time, they would also become aware of the importance of protecting native fish and insects. In total, there were 310 participants.

13. Workshop: "The Secret Garden of Snakes"

Two workshops were organized in May and June of 2005 for participants to learn about snakes through listening to lectures, observing specimens and coming face-to-face with live snakes. Participants also learned how to avoid encounters with snakes in the wild. In total, 136 people participated in this workshop.

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14. Workshop: "How to Make a Stirling Engine Model"

In recent years, air pollution caused by the incomplete burning of engine fuel has accelerated global warming and made the Stirling engine the focus of the world. Thus, from the summer vacation of 2004 to August 2006, the Museum organized six workshops for senior high school students to learn how to assemble a Stirling engine. The six workshops attracted over 210 students. The Museum also organized four teacher-training seminars during which teachers were shown the proper way to instruct students in the assembling of a Stirling engine and concepts of related subjects were discussed. Through these activities, teachers could develop a set of procedures different from normal hands-on activities through the application of creative problem solving (CPS) techniques.

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7. The Secret Garden of Snakes

8. Teacher-training seminar for "Stirling Engine"

15. Teacher- and Docent-Training Seminars for "Puncturing, Shearing and Grinding: The Diversity of Mammalian Teeth," "Make Your Teaching Aids: Electromagnetics" and "Explore Objects in the Exhibition Gallery"

The aim of these seminars was to encourage more teachers to apply teaching resources in the exhibition gallery. Participating teachers would learn how to apply exhibits introduced in the exhibition galleries and enhance their ability to use teaching resources in the gallery. The 12 seminars had 400 participants.

In 2005, the teachers' workshop on basic interpretive skills showed teachers of elementary school how to guide their students to conduct scientific exploration in the exhibition galleries. At the workshops, Museum docents prepared demonstrations, shared their experiences and discussed course descriptions with the teachers.

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The seminars in 2006 focused on the area of eletricity on the 4th floor of the Science Center. The basic class introduced exhibits and scientific theories relating to eletricity and prepared teaching aids for hands-on activities. The advanced class focused on technology products related to electricity and magnetics.

16. Astronomy Teaching Seminar for Elementary and High School Teachers

To implement the task of "establishing a life-long training system for teachers," which was part of the "Improve Teaching Training and Further the Education System" project, the Museum cooperated with National Changhua University of Education and co-organized the astronomy training seminar for elementary and high school teachers in November 2005. Then, in November 2006, the Museum organized two seminars combining the latest, along with the most basic, knowledge of astronomy for elementary and high school teachers. The two seminars were "Rediscover the Solar System" and "From the Star to the Universe." The two seminars in 2005 attracted 124 participants and the four seminars in 2006 attracted 145 participants.

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17. Atmosphere Teaching Seminar for Elementary and High School Teachers

The Museum put together the professional knowledge of scholars from National Central University, the practical experience of experts from the Central Weather Bureau of MOTC, and hands-on elements in the Museum's Science Education Department for seminars on atmosphere for elementary and high school teachers. The goal was to enhance teachers' understanding of weather broadcasts and their general knowledge of the atmosphere and to improve their ability to teach science. In December 2005, one seminar was held with 145 participants.

18. Teaching Seminar for Elementary and High School Teachers: "Explore Physics"

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In conjunction with activities for the Life-Long Learning Festival, the Museum organized a teaching seminar for elementary and high school teachers during which they visited the Museum's special exhibition sponsored by the National Science Council, "2005 Season of Science: Explore Physics," as well as physics-related exhibits and other special exhibitions. Experts and scholars of physics were invited to give speeches while docents and volunteers of the Museum showed participants how to operate certain exhibits. We hoped that the seminars would enable teachers to develop an in-depth understanding of the exhibitions and inspire them to apply the exhibitions to assist their teaching and to develop physics-related exhibits. Two semiars were held in 2005 with 144 participants.

19. Family Workshop: "Making a Plant Head-dress" and Aboriginal Dance

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In conjunction with the special exhibition, "Irigu: The Sacred Lily (Irigu Ki Baryangalai): Plant Headdress of Rukai in Wutai," in April 2006 the Museum organized a workshop for the general public that combined lectures and hands-on activities, such as the making of a special plant headdress, and information about the life wisdom of the Rukai. It was a diverse, entertaining and interesting educational workshop for families. A total of 1,245 participants took part in twenty workshops.

1. A teacher-training seminar
2. A docent-training seminar
3. Astronomy teaching seminar for elementary and high school teachers
4. Teaching seminar for elementary and high school teachers: "Explore Physics"
5. 、6. "Life as a Rukai" camp

20. 2006 Little Docent Camp

In July 2006, the Museum organized a camp targeted at sixth-graders in elementary schools in which participants learned interpretive skills and acted as docents. They also talked face-to-face with experts in the natural sciences to increase their understanding of the functions of specimens. There were 120 participants in total.

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21. NMNS Happy Camp

In August 2006, the Museum organized a 'happy camp' targeted at fourth-and fifth-graders in elementary schools in which they visited exhibitions related to aborigines in Taiwan and learned about their tradtional culture. They also learned to make paper puppets of aborigines and used the puppets to tell stories in groups. There were 121 participants.

22. The Amazing Light: A Workshop on Polarized Light Painting

The Museum put together a guided tour of the special exhibition, thematic lectures and 3D theater for an audience of 11 years and older in September 2006. Participants visited the special exhibition, "The Magic of Light and Shadow," and learned how to make a polarized light painting. In total, 160 people participated in the workshop.

23. Family Workshop on Spiders

The family workshop on spiders, held in September 2006, allowed visitors to gain more of an in-depth understanding of the Museum's exhibitions with a spider connection. The staff of the Museum introduced the characteristics and habits of spiders to the participants, who also took part in hands-on activities and games with a spider web theme. A total of 1,215 people participated in this workshop.

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24. Workshop: "Meeting Ancient Columns: The Mortise and Tenon Joint"

In conjunction with the Life-Long Learning Festival in 2006, a workshop targeted at the younger generation was organized in August. Through an interpretive guided tour, demonstrations and tours to historic sites, participants learned about the mortise and tenon joint in traditional Chinese architecture. The two workshops attracted 80 elementary and junior high school students.

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Educational Activities in Conjunction with Special Exhibitions

Educational activities organized in conjunction with special exhibitions help to reinforce the educational function of these exhibitions; hence, for the biennium in 2005-2006, the Museum organized the following educational activities that tied in with the themes of the special exhibitions:

1. Bat Challenge

As the word "bat" in the Chinese language sounds identical to the word for "good fortune," during the Chinese New Year Festival of 2005, the Museum organized an activity for visitors to give a "one-sentence greeting" to the Museum. A total of 2,167 people took part in this activity.

2. Where is the Bat?

This activity was designed for families to learn about over 30 different kinds of bats in Taiwan. Participants used simple materials to create an art work to show the characteristics of bats and learned how to take care of a young bat. They also learned about bat habitat, ecology and the device used to detect bats. The activity was held on weekends in April, May and June in the outdoor garden of the Museum and, in July, in Fazih Stream of Taichung City. The five activities attracted approximately 300 people.

1. Little Docent camp
2. Family workshop on spiders
3. 、4. 、5. Workshop: "Meeting Ancient Columns: the Mortise and Tenon Joint"

Public Lectures

3. Challenge Activity for the Special "Year of the Dog" Exhibition

In conjunction with the special exhibition for the Year of Dog, an interesting challenge game targeting elementary school students and families was organized during holidays in February 2006. Participants gained more understanding about dogs, as well as their relationship with human beings, and the activity helped participants establish correct concepts of life education. A total of 812 groups purchased the activity passport and completed the game.

4. An Experience Activity: "Explore Our New Gallery"

After the Museum's exhibition hall, "The Journey of Life," was renovated, the Museum organized a challenge and experience activity on weekends in May 2006. As participants visited the new exhibition, they would develop a better understanding of the profoundness of biomedical science and explore the human mind. The activities were held for elementary school students and families and, in total, 2,684 people took part in the 18 activities.

5. Hands-on Activity: "The Codes of My Life"

This hands-on activity held in June 2006 was designed for elementary school students over 10 years of age and families. Participants used their English names to find out about the corresponding relations between three codons of DNA and the amino acid. The eight activities attracted 472 people.

6. "All about Teeth" Challenge

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During the winter vacation of 2006, in conjunction with the special exhibition, "Puncturing, Shearing and Grinding: The Diversity of Mammalian Teeth," a challenge game was organized to introduce the features, teeth and feeding habits of mammals. The activity offered families an opportunity to see the diversity of mammalian feeding structures and the functions of these structures. A total of 4,245 people took part in the 16 challenges.

1. Popular Science Lectures at the Science Center

The Museum regularly organizes general and thematic lectures to enhance public understanding of the basic science behind exhibitions displayed at the Science Center, and to promote science education. Exhibitions are integrated with human resources composed of professional researchers, educators and groups inside and outside the Museum. At the same time, the activities helped the Museum fulfill its role as a social educator. The lectures were held on the 4th Saturday of every month in the Science Center's lecture hall. In 2005, a total of 24 lectures were organized attracting 1,914 participants. In 2006, another 24 lectures were organized with 1,631 participants.

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1. 、2. A field study: "Discover Fossilized Mammals in Taiwan"
3. An astronomy lecture
4. A public lecture: "The Physics of Superheros in the Movies"
5. A popular science lecture: "The Wonder of Physics"

2. A Popular Science Lecture: "The Wonder of Physics"

In conjunction with Life-Long Learning Festival and the special exhibition, "2005 Season of Science: Exploring Physics," the Museum invited scholars and physics experts to give public lectures to increase the public's interest in physics and its applications in our daily lives. In 2005, a total of 10 lectures were organized with 1,500 participants.

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3. A Public Lecture: "The Physics of Superheroes in the Movies"

Through a Proactive Project for Cultivating Outstanding Talent in Basic Science Education, the Advisory Office of the Ministry of Education (MOE), and the Museum, cooperated with the Department of Physics from Tunghai University and invited scholars, Internet animation and cartoon commentators, and movie critics to give a lecture on popular science. The lecture guided the general public to reconsider the rationale of superpowers demonstrated by science-fiction movie heroes. A total of 230 people attended the lecture.

4. A Series of Lectures on "Typhoon Island: The Exploration of Taiwan's Ecology"

"Typhoon Island: The Exploration of Taiwan's Ecology" is an ecological documentary showing 67 creatures indigenous to Taiwan. In January 2005, the Museum played the documentary and invited experts and scholars of ecological education to explain the film's underlying messages, promote environmental protection concepts and raise public awareness. A total of 244 people took part in the 3 lectures.

5. A Public Lecture: "Rhythms of Life"

In August 2006, in conjunction with the special exhibition "Rhythms of Life," the Museum invited experts and scholars of ecological education to explain this special exhibition's theme and share their new knowledge with the audience, hoping that the activity would help raise public awareness of ecological protection. A total of 2 lectures were held with 205 participants.

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Outdoor Activities and Astronomical Observations

1. Activity: "Exploring the Coastal Areas of Southern Taiwan: Kenting"

This activity aimed to offer students a chance to get closer to, and learn more about the natural world. At the same time, students learned to choose recreational activities that were good for them, and inspired their interests in natural science and environmental protection. During the 3-day program, which combined the Museum's resources, star gazing, and observations of terrain and plants, participants had an interesting field trip. The activity was organized 3 times in 2005 and attracted 118 participants. In 2006, the same activity was organized 3 times, attracting 120 participants.

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2. A Summer Exploration Camp for Cross-strait High School Students

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Sponsored by the Foundation of National Museum of Natural Science, the Museum cooperated with the Beijing Museum of Natural History to organize a summer camp for cross-strait high school students. The camp encouraged high school students from across the Strait to exchange ideas, as well as establish cooperative relations with a museum in mainland China. Based on natural science, the Museum organized educational activities and fieldtrips through its collections, exhibitions and educational resources. These were to encourage the students' love of nature and engage their interest in environmental protection. From August 15th to 24th, 2005, 28 students joined the summer camp. These included 13 students from Beijing's Yuchai School, and 15 students from Taichung. In July 2006, a delegation of Taiwanese students visited mainland China to participate in the summer camp which lasted 10 days. In total, 41 students joined the camp. These included 15 junior high school students from Beijing and 26 junior high students from Taiwan. In August 2006, the Museum, in cooperation with the Shaoxing Science & Technology Museum organized the camp. The Museum's Director accompanied the 21 teachers and students from the Jian Gong Senior High School who participated. In Taiwan, 15 Taiwanese high school students joined the same camp.

3. Sunspot Observations

This activity was held on Sundays during July and August of 2005. Participants observed, indirectly, the sun's surface and looked for sunspots as a special sunspot observer reflected the sun's image onto a piece of white paper. The activity gave the public an opportunity to observe the sun's surface and encouraged their interest in astronomy. The same activity was held 54 times, attracting 1,476 participants.

4. A Field Study: "Discover Fossilized Mammals in Taiwan"

In the summer of 2006, the Museum organized several fieldtrips in conjunction with the special exhibition "Puncturing, Shearing and Grinding: The Diversity of Mammalian Teeth." These helped teenage and elementary school students have a better understanding of fossilized mammals in Taiwan. Through demonstrations, a field study, and hands-on activities, participants learned about the mammals, and where the fossils were excavated. They also participated in an actual field study just like real scientists. The 3 field study activities attracted a total of 135 participants.

1. Award Presentations for Teachers of the Year

Every year, the Museum selects one or two outstanding science teachers and holds an awards presentation ceremony to commend their efforts. Honorable guests as well as science teachers are invited to attend the ceremony and an exhibition organized where these outstanding teachers present their work and explain how they made use of the Museum's resources. Through this activity, teachers can gather information about the latest special exhibitions, learn how to make use of the research and relevant resources of the Museum, and, share their experiences with others. They can also learn how to arrange field trips to the Museum. Ms. Chen Yun-ru from the Chung-Lun Junior High School, and Ms. Chang Su-nyu from the Taichung Municipal Sie-He Elementary School in Taichung City were Teachers of the Year for 2005. In 2006, the award winner was Ms. Hu Jin-chi from the Taichung Municipal Chung-Ming Senior High School.

1. 、2. Activity: "Exploring the Coastal Areas of Southern Taiwan: Kenting"

3. A summer exploration camp for cross-strait high school students

4. An award presentation for teachers of the year

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2. A Writing Contest for the Special Bat Exhibition: "Starry Moon Visits Relatives"

In March 2005, to add a human touch to science education, the Museum organized a writing contest, in conjunction with the special exhibition of bats. In this contest, elementary school students were asked to write stories relating to science and based on reference information given by the Museum. "Starry Moon," the kalong, would be the main character. Eleven outstanding stories were selected from the 98 submissions, and the award winners were openly commended.

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3. A Bat House Contest: "Building a New Home for Starry Moon's Relative"

The contest was held in April 2005. Participants took part in the contest in groups and were asked to design a new house for the Japanese house bat (*Pipistrellus abramus*) with simple and environmental-friendly materials. Nine outstanding works were selected and exhibited.

4. A Rainbow Bridge Contest: "Build a Bridge of Knowledge"

The Rainbow Bridge is an arched wooden bridge with a unique structure, commonly found in the northern Song Dynasty. The components of the bridge were woven together and shorter timbers used to create the longer span; hence, no bridge columns were used. This activity introduced the basic principles and history of the "Rainbow Bridge" and allowed participants to build small models of the rainbow bridge by themselves. It also provided a fun, educational experience for families and friends. The same activity was held 68 times in 2005 with 2,100 participants. In 2006, it was held 36 times, attracting a total of 1,001 participants.

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1. An award presentation for writing contest winners

2. 、3. A rainbow bridge contest: "Build a Bridge of Knowledge"

5. Celebrating the 20th Anniversary of the National Museum of Natural Science: An Invitational Junior Contest for Robot Design

To encourage teenagers to design robots and demonstrate the outcomes of robot design in junior competitions in Taiwan, the Museum organized 4 invitational contests in February 2005 as a warm-up activity for the Junior RoBoCup Contest in Taiwan. It was also to celebrate the 20th anniversary of the Museum. Twenty teams were formed by 77 teachers and students to participate in the contest. A total of 737 people took part in the activity.

6.Between Concave and Convex: A Creative Design Contest of Dougong (bracket set)

The mortise and tenon joint in traditional Chinese architecture form an interesting and practical 3D puzzle. In conjunction with the Life-Long Learning Festival, the Museum introduced the traditional techniques of "dougong" with a guided tour, demonstration, and a hands-on activity hoping that participants would have a better understanding of three dimensional spaces, and be inspired to create a different spatial structure. We held the activity 32 times with 809 participants.

7. A Power Tech Contest

In conjunction with the Museum's exhibitions, "Matter & Energy" and "Scientific Exploration," and to improve the content of "science and technology" in elementary and junior high school curriculums, the Museum cooperated with the National Taiwan Normal University and the Taiwan Creativity Development Association to organize a series of interesting contests. These encouraged participants to be scientifically creative, and gave the students an opportunity to apply "science and technology." In October 2005, the preliminary contest for central Taiwan was held, with 61 teams (244 students) from elementary and junior high schools taking part. The final contest in Taiwan was held in November with 86 teams from the elementary schools and 94 teams from the junior high schools. In all, 720 students participated in the contest. In 2006, the preliminary contest for central Taiwan was held with 57 teams (228 students).

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4. 、5. Between concave and convex: "A Creative Design Contest of Dougong"

6. A power tech contest

Drama and Musical Performance

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1. A Puppet Show: "A Secret Alien Visitor to NMNS"

In the summer of 2005, the Museum prepared a puppet show called, "A Secret Alien Visitor to NMNS" in conjunction with the exhibitions: "Nature Out of Order: A special exhibition of Non-native Species" and the "Botanic Hacker: A Special Exhibition of Alien Plant Invaders." The role of human beings in the growth of alien species was reviewed through the dialogue between the puppets, and the negative image of the alien species was changed. We learned to re-evaluate pressing ecological problems from a different perspective. A total of 5,414 people attended the 27 shows.

2. Yami's Traditional Skills in Taichung

In August 2005, the Museum invited 15 members of Iraralay from the township of Lanyu to visit and perform in the Museum. We hoped to give the people living in Taiwan further understanding about the traditional dancing and weaving skills of the Tao. Visitors could also learn how to make a traditional glass bead necklace with the on-site DIY activities. The 21 activities attracted a total of 2,075 people.

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3. Sequential Activities for "Ancient Sound and Modern Music"

From October to December 2005, in conjunction with the "Exhibition of Musical Instruments from the National Palace Museum and the Chimei Museum," the Museum organized 12 concerts and public lectures during the weekends. Well-known musicians, critics, and performing groups were invited to perform and give speeches in the Museum. Over 10,000 people participated in the activities enjoying the great music and learning more about various types of musical instruments and the history of music.

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4. A Puppet Show: "Celebrating the 20th Anniversary of the National Museum of Natural Science"

To celebrate the 20th anniversary of the Museum, and to promote the special exhibition for the Year of the Chicken, the Museum offered a variety of educational activities that were both diversified and interesting. Puppets and puppet shows, combined with visual effects and slide-shows, were used to convey scientific knowledge and concepts behind this special exhibition to the general public. In February 2005, the Museum presented a puppet show called "Weasel Greets Chicken for the New Year." The 12 shows attracted 2,665 people.

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5. An Animal Carnival and Parade

In 2006, during winter vacation and the Chinese New Year, the Museum organized carnivals and parades with different puppets and lively music. These activities invited many visitors to interact with the puppets to celebrate the New Year. A total of 22 parades were organized with 7,462 participants.

6. A Shadow Puppet Show: "These are My Teeth"

In conjunction with the special exhibition, "Puncturing, Shearing and Grinding: The Diversity of Mammalian Teeth," the Museum presented a unique shadow puppet show combined with visual effects and slide-shows during the 2006 winter vacation and the Chinese New Year. It explained the scientific knowledge and concepts behind this exhibition. Informative facts, about the unique dentitions and dental structures of animals with different feeding habits were divulged through interesting stories and virtual animation. The 22 shows attracted 4,095 participants.

1. A puppet show: "A Secret Alien Visitor to NMNS"
2. The performance of Yami's traditional skills
3. Sequential activities for "Ancient Sound and Modern Music"
4. A puppet show: "Weasel Greets Chicken for the New Year"

7. The Year of "Music Everywhere" and a Mid Autumn Festival Music Concert

In October 2006, the Museum organized a series of activities to celebrate the Mid Autumn Festival with the general public. These activities included Hip-Hop dance, family drawing contests, art creations, dance, martial art, singing, live bands, and live performances from the winners of the contest - "2006 Music Everywhere." Approximately 4,000 people participated in the activities.

8. The "Sing Our Song" Aboriginal Concert

In December 2006, the Museum invited aboriginal singers from different tribes in Taiwan to perform in a concert. Our youngsters and the general public were given a chance to listen to the voices of the aboriginals and appreciate their music. Approximately 1,000 people attended the concert.

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9. The Puppet Show: "Mother Hen in Wonderland"

During the summer vacation of 2006, the Museum presented an interesting hand puppet show. The theme of the show was related to the exhibition "Origin of Life." The interactive puppet show guided the audience through the evolution of life. There were 48 shows with 10,108 participants.

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10. Storytelling Puppets: "The Rhythms of Life"

This program was performed by the Museum staff and volunteers. Before the performances, the performers attended a lecture given by the American puppet show master, Mr. Roccoberton, and received professional training from The Puppet and Its Double Theater. Through brainstorming and their collective efforts, the performers prepared the play, which was revised many times over. Thanks to the professional instruction, they were able to complete three shows: "Day and Night: Birds and Fruit Bats," "Season: Wild Goose" and "The Length of Life: Goodbye, Doggy." Their performances were well-received by the audience with parts of the shows being presented in English. The 216 shows attracted 10,020 people.

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1. 、2. The puppet show: "Mother Hen in Wonderland"
3. 、4. Storytelling puppets: "The Rhythms of Life"
5. 、6. Activities for city and countryside communications
7. Vote for the Genius of Einstein

Other Thematic Activities

1. City and Countryside Communications

In order to offer students from rural areas an opportunity to use the Museum's resources, and, for children and families from the different areas to share their life experiences, the Museum organized this activity from June 30th to July 2nd in 2006 to build a bridge of friendship for these youngsters.

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It was the first time the Museum had played the role of mediator. With the experience we've accumulated over the years and a well-designed program, participants could learn more about the Museum from the different aspects and might be inspired or encouraged to learn more about natural science. In addition, families from neighboring elementary schools became host families for these children, to broaden their vision, as they took part in a common educational scientific activity and shared their life's experiences with others. At the same time, the Museum was able to find groups who were willing to cooperate with the Museum in similar activities. Consequently, the Museum can offer more educational services and enhance our relationships with the communities.

During the 3-day activity, all the participants had a great time with their host families and others. They included 20 students from the Jhong-Sing Elementary School from the town of Shueilin in Yunlin County, 9 students from the Jhong-Hua Elementary School in Taichung City, and 1 student from the Chung-Cheng Elementary School in Taichung City. The activity allowed them to create new life and learning experiences, very different from their experiences in the past.

2. Interactive Learning Activity: "Making Special Friends"

The Museum held three levels of the interactive activity in April 2006. Students from schools for the visually impaired and neighboring schools were invited to participate in the interactive learning activity and establish an accurate concept of life's teachings.

It is our hope that students can learn from each other and learn to "see the world through a different window." In this activity, teachers from special education schools taught normal children Braille, and the orientation and mobility of visually-impaired people. At the same time, visually-impaired students tried to overcome their physical barriers to learn about dogs' biological characteristics, dentition and feeding habits. Finally, participants worked in teams under the leadership of professional craftsmen from Lugang to make a dog model out of dough. They also learned to respect and cherish their own lives.

3. "Who Is He?" Vote for the Genius of Einstein

The world's physics community chose the year 2005 as the World Year of Physics, because 2005 marked the 100th anniversary of when Albert Einstein first presented his papers about the Quantum Theory, Brownian motion and Relativity. In conjunction with the Life-Long Learning Festival in 2005, the Museum selected 6 photographs of Albert Einstein for Museum visitors to vote for the "Genius of Einstein" and have a better understanding of the man Einstein, and his great contribution to mankind. The activity was held in July 2005 and attracted 13,696 participants.

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4. Special Educational Activity for the Visually-impaired: "Hands-on Pottery"

In order to give the visually-impaired a chance to touch pottery artifacts, the Museum invited students from the schools for the visually-impaired and various social groups to join the "Hands-on Pottery" activity. The activity is divided into four levels. Participants conducted archaeological research, listened to lectures about pottery-making and explored the formation of cultural artifacts. The activity attracted 172 participants.

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5. Activities to Promote Cooperation for Science Education

Taichung City Science Fair for Elementary and Junior High Schools: The Science Fair was co-organized by the Museum and Taichung City's Education Bureau in June 2005 and 2006 to showcase works designed by students, to present their research on natural science, and to promote scientific knowledge. In 2006, stalls were provided for students to give scientific demonstrations. Hands-on items were selected from the curriculum to take part in the "Educational Carnival."

Life-long learning series of activities from a social educational institution: In conjunction with the Life-Long Learning Festival and to celebrate International Museum Day, the Museum organized a series of exciting events. A total of 1,018 events were organized in July 2005 with 27,449 participants. From May to November 2006, 3,284 activities were held with 92,074 participants.

Production of scientific educational programs: The Museum assisted the media to shoot exhibitions or produce educational programs promoting scientific knowledge. There were 3 productions in 2005 and 14 productions in 2006.

Exhibition/mobile exhibition for loan with supportive training of tour guides: Based on the schedule of a variety of specific exhibitions/mobile exhibitions and the needs of the borrowing organization, the Museum would arrange professional guides to train teachers and volunteers, so as to enhance the Museum's role in providing educational services. Three such trainings were provided in 2005.

Movie "The Blue Butterfly": A film produced by the Museum in cooperation with Hua Jaan Films, the Blue Butterfly revealed the true value of life and inspired the audience to "live a joyful life and always strive for better." The movie premier for central Taiwan was held at the Museum's 3-D Theater in July 2005 with 450 people in attendance.

Young Listeners in NMNS: In conjunction with the special exhibition "Puncturing, Shearing and Grinding: The Diversity of Mammalian Teeth," the radio program "Reading With Kids" from the Taipei Headquarters of the National Education Radio was invited to the Museum to hold a gathering of young listeners in May 2005. A total of 120 listeners attended the event.

Special Debut of "In the Womb: Animals": The December 2006 debut was co-organized by the Museum and the National Geographic Channel. During the debut, the Museum explained to the audience the growth of various animal embryos such as elephants, dogs and dolphins, in order to promote a better understanding and love of animals and to respect all life. A total of 350 people attended the debut.

1. Special educational activity for the visually-impaired: "Hands-on Pottery"
2. Double Ninth Festival Celebration Activity
3. 2006 Taiwan Museum Expo

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6. Double Ninth Festival Celebration Activity

To celebrate the Double Ninth Festival and to follow the life-long learning project of the Ministry of Education in enabling senior citizens to understand natural science and culture, the Museum invited elders over the age of 60 from Hsiao-Ming Senior University and Evergreen College for Senior Citizens to visit the Museum in groups, free of charge. As the activity centered on the theme of "health for longevity," the Museum staff prepared a guided tour so seniors could visit relevant exhibitions and listen to lectures from medical professionals on ways to stay healthy. In total, 80 people participated in the activity.

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7. Evening Tour for Spring Scientific Meeting of Taiwan Society of Cardiology

Groups can apply to the Museum for evening tours or to visit specific exhibitions in the evening. In April 2006, the Museum was used as a venue for the Taiwan Society of Cardiology to hold its spring scientific meeting. Designated areas and special exhibitions were opened in the evening for visitors to enjoy the presentation and to learn more about the Museum. There were 300 participants in total.

8. 2006 Halloween Carnival in Taichung City

In October 2006, the Taichung City Government and the Disney Channel co-organized the Halloween Carnival. The Museum held a series of interesting and creative educational activities for families. In total, there were 2,000 participants.

9. Charity Fair of Chinatrust

In December 2006, the Museum participated in the charity fair held by Chinatrust Bank and designed challenge activities for parents and children such as "What Do You Know about NMNS?" and "Science Is Fun." It promoted the discovery of exciting scientific knowledge, innovative thinking and the cultivation of creativity in science with hands-on activities. In total, 500 people participated in the activity.

10. 2006 Taiwan Museum Expo

In December 2006, the Ministry of Education held the first Taiwan Museum Expo at the Huashan Culture Park in Taipei City. For this event, the Museum organized an exhibition area of natural ecology with professional tour guides who would explain details about the exhibition. The Museum offered digital on-line learning activities and provided practical experiences within the area called "Play with Science" where visitors were involved in activities such as "Play with Sound" and "Between Concave and Convex: Creative design contest of Dougong." In total, 1,400 people participated in the guided tours, and 420 people visited the experience area.

11. Night Adventure in the Museum

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In the exhibition hall designated for night adventure, the Museum's staff encouraged children to interact along the pre-arranged route and to participate in various games and activities, which offered them a totally different nighttime visit to the Museum. "Night Adventure in the Museum" was held on weekends and holidays in May, June, October and November of 2006. With diverse settings and scenarios, the Museum took participants into a unique tour through exhibitions of natural science. In total, 540 students from elementary and junior high schools participated in the six tours.

12. Knowledge Contest: "Reading for Links"

The activity was a knowledge competition. Teams competed in reading detailed descriptions and explanations on the display boards to discover the relevance between the objects and the description. The competition was held thirty-two times in August 2006 with 313 individuals participating.

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13.Sweepstake: Reading NMNS Newsletters

The Museum collected newsletters and prepared questionnaires for participants to evaluate their ability to find information and to evaluate their reading. The Museum welcomes all visitors and encourages them to read newsletters in printed or on-line. The activity was held twenty times in July 2006 with 2,123 participants.

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1. Night adventure in the Museum
2. Sweepstake: Reading NMNS newsletters
3. 、4. Knowledge contest: "Reading for Links"
5. Outreach programs to Kinmen: An Outlying County
6. The Museum's teaching aids exhibited at a conference

Outreach Programs to Kinmen

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Thanks to the support of the Kinmen County Government and to people who care about the education of natural science, the Museum has re-located the "Kinmen Naturalist Center" from the library of the Cultural Affairs Bureau of Kinmen County to Jin Cheng Junior High School. The Center was officially opened to the public in March 2006, and serves as a bridge to natural science education between Taiwan and its outlying islands.

To celebrate the grand reopening of the Center, the Museum moved the special exhibitions "Red Imported Fire Ant" and "Volcanoes of Deep Sea" to the Center. The Foundation of NMNS and the Kinmen County Government also co-organized the outreach programs to Kinmen in March 2006. This included 55 guided tours through the special exhibitions, 28 science hands-on activities, 31 teaching demonstrations in the Theater Classroom, 36 science demonstrations, 18 shadow puppet shows: "These are My Teeth," 2 astronomical observations, teachers' training for special exhibitions, training programs for teachers of earth science and workshops for teachers to make herbarium specimens. The Education Bureau of Kinmen also invited teachers and students from elementary and junior high schools to visit the exhibitions. Staff from Fujian Provincial Government also attended the presentations. A total of 9,743 participated in the programs.

Development of Teaching Materials and Teaching Aids

Although Faraday's Law is applicable to many of the technology products we use daily, it is often difficult for teachers to effectively demonstrate to students such concepts as electric currents or magnetic effects. The Museum, therefore, applied for a subsidy from the National Science Council to develop teaching aids, which were patented in 2003 and was made available to schools.

In January 2005, the Museum was invited by the Conference on Physics Teaching and Experiment to display these teaching aids at the Annual Conference of Physics at the National Sun Yat-sen University. Many high school physics teachers and professors of physics reacted positively believing that the teaching aids could be used to help foster students' understanding. The Museum's exhibition area for "Electricity Induction" from National Tsing Hua University in Hsinchu was later set up in June, and many parents welcomed these teaching aids. In December, the same exhibition was set up at the twenty-first Annual Conference of Science Education upon the invitation from the Graduate Institute of Science Education of National Changhua University of Education. Once again, these teaching aids were greatly appreciated by teachers visiting the exhibition, and many inquired about how to create them.

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Science Education through Computer & Multimedia

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To enrich science education resources in the Museum and to establish a state-of-the-art creative digital learning environment, the Museum employed the use of technologies such as computer databases and digital multimedia. We have developed diversified "digital science teaching resources," which can be used for the promotion of science education and academic research.

In 2005, the Museum completed the production of programs for "Nature Out of Order: A special exhibition of Exotic Species" and a multimedia exhibition for "Puncturing, Shearing and Grinding: The Diversity of Mammalian Teeth." In 2006, three interactive multimedia programs were completed, which included "This Is My Language," "Around the Pacific Ocean," and "Faces of the Oceania." The Museum also produced a computer exhibition program called "Bodies and Body Decoration of the Oceanians."

Educational Activities to Explore Natural Ecology

Science education is the essential way for people to understand biodiversity in the natural world. From its inception, the Museum opened its garden for visitors to observe natural life. In 2005, the Museum produced a documentary about the life of a Malay Night Heron (*Gorsachius melanolophus*) when it built a nest, raised nestlings and how the nestlings grew. The film was broadcasted on the Museum website so people could watch the precious live example without leaving their homes. In 2006, the Museum set up "iNMNS," a website offering educational information, images and film clips about natural life. On the website, one will find information about the Malay Night Heron, Little Egret, Black-crowned Night-heron, Gunther's Frog and Red-bellied tree squirrel. Visitors to the website can share their opinions or provide feedbacks via e-mail, and the Museum staff will answer questions and offer services. Twelve thousand one hundred and seventy five people visited iNMNS in 2005 and in 2006, 10,315 people visited.

1. Nature Discovery website
2. Digital Multimedia website
3. Guided tour by a volunteer from TSMC Education and Culture Foundation
4. Volunteer-training program

Volunteers

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Eleven hundred and fifty four people volunteered 158,720 hours to the Museum in 2005, which was equivalent to 78.7 salaried workers. On average, the number of volunteers available per day was 115 (each serving half a day). The total number of volunteers available for special events for the entire year was 1,022. It was estimated that in 2006, 1,033 people volunteered services, contributing 158,688 hours to the Museum, equaling 78.6 paid workers. The average daily number of available volunteers was 120 with a total of 1,969 supporting special events.

It is highly probable that in the future the Museum would adjust its operation strategy by replacing many of its salaried workers with volunteers in providing services to the public. Volunteers working at exhibition areas and at 921 Earthquake Museum of Taiwan will be increased. In addition, the Museum will continue to enter into agreements with Chung Shan Medical University, China Medical University, National Changhua University of Education and TSMC Education and Culture Foundation who support the Museum by providing guided tours. In 2005, 239 volunteers from TSMC Education and Culture Foundation contributed 855 man-hours, serving a total of 11,275 visitors. Additionally, an increase of four to six professional guides was made available on holidays. In 2006, a total of 230 volunteers from TSMC Education and Culture Foundation contributed 791 man-hours serving 59,203 people. To recruit volunteers, the Museum relied mostly on online registration (35.5%) and recommendations of existing volunteers (34.7%).

Every year, 32 students are recruited from four national senior high schools in Taichung City who volunteer during winter and summer vacations. In addition, 110 students are recruited from various vocational and senior high schools in the central district that volunteer during holidays throughout the semester. These volunteers are responsible for specific exhibits, guided tours in small areas and for visitor safety. From its beginnings in 2005, the service period was extended to one year, requiring student volunteers to work for about 100 hours. They also receive 12 hours of training in advance.

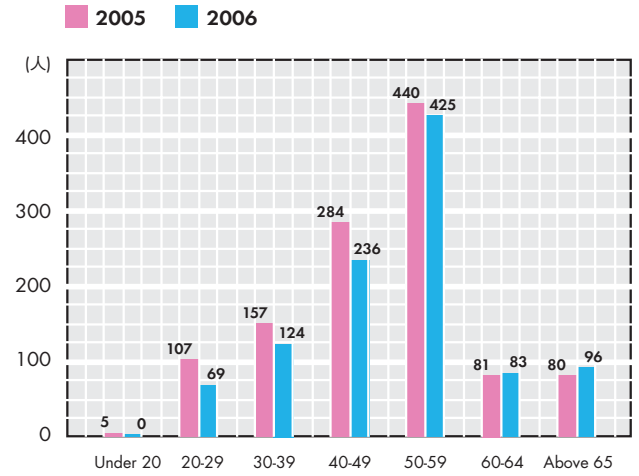
To improve volunteers' capabilities, in 2005 the Museum organized five computer-training programs to provide 101 volunteers. In all, 492 hours of training were offered to volunteers with professional knowledge and skills relating to various exhibitions. The Museum also organized 17 sessions for English and Japanese guided tours training. In 2006, the five computer training programs provided to 103 participants. In total, 2,309 volunteers took part in 460 hours of training programs. One session of English guided tour training was organized for 16 people.

In 2005, 764 volunteers participated in a developmental program entitled "Versatile Volunteers" organized by the Museum, which aimed to enhance performance through internal marketing. In 2006, the program had 782 participants and was re-named "Team Spirit and Self Development." The Museum also prepared a presentation of "Images of Teamwork in 2005" to further enhance volunteers' team spirit. To encourage interaction among museums during 2005 and 2006, arrangements were made so that 40 volunteers could visit the Kaohsiung Museum of History, Kaohsiung Museum of Fine Arts and the Hsin Kang Foundation of Culture and Education.

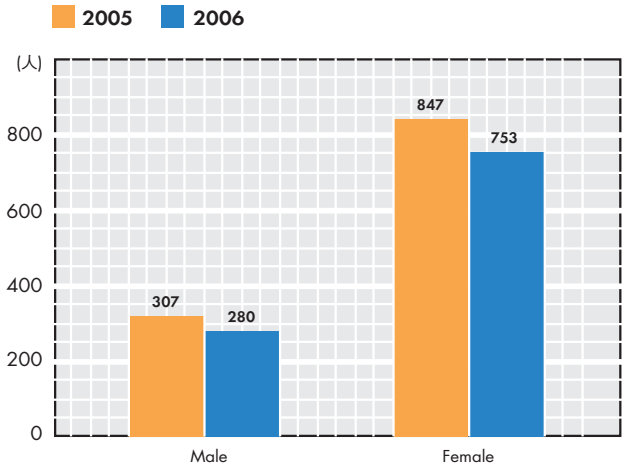
In 2005, the Museum received the National Great Volunteer Team Award from the Ministry of the Interior due to the great efficiency and operating system of its volunteers.

As volunteer commendations are organized annually, in 2005, 633 volunteers received honors, among them, 16 volunteers received the highest honors. In 2006, 707 excellent volunteers were recognized. Ms. Wan Wei-ling received the third level medal of thirteenth Voluntary Services Award from Voluntary Services Association of R.O.C.

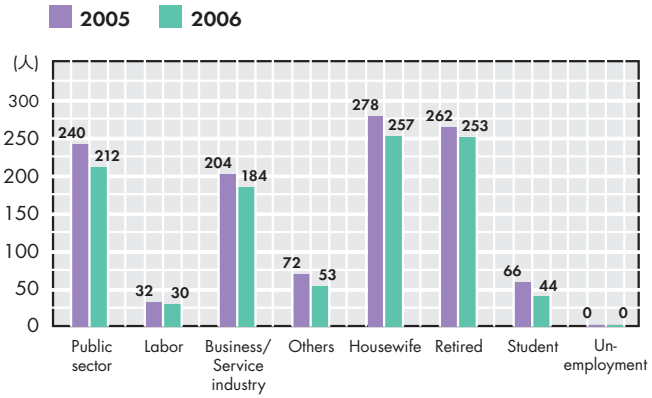
In the future, a more flexible mechanism of recruiting and using volunteers will be established. We will also focus on building an interacting platform for the public to participate in our cultural and educational services and to create a life-long learning environment. We aim to fulfill our volunteers' need to enjoy leisure time, achieve self-development, interact with others, provide feedback to the public and to take part in public affairs.



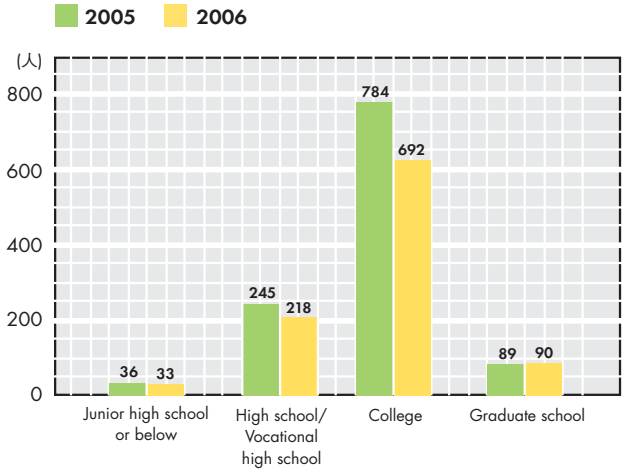
Age Division of Volunteers in 2005-2006



Volunteers by Gender in 2005-2006



Occupations of Volunteers in 2005-2006



Education Level of Volunteers 2005-2006

Cross-straits Cultural and Educational Exchange

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"The Fairy on the Cliff: Special Exhibition of *Lilium speciosum* var. *gloriosoides* Baker" and "Rediscovering Formosan Rock-Monkey" are two important exhibitions that demonstrate the Museum's ability to transform its research results into exhibition. To promote the concept of ecological protection and to enhance cross-straits cultural and educational exchanges, the two exhibitions went on a traveling tour throughout China.

In July 2005, when the exhibitions traveled to the Fuzhou Science and Technology Museum, researchers from the Science Education Department of the Museum were invited to give a speech at the Conference on Science Education for Teenagers to share the Museum's experience in education. The topic of the speech was "Interaction between Museum and Schools: The Example of National Museum of Natural Science in Taichung City". Later in December, the exhibition traveled to the Wuxi Science and Technology Museum in Jiangsu Province where speeches were delivered to local teachers on the characteristics, educational goals at different phases and how schools used the resources of the Museum.

In conjunction with the series of activities of the First Children's Happy Camp in Jiujiang City, the two exhibitions traveled to Jiujiang City Library of Jiangxi Province in June 2006. Experiences were shared with the local community about the interaction between the Museum and the schools. This was the eighth stop of the tour and the first time that the Museum cooperated with a local library in the sharing of experiences.

The tour exhibitions really made the Museum known to many people in China, and most museums were impressed by the high quality of our exhibitions. In recent years, numerous museums were established or renovated in China, and they continue to train professionals to work in museums. However, in terms of production of exhibitions, science education, operation, promotion, marketing and service quality, there is room for improvement for many of the museums in China. Due to the Museum has laid a good foundation of collaboration and interaction with local schools, many professionals in China's museums have also expressed interest in learning from the new model.

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1.、2.、3. Cross-straits cultural and educational exchange

Exhibits Department

2005 and 2006 have been productive years for the exhibition department. A total of 29 temporary exhibitions were developed, with sizes ranging from 250 square meters to 900 square meters, with themes covering a wide range of interests. Of these exhibitions, four were international travel exhibitions, including "Facing Difference" from the United Kingdom; "Dinosaur of Darkness" from Australia, "A *T. Rex* named SUE" from the Field Museum of the United States, and a photographic exhibit on "Biodiversity and Humanities" from France.

In addition, the museum received special funding from the museum's supervisory body, the Ministry of Education, to renovate some of the permanent, yet dated, exhibitions. In July 2006, the Journal of Human Life gallery was completed to replace the aged Human Body gallery. As of this writing, a new gallery, Oceania, was close to completion and was scheduled to open in May 2007. Three more projects were underway and will be completed within the next two years.

In order to expand our service and reach out more audience, we also delivered various temporary exhibitions to rural schools upon requests. This public program was usually accompanied by a "moving exhibition" which is an exhibition encased in a modified container.

Information for Each Exhibition

Memories

● 2005.01.01~2005.06.12

2005 marked the twentieth anniversary of the museum and a special exhibition was launched to celebrate the occasion. This exhibition was developed by an audio-visual specialist who used graphic images to recapture the development of the museum, which spanned the years from 1986-1999. The exhibition also highlighted a rare collection of the audio and visual systems used in the museum over the past two decades. The collection was a rare gem for the younger generation who have grown up with digital technology and have never seen many of the early, more bulky, analog devices.

The Prehistoric Boy of Taichung Exhibit

● 2005.01.25

This special exhibition highlights the findings of a prehistoric site excavated by the curators of the anthropology department in 2003. The main piece was the skeleton of a 1300 year old boy along with other tools and animal remains. A reconstruction of the facial features of this prehistoric boy is also featured.

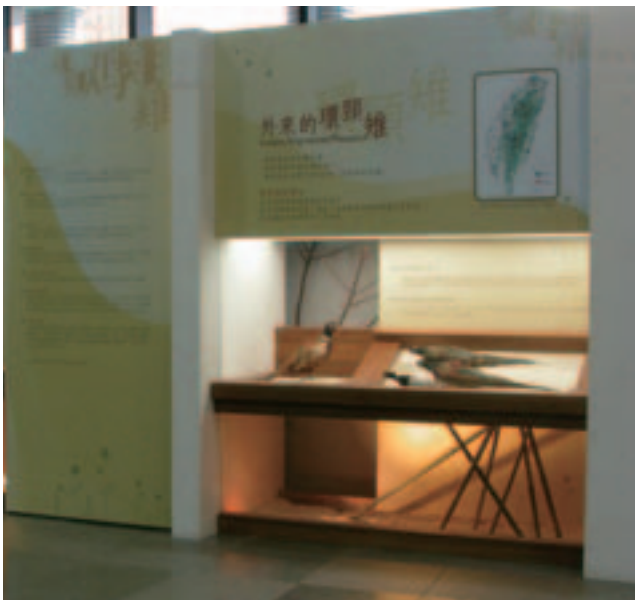
▲ Prehistoric boy exhibit showing various archeological findings.

Omura's Whale Exhibit

● 2005.02.04~2005.04.30

Omura Whale is a new member of the rorqual family and was identified in 2003 by a group of Japanese scientist. This exhibition showcased the complete skeleton of an Omura Whale along with a related species, the Minke Whale for comparison. Additionally various other whales and dolphin skeletons were featured in the exhibit. All these skeletons are part of the museum's larger collection of mammalian specimens.

▲ A complete Omura's whale skeleton



▲ Rooster exhibit showing pheasant specimens

The Year of Rooster Exhibit

● 2005.02.04~2005.05.01

This is a series of the Chinese Lunar New Year exhibition representing the twelve Chinese animal signs and 2005 was the year of Rooster. The exhibition showcased the natural history of the rooster and related species with a special emphasis on the cultural relationships with human. A live exhibit featuring the different rooster breeds was also on display.

Bats Exhibit

● 2005.02.04~2005.12.18

The East and West see the bat in a very different ways. Generally, Western media portrays bats as blood-sucking creatures. The Chinese perceive bats as a sign of luck, primarily because the Chinese pronunciation of bat ends with the sound "fu" which means good luck. This beautifully built exhibit highlighted the various aspects of the natural history of the bat and incorporated cultural interpretations of the bat in Chinese daily life.

▲ Bat exhibit showing various cultural bat symbols

Scientific Illustration Live Demonstration

● 2005.03~

This is one of the 'behind the scene' program series that shows the activities of the museum. The live illustration demonstration features guest artists performing for the public, showing how various scientific illustrations are drawn. The artists also answer questions from visitors, making it one of the most popular and unique "exhibits".

▲ The artists' corner

Nature Out of Order: A Special Exhibition on Introduced Species

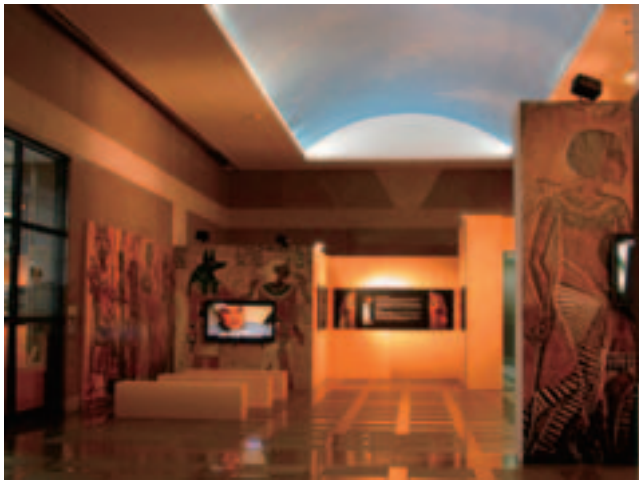
● 2005.05.15~2005.08.31

Introduced species, or non native species, are one of today's ecological crises and there is an urgent need to communicate these issues to the public. However, this exhibition took a very different approach to this problem. Instead of portraying these species as invasive monsters, the exhibition guided the audience to rethink their role in creating the current situation, especially our attitudes toward nature as well as the way we want to live.

▲ Human being: Nature's mixer

Tutankhamen and the Golden Age of the Pharaohs

● 2005.06.10~2006.04.24



▲ Bringing the king back to life

This exhibit highlighted recent findings of King Tut with the use of modern technology, such as CT scan. The most notable were the facial reconstruction multimedia programs, these programs showed how ancient lives can be brought back to life with the use of the latest information technologies. This exhibition was jointly developed with Taiwan's National Geographic Channel.

Zheng He

● 2005.06.30~2005.10.16

The year 2005 marked the 600th year of the greatest Chinese explorer, Zheng He, who lead a mighty fleet on seven voyages over a span of 28 years from 1405-1233. This exhibit highlighted the life of this great explorer as well as the early ship building technologies of ancient China.

▲ Chinese ancient ship building technology

The Fun of Physics

● 2005.07.01~2006.09.02

The United Nations declared 2005, the Year of Physics. With this agenda in mind and under a special grant from the National Science Council, the museum launched this highly interactive hands-on exhibition with an objective to promote public interest in physics. The exhibition was very popular among students.

▲ Having fun with science

Facing Difference

● 2005.08.10~2005.11.10

This exhibition was adopted from the original Future Face exhibition developed by Prof. Sandra Kemp of the Royal College of Art and was first launched in the Science Museum in London. The exhibition lead the audience to examine the human face from many perspectives, including science, anthropology, art, social and philosophical. In addition to many rare and precious collections, the exhibit also featured artwork from many well-known contemporary Western and Asian artists. This exhibit was exemplar of the recent Science-Art exhibition trend.

▶ Who's face is this?

The Sound of Music

● 2005.10.08~2006.01.08

This exhibition was developed by the anthropology department and intended to examine the development of musical instruments. Featured in the exhibition were many rare and precious violins, on loan from the private Chimei Museum. Additional highlights included collections from the National Palace Museum, which included the very famous "jadeite cabbage with insect".

▲ Exhibit showing various rare collections of musical instruments

Diary inside the Womb

● 2005.10.12~2006.02.19

Using the latest photographic techniques and computer imaging technology, this travel exhibition highlighted the stages of fetal development within the womb which under ordinary condition, were quite inaccessible to unaided eyes. The exhibition was accompanied by numerous interactive exhibits and was very popular among the family visitors.

▲ Get a feeling inside the womb

The Mighty Mite

● 2005.10.21~2006.02.20

This exhibition was developed by the curator of zoology and lead the audience to become acquainted with an unfamiliar world of minute mite. Featured in the exhibition were various aspects of the natural history of these generally unseen tiny creatures. Their impacts on economics and health were also emphasized in the exhibition.

▲ Get to know the microscopic guests that cause health problems

Photo Exhibit: The Adventure of Zheng He

● 2005.11.08~2006.02.28

To celebrate the 600th anniversary of Zheng He's great ocean expedition, the museum collaborated with Taiwan's National Geographic Channel to launch this photo exhibit, featuring forty spectacular large scale photographs from the collection of Michael Yamashita. These photos were taken from the current locations of Zheng He's routes, they reflect the lives of people in those locations.

▲ A modern phtographic journey of the great sea explorer

Through the Eye of the God: A Photo Journey of Africa

● 2005.11.09~2006.05

This photo exhibit featured the work of Robert B. Hass who has captured the beauty of the African landscape through his camera. One of the most interesting aspects of these photos was the use of shadow as a key component in the composition of the photos.

▲ Beautiful Africa

◀ The crucial 1.5% difference

The Wonderful Brain

● 2005.11.18~2006.01.02

This exhibition highlighted the latest discoveries in neuroscience and attempted to link these findings to everyday life. It also presented a scientific basis for some common mental illnesses and practical advice on how changes in lifestyles and nutritional regimes might alleviate these illnesses.

▲ A mighty dinosaur of Antarctica

Dinosaurs of Darkness

● 2005.12.23~2006.04.23

People rarely link Australia with dinosaurs. But scientific discoveries in Australia for the last two decades have changed this widely held view. This was a travel exhibition originally developed by the Monash Science Center in Australia. Dinosaurs in this region had special physiological adaptations for the long dark winter nights and these anatomical features were highlighted in this exhibition along with other contemporary prehistoric creatures.

Bronze Threaded Jade Suit Reconstruction Live Demonstration

● 2006.01.13~2006.02.28

This is another 'behind the scenes' program in which invited skilled craftsmen demonstrated how to reconstruct the Jade suit from a total of about 1300 loose pieces. This suit was the museum's recent acquisition dated from the Han Dynasty. The Jade suit is actually a burial suit wore by Chinese emperors and nobles.

The Year of the Dog Exhibit

● 2006.01.24~2006.05.14

Dogs have a long standing relationship with humans and is always portrayed as the best friend of mankind. This exhibit highlighted the natural history of the dog family as well as the cultural relationship with humans. One of the main attractions in this exhibit was the digital reproduction of the "Ten Prized Hounds" from the Ching Dynasty.

▲ Man's best friend

▲ The ultimate predator?

The Diversity of Mammalian Teeth Exhibit

● 2006.02~2006.11

This specimen rich exhibit highlighted the mammalian adaptation to diet, showing the diversity of structures and functions of mammalian teeth. More than two hundred specimens were on display and these specimens were from the museum's paleontological collections. The exhibit also featured some interactive hands-on exhibits demonstrating the working principles of the various parts of the mouth.

▲ Headdress of honor

Irigu: Plant Headdress of Rukai

● 2006.03.15~2006.06.19

In Rukai tribal language, Irigu means the "Lily of Honor". This exhibit highlighted the development of the Irigu in Rukai and represented the various social meanings associated to different types of traditional plant headdresses. In addition to Chinese, this is the first exhibition that used the native Rukai language as the exhibit text and this was highly welcomed by the tribe people when the exhibition traveled to their village.

High Speed Rail Exhibit

● 2006.04.01~2006.04.30

This exhibition used numerous stimulators to engage the audience in understanding the engineering principles behind the High Speed Rail, which represent one of the major developments in transportation in Taiwan. The exhibit was fun and engaging.

The Magic of Light & Shadow Exhibit

● 2006.07.01~2006.11.30

This highly interactive exhibit showcased the scientific principles behind many visual experiences that we encounter in everyday life. The exhibit was fun and engaging and was very popular among students.

▲ Science is fun!

Rhythms of Life

● 2006.07.05~2006.09.10

Originally developed by the Natural History Museum in London in 2001, this exhibit was later acquired by the National Taiwan Museum. This exhibit highlighted the rhythms of the natural world and how life responded to these daily, seasonal and annual cyclic changes. The exhibit relied heavily on many hands-on interactive displays to elaborate on this interesting theme. The background percussion music really added a "beat" to the exhibit.

▲ Can we beat several million years of evolution by drinking a cup of coffee?

Biodiversity and Humanity

● 2006.07.15~2006.09.23

We are now facing the crisis of a loss in biodiversity. Two French non-profit organizations designed a photographic travel exhibition with the objective of raising public awareness on the urgency of this issue. The exhibition featured sixty large scale photographs with descriptive explanations that elaborated on the current state of the crisis in biodiversity. These photographs were both spectacular and heart-felt.

▲ Act now and conserve before it's too late!

▲ *T. rex* is still the all time favorite of all the dinosaurs

A *T. rex* named SUE

● 2006.09.29~2007.01.07

Originally developed by the Field Museum of Chicago, this travel exhibition featured the mighty skeleton of SUE and included many interactive exhibits showcasing the various ways dinosaurs move. In addition to these exhibits, the museum added a skeleton of *Tarbosaurus*, which is a close relative of the *T. rex* from Mongolia. Furthermore, two scale models of the more recently discovered early members of the tyrannosaur family were displayed. Supplemental exhibits included a skeletal set of the hind quarters, showing the prominent features that distinguish the *Tyrannosaurs* from the *Allosaurs*.

Knowledge Express

● 2006.10~2007.01

This is an experimental exhibition design concept that used very simple modular elements to facilitate the setup of an educational exhibition with the least effort and resource. The first two themes of this series were on "Getting to know our bodies" and "Common birds of the metropolitan areas of Taiwan". The goal was to solve the challenge of the costs associated with setting up travel exhibitions in schools located in the remote areas.

▲ Knowledge for less

Ubiquitous Taiwan

● 2006.11.01~2006.11.29

▲ Future technology

Taiwan is best known for her IT industry, and innovation is the key to drive for such success. This exhibition highlighted the most recent developments of the Taiwan IT industry and telecommunication technologies and their applications in everyday life. All exhibits were interactive and very engaging.

Theaters

IMAX Theater: This dome shaped large screen theater provides the audiences with special visual experience not encountered in ordinary theaters. In addition, we employ a unique projector to project numerous light dots on the screen, creating a series of night skies according to the changes of seasons, and thus converting the IMAX Theater into an astronomical learning center. A total of 369,839 and 358,796 audiences visited the theater in 2005 and 2006 respectively. The following are brief description of the films shown for the past two years.

Forces of Nature:

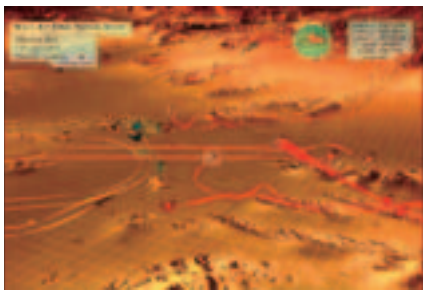
This film documented many natural hazards which still threaten the survival of our species and the efforts scientists use to understand their causes and developed ways to mitigate their effects.

Jane Goodall's Wild Chimpanzees:

This film documented the world renown primatologist Jane Goodall's research on chimpanzee in Africa and her passionate efforts to conserve our closest kin on this planet.

Fighter Pilot: Operation Red Flag:

This film documented the six-country joint air force operation named Red Flag. Watching modern supersonic fighters on the large screen, especially when the pilots performed acrobatic maneuver, was thrilling.



T. rex – Back to the Cretaceous:

This film is a fictitious script, in which the daughter of a museum paleontologist went back in time 65 million years ago and witnessed the extinction of the mighty tyrant dinosaurs.

Theaters

3-D Theater:

By wearing special glasses, this theater provides audiences with another kind of visual experience and thrill. Five films were shown for 2005-2006, including Lego Race (adapted from the feature film of Lego Land theme park), Deep Sea 3D (an Iwerks film release), The Dream Festival, Go Mars, and Tree Robo (the last three films were Asian productions). Most of these films are fictitious with special emphasis on their 3D effects. A total of 336,613 and 315,809 audiences visited the theater in 2005 and 2006 respectively.

Bird's Eye Vision Theater:

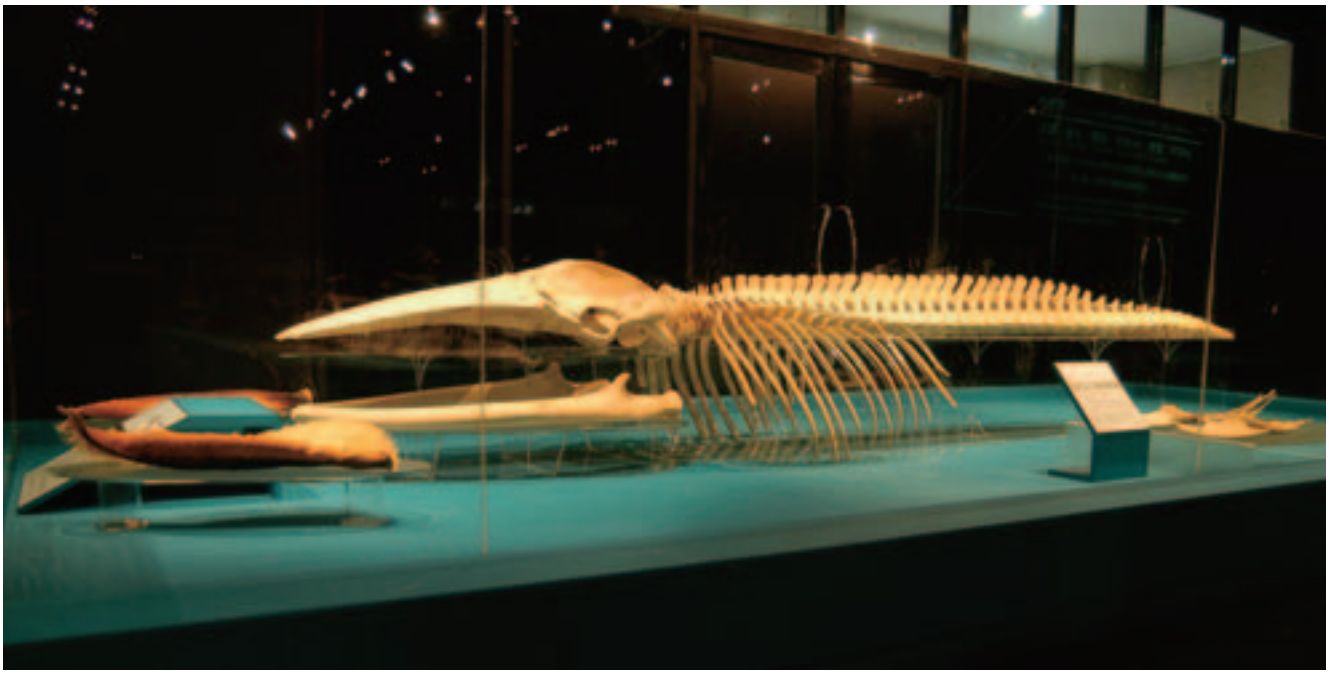
This is a one of its kind theater, in which a inversed hanging projector produces large images on a convex shaped screen installed below, this mimics a bird's eye view from high above. This also requires a special filming angle in order to create this effect. "Wonders of Nature" and "Original of Life" are two featured films currently showing on a regular basis. A total of 115,163 and 95,030 audiences visited the theater in 2005-2006 respectively.

Environment Theater:

This is another one of a kind theater in which a circular room setup with no less than eighty slide projectors mounted on the ceiling and under the control of a computerized integrated system to create a sequence of images on different screens mounted on the wall, producing a unique surrounding visual experience. Two highly customized made films "Day and Night" and "Rhythm of Life" were shown on a regular basis. A total of 64,022 and 73,937 audiences visited the theater in 2005 and 2006 respectively.

Travel Exhibition

In order to maximize and fully utilize our temporary exhibits, which usually last between four to six months, we proactively engage in loaning these exhibits to schools, regional natural history museums, cultural centers, the visitor centers at national parks, and even shopping centers for short term display or to join their special events program. There were ten exhibits that traveled for display in over thirty-three locations within the country in 2005 to 2006. Many of these travel exhibits were well received by the leasee, especially when used as supplementary educational resources in schools. Some representatives of these travel exhibits include "The Crisis of Fire Ants", "The Science of Form", "Mars", "The Flowers", and "Irigu: The Headdress of Honor" exhibits. The space requirement of these travel exhibitions is around 250 sq. meters. There is no fee for any of these exhibits and the museum also provides the man power to install these exhibits. Our aims are to serve our communities well and promote the understanding of science to the public.



Botany Department

The Botany Department consists of two divisions: Vascular Plant Division and Nonvascular Plant Division. These two branches are responsible for collection and research, to provide support to exhibitions at the Museum and to promote science education. The Department is also in charge of the operation of the Botanical Garden of NMNS. Over the past two years, we have actively contacted other academics in the same field and have exchanged ideas with specialists not affiliated with the Museum. In this way, knowledge about NMNS is extended to the people of Taiwan and beyond.

Important Events

From March 22 to April 3, 2005, staff from the Department attended the International Conference on Digitalization of Information held in Beijing. After the conference, a botanical field trip to Hong Kong was arranged where staff collected various plants. From May 10 to May 19, 2005, staff visited the Netherlands where information relating to flower bulbs was gathered.

To pay a tribute to the late Professor Cheng Jui-ching's contributions to mycology and to honor his academic achievements, the Mycological Society of the Republic of China held a seminar at the Museum named "Fungus, Heaven, Earth and Man" on August 23, 2005, the second anniversary of his death. Mrs. Cheng accepted a certificate of appreciation from the Museum and presented a donation of her husband' s books. The Museum has sorted the documents and has included them with the thousands of fungus specimens Professor Cheng donated after his retirement.

Since the First Cross-strait Symposium of Mycology held in Wufong, Taichung County in 1992, the biennial symposium continues to be held alternately in China and Taiwan. The symposium in 2005 was the Seventh Cross-strait Symposium of Mycology. From August 23 to August 25, 2005, two symposiums of mycology were held in the Museum and in Chitou. These two symposiums were the biggest gatherings for the Mycological Society of Republic of China, attracting 200 scholars and experts. Among the participants, were 14 scholars of mycology from Mainland China who had presented many fungi specimens from China as gifts to the Museum. Arrangements were made so that ten of these scholars could visit Taiwan for observation. Such activities help to enhance cross-strait academic exchange.

In July 2005, the Department's staff attended the International Botanical Congress in Vienna, Austria. The history of the Botanical Garden of NMNS as well as the Museum's plan and strategy for exhibition of science education was presented to the Botanic Gardens Conservation International (BGCI). The work of the Museum gained recognition from the international community there. In March 2006, Dr. Junko Oikawa, BGCI's representative in Asia, led a delegation to visit Taiwan. The delegation admired the Museum's efforts to combine the collection in the Botanical Garden and its exhibition of science education and was impressed with the enthusiasm of the visitors to the special exhibition of papermaking. Dr. Oikawa was invited to write an article for the Special Edition of the BG Journal. She remains very active in the conservation of international botanical gardens and in the promotion of academic exchange.

From March 22 to April 4, 2005, staff of the Department attended the International *Camellia* Conference held in China and collected Theaceae plants and *Camellia* species. Then from May 19th to 26th, 2006, staff visited the Philippines to examine and collect plants. Consequently, from August 20 to 25, the National Science Council provided a subsidy to the Department to participate in and present two papers to the Eighth International Mycological Conference in Australia. From July 3rd to 6th, 2006, staff of the Department attended the Fourth International Symposium on the Family Zingiberaceae. Information about the key development of the plant family Zingiberaceae was gathered as well as research on categorization and conservation, which should prove helpful for future planning and development of the collection of family Zingiberaceae. The staff also visited the newly opened Ginger Garden in Singapore Botanical Garden to see how the Ginger Garden grows gingers and exhibits the plants. The staff also made contact with several organizations that might exchange plants with the Museum, such as Singapore Botanical Garden, South China Botanical Garden of Chinese Academy of Sciences, Xishuangbanna Tropical Botanical Garden of Chinese Academy of Sciences and other notable botanical gardens that collect Zingiberaceae plants.

To keep the vitality of the Botanical Garden, the Museum signed a memorandum of cooperation with National Taichung Agricultural Senior High School (NTASHS) who would like to expand their teaching resources. The Museum would assist in managing the school's garden while at the same time, solving its problem of lack of space in the Botanical Garden. According to the memorandum, the first, second and third campus of NTASHS will be planned and constructed. Among the three campuses, the third campus will cover nearly a hundred hectares and it will become the most important botanical garden for teaching of succession of low altitude hill plants in Taiwan.

Milestones (2005-2006)

2005

- Investigation of biodiversity resource on Lignicolous basidiomycetes in Taiwan.
- "Wollemi Pine"wasintroduced to Australian Flora Exhibition in the Museum.
- Investigation on the list of medical plants in the botanical garden of Sunlinksea Recreational Park.
- The gallery of Evolution of Plants in Life Science Hall was updated.
- All fungal specimens in the Museum were checked and renewed.
- Ex vitro acclimation of Taiwan *Chrysoglossum erraticum* Hook.
- Aseptic propagation of the native orchid of Taiwan, *Vanilla planifolia*.
- To carry out the project of National Science Council, the Department visited Yunnan to collect fungi specimens and attended the Fifth International Conference on Mushroom Biology and Mushroom Products in Shanghai, China to present a paper.
- Staff of the Department was invited to attend the First Cross-strait Symposium on Biodiversity Information Management. An oral report was delivered.
- Summer ex situ domestication of *Begonia.*
- Restoration of *Camellia huisanensis* Sasaki.
- The Museum organized the academic seminar"Fungus, Heaven, Earth and Man".
- The Museum organized the Seventh Cross-strait Symposium of Mycology.
- Staff of the Museum visited Tsukuba and Hawaii Tropical Botanical Garden for further training.
- Staff of the Department visited Royal Botanic Gardens, Kew in the United Kingdom England and checked specimens.
- Cooperation with National Taichung Agricultural Senior High School.
- Germinated seeds from Hawaii were transplanted for follow-up care.
- Staff of the Department attended the 2005 International Workshop on Integrated Biodiversity & Natural Specimens Databases & Forum of Species 2000 Asia-Oceania.
- Germination test on seeds from germplasm bank in our Botanical Garden.
- The Department co-organized the exhibition"The Life of Great Grandpa Exhibition of Taiwan Ethno-plants" with Agricultural Exhibition Hall NTU and presented a keynote speech named "Medical Plants of the Aborigines in Taiwan" during the exhibition.
- The Department organized "Botanic Hacker: A Special Exhibition of Invasive Plants" (which included exhibition of living plants, photography exhibition, seminars and two plant drawing workshops). The photography exhibition of invasive plants was later moved to National Taiwan University and National Chung Hsing University.

▲ The beautiful flowers took from *Paphiopedilum* exhibition

▲ The naturalized plant, *Passiflora foetida* L. var. *hispida* is very common in southern Taiwan

- Implementation of the project of digital museum in National Digital Archives Program.
- Implementation of the project of National Science Council: "Production System of Healthy *Cymbidium* Seedlings".
- Implementation of the project of National Science Council–"Taxonomic Research of Veroniceae in Taiwan".
- Implementation of the project of National Science Council–"Taxonomic Research of *Angelica* (Apiaceae) in Taiwan".
- Implementation of the project of National Science Council–"Taxonomic Research of categorization of *Tripterospermum* in Taiwan".
- Execute the project of National Science Council: "Research on Sarcosomataceae in Taiwan".
- Implementation of"The Plan to Investigate and Establish Permanent Plot in the Forest Located near Upstream Area of Nantzuhsien Stream in Yushan National Park (2)".
- Implementation of"The Plan to Investigate and Establish Permanent Plot in the Evergreen Broad-Leaved Forest and Deciduous Forest Located near the Mid-altitude Area of Nantzuhsien Stream".
- Investigation of plants in the third campus of National Taichung Agricultural Senior High School in Dadu Mountain.

▲ Academia Deputy Director Dr. W. H. Chou delivered a speech for *Camellia* exhibition

2006

- Continue to cooperate with international botanical garden of National Taichung Agricultural Senior High School.
- Beijing Normal University contacted the Department about renewal of exhibits for Siberian tiger area in the Gallery of Life on Earth.
- Staff of the Department attended International Camellia Conference.
- The Department received representatives of BGCI in Asia and Japan to visit the Museum.
- Cooperated for development of testament of absorption spectroscopy of lichen specimen.
- The Department worked on artificial pollination, fruit collection and aseptic seeding for the rare species of *Begonia*.
- Staff of the Department visited National Orchid Garden in Singapore to see how they manage the garden and protect germplasm, and to learn from their experience.
- Staff of the Department visited Singapore Botanical Garden to attend the Fourth International Symposium on the Family Zingiberaceae and visit the Ginger Garden.
- Staff of the Department went to Cairns, Australia to attend the Eighth International Mycological Conference.
- Staff of the Department went to China to attend the International Conference on Botanical Gardens and to present botanical gardens in Taiwan.
- Staff of the Department went to Lanyu to carry out fieldwork and to collect information about ethnobotany of Dawu tribe in Lanyu.
- Aseptic propagation of 11 original *Begonia* from the Philippines, Vietnam, China and Hawaii was completed.
- Implementation of the National Digital Archives Program.
- Implementation of the project of National Science Council–"Taxonomic Research of categorization of *Tripterospermum* in Taiwan".
- Implementation of the project of National Science Council–"Research on Taiwan Sarcosomataceae".
- Implementation of "The Investigation Plan for Vine Ecology in the Permanent Plot in the Forest Located near Upstream Area of Nantzuhsien Basin in Yushan National Park".

Collection, Research, and Science Education

I. Important Collection

▲ Dr. Ching-I Peng, Research Fellow of Biodiversity Center of Academia Sinica make opening address to *Begonia* exhibition

By the end of 2006, the Department had collected 23,528 herbarium specimens. One specimen that is worth mentioning is the type specimen of *Tripterospermum lilungshanensis*. The specimen of *Cyanotis axillaries* (Commelinaceae) was collected in Dashu Township, Kaohsiung County in 1934. It was not until 1999 that we discovered another specimen in the Water Park of Wanan Village in Taiwu Township, Pingtung County. It is believed that our record is the second known distribution point. *Stellaria monosperma* var. *japonica* of Caryophyllaceae (with one seed) has no record in the present flora. Hence, both the collection record and the specimen from Green Island donated by Kuang-Pu Hsieh are precious. The Department also exchanged some plant specimens with the Institute of Botany in the Chinese Academy of Sciences for specimens from China, with the Japanese Museum of Natural History and Japan Chiba University for Japanese specimens, and with Missouri Botanical Garden in USA for African specimens, as these specimens are difficult to find. By April 2006, the Department had checked the entire inventory of our Herbarium specimens.

By the end of 2006, the Department had 27,364 logged specimens, including 5,499 seaweed specimens, 17,708 bryophyte specimens and 4,157 lichen specimens. Apart from those that were collected by our staff, these specimens also included those purchased from China, exchanged with Japan and donated by academic organizations and individuals. By the end of 2006, the Department had a collection of over 20,000 fungi specimens, making our collection the biggest site to look for fungi specimens in Taiwan. The number of logged fungi species is over 2,000 with nearly 1,000 different fungi species.

Recently, the Botanical Garden of the Museum was very

active in extending the range of collaboration. We established the Pteridophyte Garden with Chi-tou Forest Recreation Area of National Taiwan University and worked with Sunlinksea Forest Recreation Area on the collection and exhibition of the peony. By September 30, 2005, the Botanical Garden had collected 2,180 living plants (including subspecies, varieties, form and horticultural varieties) belonging to 207 families and 899 genera. Among them are 34 families, 68 genera and 191 species of fern, 7 families, 12 genera and 15 species of gymnosperm and 166 families, 819 genera and 1,974 species of angiosperm. The Botanical Garden established its germplasm and seed bank in early 2005 to collect seeds from native plants of Taiwan for conservation, research and exchange. By September 2006, the Botanical Garden had collected 380 species of native plants, among which, more than 200 species were collected from the field. At present, seed activity analysis is in progress. The Department has also strengthened our cooperation with the Research Center for Biodiversity, Academia Sinica in collecting germplasm of *Begonia* in East Asia. At present, the Department has collected approximately 120 species of native *Begonia*. We grow these plants with traditional propagation and tissue culture. In addition, 40 species of native *Begonia* are kept in an aseptic environment with seeds of five different *Begonia* cryopreserved. Our experiments show that the germination rate of these seeds can be kept stable and the plants can grow normally. In the future, the present materials would be used to conduct preservation experiments to find a safe and economical way of cryopreservation. The Department continues to work with Chung Ming Elementary School of Taichung City on the "Propagation Plan for Taiwan Native Plants". In the future, a great number of rare species can be grown on the school campus, making the school a place for plant conservation with native plants as useful teaching material. At present, the Department has bred about 2,500 seedlings of 50 native species. From 2005 to 2006, in terms of collection and raising of seedlings of rare native aquatic macrophyte, the Department conducted cutting propagation on two large woody aquatic plants, including *Cephalanthus naucleoides* DC (which has become extinct in the wild) and *Salix kusanoi* (Hayata) Schneider (the endemic species in Taiwan that is endangered with now only over a hundred in the wild). This result was satisfactory and these plants were provided to schools and research institutions as teaching material for ecological education. In December 2005, the Department published the "List of Plants at the Botanical Garden, National Museum of Natural Science" in which living plants collected in the Museum were categorized according to the plant taxonomic system.

II. Important Research

The taxonomic research on *Tripterospermum*, Gentianaceae, showed that these plants are mostly mountain plants native to Taiwan; hence, these plants are suitable as subjects of speciation of Taiwanese endemic plants. In the research, seven Taiwanese species were studied, five of which are endemic species. These include the recently discovered *Tripterospermum lilungshanensis*, a new species similar to *Tripterospermum alutaceifolium*. These two species are separated by the Central Mountain Range, so the interval distribution is different as one is in the north and the other in the south. *Tripterospermum lilungshanensis* can only be found in small populations in the mid-altitude mountains in southern Taiwan so it is considered an extremely rare species.

The Department has also continued to conduct research on mistletoes and provided new evidence and analysis of hyperparasitization of *Taxillus tsaii* Chiu. As for research on forest dynamics, the Department participated in the investigation and long-term research of permanent plot. For evergreen broad-leaved forests in mid-altitude areas, the *Quercus* zone along the trail of Nantzuhsien Stream was selected. The Department cooperated with Taiwan Academy of Ecology and Providence University and completed the allocation of the plot of 9.2 hectares and field tally. This fourth largest permanent plot is also the largest area in the mid-altitude region in Taiwan. The results of this research could be used when making comparisons with large permanent plots in the international community and could serve as an important foundation for ecological research on special forests in high mountain islands in East Asia. The achievement of Yushan National Park should be noted for its long-term efforts in conservation. To analyze the role of vines in forest succession, the Department conducted an ecological study of vines in the permanent plot to understand the diversity and distribution of vines in our forest ecosystem. This study is the first important academic research of its kind in Taiwan that integrated investigation and analysis of vine with the forest ecosystem.

In terms of morphology and molecular phylogeny of Rhamnaceae in Taiwan, the Department observed the characteristics of the pollen grain and divided the pollen of Rhamnaceae in Taiwan into three types according to the ektexine: Sageretia-type, Phylica-type and Rhamnus-type. As for anatomical characteristics of the wood, most trees are either diffuse-porous, have vessel solitary pores, radial pore or vessel clusters. The distribution pattern is diagonal or arborization with simple perforation and alternate bordered inter-vessel pits. The wood fiber has pits, but no spiral thickening on the walls. The wood rays are heterogeneous and not storied; most do not have sheath cells. Ray parenchyma cells of the wood and inter-vessel pits are alternate and the same as inter-vessel pits. Wood in the same genera has similar anatomical characteristics. Sequence data revealed that whether or not 5.8S was tagged in ITS of nrDNA was consistent with the constructed molecular relationship. For both inter- and intra-generic phylogenetic relationship, the resolution ability of cpDNA is smaller than

▲ *Tagetes minuta* L. a new naturalized plant in Taiwan published by Dr. C. M. Wang

that of nrDNA. The dendrogram constructed with DNA sequence appeared to correspond strongly to the types of fruit. Between 2005 and 2006, three newly naturalized species were announced, which were *Geranium molle* L., *Austroeupatorium inulifolium* (Kunth) King & Robinson and *Tagetes minuta* L..

Tropical species have always been the focus of the Botanical Garden; hence, the Garden has paid attention to the conservation of genetic resources of native and rare tropical species for its research and work. In 2006, the Department published a paper about tissue culture of a rare plant in Lanyu, Taiwan—*Dehaasia triandra* Merr. The paper offered another alternative for ex-situ conservation of the rare plant.

After spending over ten years on field survey, the Department discovered a new species of corticoid fungi named *Brunneocorticium pyriforme* and placed it in a new genus. The new fungus was collected on the stem or branch of living *Murraya* spp. (Rutaceae) in low altitude subtropical-tropical Taiwan and Xishuangbanna, in Yunnan, China. Phylogenetic analysis based on sequence data derived from LSU rDNA included *Brunneocorticuium* in the euagarics clade of Homobasidiomycetes, allied to the agaricoid genera *Marasmiellus*, *Campanella*, etc. The molecular analysis indicated that the *Brunneocorticium* was independent from other corticoid genera with similar morphological features. Basidiocarps of B. *pyriforme* are resupinate with a smooth hymeneal surface, a dimitic hyphal system, with nodose-septate generative hyphae and abundant yellowish brown skeletal hyphae, and leptocystidia. It has two segregated basidia and pear-shaped basidiospores. The paper, submitted by the Department about this finding of the new species and genus contributed to "Mycologia", has been accepted. (Picture: the micro feature of *Brunneocorticium pyriforme*)

III. Exhibitions and Science Education

▲ **Sunflower exhibition, about 20 different varieties have been displayed**

From 2005 to 2006, a total of 19 special exhibitions were held, which included (1) *Cymbidium* Exhibition (2005.1.28~2005.2.28 with 11,333 visitors); (2) The Living fossil—Wollemi Pine (2005.2.25~2005.5.28. This was an outdoor exhibition, so the number of visitors was not included); (3) Fragrance of Spring—Special Exhibition of Tree Peony (2005.4.1~28 with 14,030 visitors);(4) Monthly Tour Exhibition of Lady's Slipper Orchid (2005.4.22~24. This exhibition was placed in the Green House, so the number of visitors was not included); (5) Mother's Heart—A Special Exhibition of Daylily (2005.5.5~29 with 4,010 visitors); (6) Botanic Hacker: A Special Exhibition of Invasive Plants (2005.6.10~2005.8.28 with 13,262 visitors); (7) Photography Exhibition of Invasive

Plants (2005.7.5~2005.10.31.This exhibition was placed in the Green House, so the number of visitors was not included.); (8) Differentiating Lotus (2005.7.1~2005.9.30. This was an outdoor exhibition, so the number of visitors was not included.); (9) Story of Sunflower—A Special Exhibition of *Helianthus* (2005.9.9~2005.10.20 with 9,440 visitors);(10) A Special Exhibition of *Begonia* (2005.11.11~2006.2.19 with 12,253 visitors); (11) New Year Exhibition of *Camellia* (2006.1.20~2006.2.19 with 12,140 visitors); (12) Monthly Tour Exhibition of Lady's Slipper Orchid (2006.2.22~26 with 2,970 visitors); (13) Special Exhibition of Lady's Slipper Orchid (2006.2.28~2006.3.26 with 6,643 visitors); (14) "Made in Taiwan" (2006.2.14~2006.3.30. This exhibition was placed in the Green House, so the number of visitors was not included.); (15) Amazing Plants—Handmade Paper Craft of Plants from Nation Museum of Natural Science (2006.3.31~2006.4.30. This exhibition was placed in the Green House, so the number of visitors was not included.); (16) Flower of the King—A Special Exhibition of Tree Peony (2006.4.4~30 with 10,256 visitors); (17) Flower Exhibition for Mother's Day (2006.5.5~29 with 3,579 visitors); (18) An Exhibition of Native Aquatic Plants in Taiwan (2006.7.1~2006.9.30 with 3,579 visitors); (19) Peaceful Mind—An Exhibition of *Chrysanthemum* (2006.12.15~2007.1.7 with 14,074 visitors).

From 2005 to 2006, the Department also supported various science education activities by providing description and guided tours. These activities included: Pressed Flower for the Chinese New Year: DIY Activity; Here I Come: Observation of Natural Life; The World of Flower: Children's Creative Floriculture Contest; Fairies in the Grass: Play with Natural Materials; Glad To Meet You: Natural Game; Fairy Garden; On Earth; A Special Exhibition of *Cymbidium*: The Fantasy of Damo; One Day Visit of Tree Peony in Sunlinksea; Mothers' Heart: Activity for the Exhibition of Daylily; Forest Grandpa; Young Carpenter; Brick, Brick, Brick; Art and Plant; Make Your Own Pressed Flower; 6th Anniversary of Botanical Garden; Sunflower Bible; A Special Exhibition of *Begonia*; Activities for the Special Exhibition of *Camellia*: Make Your Own Paper Dolls; Winter Camp in the Botanical Garden (1. carpenter class; 2. pop doll studio; 3. begonia painting on ceramic plate; 4. secret of lantern festival—Chinese lantern); Plant and Paper Workshop; One Day Visit of Tree Peony in Sunlinksea; Brick Paining of Flower Exhibition for Mother's Day; Family Activity in Secret Garden of Aquatic Macrophyte; Celebrating 7th Anniversary of the Botanical Garden—Floral Festival (1. making colorful pop dolls; 2. paint your wood chip; 3.paint the insects; 4. lithograph; 5. exploring flowers in the Botanical Garden; 6. cultural artifact exhibition for children).

Moreover, the Department invited specialists or scholars to participate in the program of plant Q&A held in the Center of Research and Education in the Botanical Garden or in the exhibition galleries. The emphasis of these talks was on hands-on practice. We hoped that through these activities, the audience could learn to improve their living environment with plants while at the same time get answers to their questions about how to grow certain plants. From 2005 to 2006, 15 sections of plant Q&A took place. The topics covered in the program were as follows: Blooming and Insects; Names of Plants; Protect Your Plants from Common Insects and Pathogens; Improve Your Living Quality with Plants; Healthy and Organic Life—How to Grow Organic Vegetables at Home; Maintenance and Management of Lawn; How to Take Care of Your Citrus; How to Take Care of Your Garden; Sustainable Application of Herbs; Cultivation and Management of Chincherinchee for the Chinese New Year; Cultivation and Management of Aquatic Plants; Transplant of Trees; Construction and Management of Roof or Balcony Garden; How to Take Care and Use Indoor Foliage Plants; Simple Tips to Grow Orchids.

▲ **Daylily display, one hybrid "Cidar waxing"**

Zoology Department

The Department is divided into four divisions: Invertebrates, Entomology, Herpetology, and Birds and Mammals. Currently, the Department comprises nine researchers, three technicians and one contract technician for a total of thirteen staff. In the next two years, there are plans to recruit two doctoral researchers. One will specialize in invertebrates and the second in mammals or birds. At present, the primary task of the Department is the research and collection of specimens from Taiwan and East Asia. For the time being, the Department includes approximately 530,000 animal specimens covering a wide range of species and accounting for two thirds of the Museum's entire collection. The quality of these animal specimens is among the best in Taiwan.

With a limited number of researchers of its own, the Department works in close cooperation with other museums. Through subsidies awarded by the National Science Council, domestic and foreign specialists are invited for short-term research projects in order to utilize and preserve these precious specimens. We also welcome local and international zoologists from various research institutes to exchange ideas and collaborate with the Museum.

Milestones (2005-2006)

2005

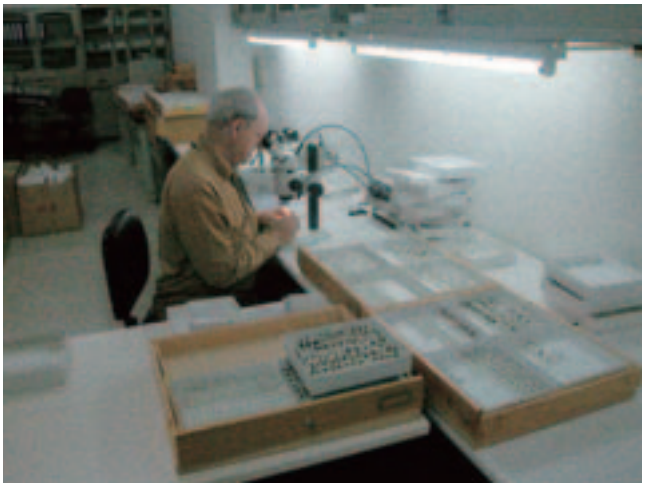
- A special exhibition entitled "The Red Imported Fire Ant," traveled to the Taoyuan County Museum of Natural History, the Yilan County Natural History Education Museum and Maolin National Scenic Area Administration in Kaohsiung County.
- The number of terrestrial invertebrate specimens was increased substantially. Thanks to a one-month visit by Hungarian millipede taxonomist Dr. Zoltán Korsós, the Department gained more understanding regarding the handling, identification, preservation and collection of terrestrial arthropods. The collection of millipede specimens was enlarged from the original 20 specimens drawn from five species up to 200 specimens from 30 species, 19 families and 10 separate orders. The centipede and scorpion specimens were also increased.
- Dipterist Wolfgang Schacht, from Zoologische Staatssammlung Munich, Germany, was invited to assist the Museum in the identification of Dipteran specimens. About 25,000 specimens were identified to the level of family. This information was essential for the Museum to both to accurately place the specimens and enter the relevant data in the computer management system.
- Special Exhibition of Acaroid Mites
- Staff of the Department visited Nagoya, Japan to organize and pack specimens owned by Professor Sato Masataka. In the second shipment, there were 64,000 insect specimens. In total, Professor Sato donated 117,000 specimens to the Museum.
- The Department assisted the Naturalist Center, the Minizoo, and the Children's Area to identify and display approximately 100 pieces of herpetology specimens.
- From 2005 to 2006, the Museum received around 150 pieces of important snake specimens donated by the Changhua County Government.

2006

- To celebrate the grand reopening of the Naturalist Center, the Invertebrate Division staged two themed exhibitions entitled "Echinoderms and Shellfish" and "Sea Urchins of the Phylum of Echinodermata." In addition, the Division prepared group lessons and displayed dry sea urchin specimens exchanged with Singapore as well as sea urchin fossil specimens collected by the Geology Division. The "Echinoderms and Shellfish" exhibition coupled living specimens and fossils. At the same time, interactive lectures were organized for both children and adults.
- The Department prepared a live demonstration explaining the scientific drawing process of invertebrate specimens. This served both to educate the public in understanding this important process while accumulating hand drawn illustrations of important specimens.
- The Department cooperated with the Yangmingshan National Park Administration to carry out an insect specimen preservation and management project. The Department assisted Park Administration by arranging four sets of specimens and providing descriptions. Another 2,970 specimens were preserved in the Museum and registered as part of the museum collection.
- Professor Satô Masataka passed away due of illness. Mrs. Satô donated 7,300 pieces of unprepared specimens to the Museum on his behalf.
- The Department subscribed to the Zoological Record published between 1864 and 1965 from a Dutch publisher.
- Between 2005 and 2006, the Department continued to cooperate with Academia Sinica and the Research Team of Abyssal Benthos at National Taiwan Ocean University. Department staff took Ocean Research Vessel No. 1 of the National Science Council and Fishery Research Vessel No. 1 of the Fishery Research Institute and set out on a voyage to conduct research and collect invertebrates of abyssal benthos in the deep ocean off the coast of Taiwan. The deep-sea operation reached 4,400 meters under the sea while the staff collected specimens of deep sea invertebrates such as *Spinula calcar, Yoldia aurata, Acila divaricata archibenthalis, Compsodrillia mammillata, Verticordiidae, Arbaciidae, Ophiolepidinae*. For specimens of newly recorded deep-sea species, the Museum requested

assistance from taxonomists of various fields as they sought to identify, utilize and publish accounts of these new species. (2005.8~2006.8)

- The Department carried out research on Taiwan Barnacle Fauna and the commensal deep-sea barnacle. In collaboration with Dr. Yi-syong Cai on the Barnacle Fauna research, it was expected that the barnacle collection would be increased from less than 40 to 70 species. Meanwhile, the partnership provided a large number of specimens of *Verrucomorpha* attached to the spine of a deep-sea sea urchin named *Stylocidaris reini*. Working with Dr. Benny K. K. Chan from the Research Center for Biodiversity of Academia Sinica, the Museum conducted research on the reproduction cycle and biology of *Verrucomorpha* as well as the diet of another large deep-sea barnacle *Scalpellum stearnsii* Pilsbry, 1890 (2005~2006).
- The Museum received four pairs of paratype specimens of Cerambycidae from Mr. Hasegawa Michiaki of the Tayohashi City Musuem of Natural History, six holotype specimens of Coleoptera from specialist Masumoto Kimio, six type specimens of Helotidae from Dr. Chi-feng Lee, and two paratype specimens of Curculionidae from Dr. Heiko Gebhardt (2005~2006).
- In 2005 and 2006, the Taiwan Cetacean Society donated three skeleton specimens of *Mesoplodon* to the Museum increasing the total collection of Ziphidae in the Museum to twelve specimens, of which the *Indopacetus pacificus* is one of only nine in the world.
- In 2005 and 2006, the Department assisted the Anthropology Division to identify and organize animal skeleton specimens discovered at an archaeological site. The preliminary categorization and identification of 15,000 pieces was completed and nearly 8,000 pieces of specimens catalogued. Animal skeletons included wild deer and boar as well as badgers, mongoose, dogs, mice, birds, turtles, whales, dolphins, frogs and fish.
- In conjunction with the exhibition held by the Museum, the Herpetology Division staged a mini exhibition entitled "Parental Care in Long-tailed Lizards (Mabuya longicaudata)." In addition to exhibits and computer animation, the Division also prepared living specimens for display. It also worked closely with the Naturalist Center to prepare several interactive lectures for children and the general public.
- The Department assisted the Taichung Customs Office and the Taichung Post Office to identify approximately 30 specimens that included Tuataras, King Cobras and Crocodiles.



▲ Mr. Wolfgang Schacht sorted Dipteran specimens in collection room

▲ The NMNS staff checked the condition of the arriving of Prof. Satô's donation

Collection and Research Results

1. History of Professor Satô Masataka's Donation of Insect Specimens

▲ Prof. Satô was signing the deed of gift for NMNS

To increase the Museum's collection of insect specimens, the Museum made the acquaintance of Professor Satô Masataka through Dr. Chi-Feng Lee in 2004. Professor Satô once taught at Nagoya Women's University, Japan. At the time of his retirement in 2003, he had published over 500 academic papers as a world-renowned Coleoptera taxonomist. He had also traveled the world collecting specimens and collaborating with colleagues of different countries. It was his wish that his collection of the last forty years might be kept in an institution with a first-class environment for preserving the specimens. Hence, the Museum invited Mr. and Mrs. Satô to visit to view the facilities and see firsthand how the Museum manages its insect collection. Ultimately, Professor Satô agreed to deposit his insect specimens at the Museum. The Museum Foundation also helped Professor Satô realize his dream by donating totally NTD1,500,000 to both the Japan and Taiwan Entomological Societies.

In December 2004, Museum staff visited Professor Satô in Japan, returning with the first shipment of 53,000 specimens. Among these specimens, there were nearly 50,000 pieces of Coleoptera, including at least 50 beetle families such as Hydrophilidae, Dytiscidae and Lampyridae. In addition, specimens covered 19 orders including Hemiptera, Odonata and Hymenoptera collected from Japan, Taiwan, China, Laos, the Philippines and Europe. Simply but, the collection was rich and diverse. Apart from these specimens, Professor Satô generously donated all his publications, specimen boxes and collection tools to the Museum.

On December 30, 2004, the Museum held a press conference for the new exhibition—"Fascinating Beetles & Dedicated Satô: A Special Exhibition on the Recognition of Professor Satô's Donation." At that time, Mr. and Mrs. Sato were invited to the Museum for another visit. Due to time constraints and space limitations, the Museum was not able to display all the specimens donated by Professor Satô, yet it was easy for the public to appreciate the diversity of the collection.

In December 2005, Museum staff returned to Japan for the second shipment of 64,000 specimens, most of which were Coleoptera. Most specimens had been collected by Professor Satô, but some had been received from interflow with well-known Japanese and international entomologists. It was discovered the collection also included specimens collected in Taiwan by the German merchant, Hans Sauter, between 1902 and 1912. On this trip, the Museum also received paratypes of *Pseudocalamobius pubescen* and *P. niisatoi* as gifts from Mr. Hasegawa Michiaki, a researcher from the Tayohashi City Museum of Natural History.

Professor Satô passed away in the morning of August 9, 2006, leaving many in mournful sorrow. In fact, Professor Sato had learnt that he had pancreatic cancer in February and had fought against the illness for five months. Our condolences went out to his family and friends.

The finished specimens of the 117,000 pieces donated by Professor Satô have been processed with a freezing-technique for the purpose of pest eradication. These specimens were

▲ Prof. Satô and his collection at home

identified, categorized, catalogued and the data entered into the Museum database. Entomologists from Taiwan and other countries contacted the Museum to examine or borrow the specimens. At the same time, the unprepared specimens were being processed. Each specimen is considered invaluable and a witness of history. Each tells a story about the efforts of collectors and processors.

In Japan, entomologists held a commemoration ceremony to celebrate the life of Professor Satô and his contribution to science. The Museum is expected to stage a special exhibition on the first anniversary of his death to commemorate Professor Satô's achievements and donations. We will never forget Professor Satô's contribution to the field of entomology and will always be grateful for his generous decision to donate his life-long collection to the Museum.

2. The Collection and Research of Deep See Invertebrate Specimens

Between 2005 and 2006, the Department continued to cooperate with Academia Sinica and the Research Team of Abyssal Benthos at National Taiwan Ocean University. Department staff took Ocean Researcher Vessel No. 1 of the National Science Council and Fishery Research Vessel No. 1 of the Fishery Research Institute and set out on a voyage to conduct research and collect invertebrates of abyssal benthos in the deep ocean off the coast of Taiwan. The major tasks were to collect and arrange specimens of Branchiopoda as well as all invertebrate specimens with the exception of barnacles. The deep-sea operation reached 4,400 meters under the sea while the staff collected specimens of deep sea invertebrates such as *Spinula calcar, Yoldia aurata, Acila divaricata archibenthalis, Compsodrillia mammillata, Verticordiidae, Arbaciidae, Ophiolepidinae*.

After preliminary identification, deep-sea invertebrate specimens registered in the Museum's specimen management system amounted to 1,700 pieces, including mollusk (spiral shells, snails), bivalve (clams), and Dentaliidae. In addition, there are Echinacea, deep-sea Cephalopoda mollusks (donated by Professor Jhong-cheng Lu of National Chung Hsing University), and pelagic arthropods such as Amphipoda, Isopoda, and Ostracoda (cypridina). Since 2005 and 2006, nearly 850 pieces have been accumulated. In Taiwan, the Museum is almostly the only institution that collects and studies the deep-sea mollusk. One would not find such a collection in the Research Center on Biodiversity of Academia Sinica, National Taiwan Ocean University, National Sun Yat-Sen University or even National Taiwan University. Among the specimens identified and registered, the Museum has accumulated a variety of barnacle species. With specimens collected from littoral zones and the shallow sea over several years, the Museum has accumulated sufficient specimens to collaborate with Dr. Benny K. K. Chan of the Research Center on Biodiversity of Academia Sinica. At present, this

▲ The Ocean Researcher Vessel No.1 of the National Science Council

partnership has produced the first draft of a popular science book entitled "Barnacles in Taiwan." Also being worked on is further research investigating the reproduction and ecology of the barnacle *Rostraverruca* sp. attached to sea urchin spines in the deep sea.

In addition to the specimens that have been identified and registered to date, the Museum still needs to identify thousands of deep-sea invertebrate specimens. These include the sponge, isolate corals, sea pens, sea anemone and Syphonophora of Cnidaria, *Lampea* sp. of Ctenophora, polychaeta of Annelida, Planktonic amphiphda, isopod, ostracod of Arthropoda, arrow worm of Chatognatha, and Salpida of Urochorda. In cooperation with Dr. Allen Chen of the Research Center on Biodiversity of Academia Sinica the Museum is studying the deep-sea sponge and isolate corals. In 2007, there are plans to invite international taxonomists to Taiwan for collaborative research assisting the Museum to identify and publish research on these specimens.

The Museum has also accumulated a large number of specimens of the five classes of Echinoderm—Crinoidea, Astelleroidea, Ophiuroidea, Echinoidea and Holothuroidea. These include many newly recorded and newly discovered species. These specimens are currently being organized and studied. In conjunction with the Digital Archives Program of Specimens of the National Science Council, it is estimated that in five years the Museum will publish its research findings. At the same time, relevant information, including collection, taxonomy, ecology and images will be digitalized and made available on the Internet to enrich virtual learning and teaching resources in Taiwan. In addition, the Museum hopes to add images of the newly recorded deep-sea species to its website to attract taxonomists at home and abroad both to visit and to assist in the identification, publication and utilization of these specimens.

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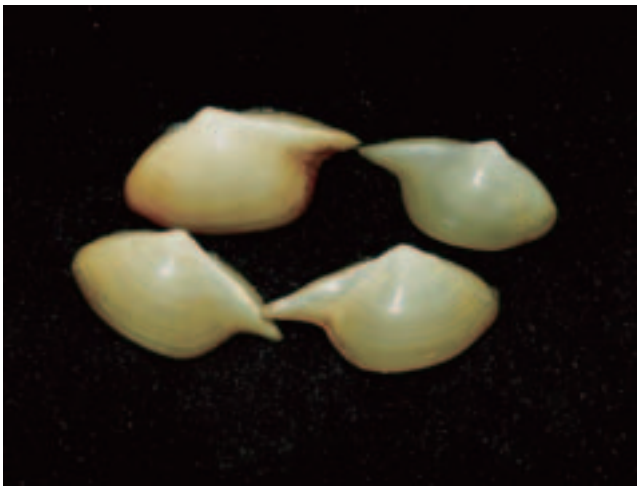

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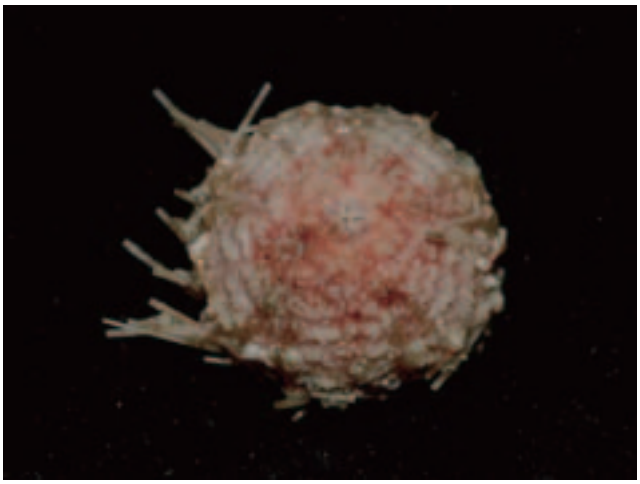


3

1. The pelagic tunicate~*Iasis* sp.

2. The deep sea bivalve~*Spinula calcar* from 4,400m.

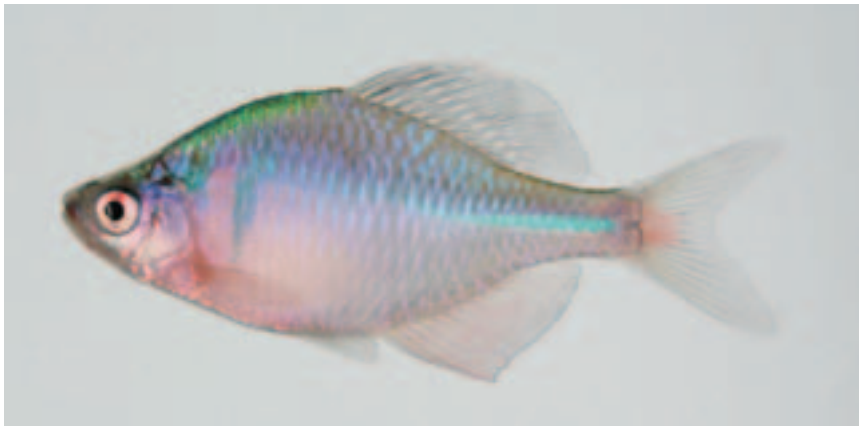
3. The deep sea sea urchin of Arbaciidae from 4,400m.

3. Collection of Fish Specimens

▲ **Fish collecting in Inner Mongolia, China**

The Museum's earliest collected fish specimens came from the Dajia River, donated by Mr. Jian-ping Jhang in 1991. As the Museum did not comprise researchers specializing in ichthyology, the specimens were labeled with temporary tags and placed in a corner of the warehouse. In fall 2002, as Department staff conducted research on herpetology and specimens collection in China, they returned with a number of specimens of local freshwater fishes. These included eyeless blind loach, *Oreonectes anophthalmus*, often referred to as cave fish. Academically and educationally speaking, these specimens are quite valuable. To properly preserve, maintain and manage these specimens, the Museum required a procedure for the collection of fish specimens. Thus, under the instruction of former director Dr. Jia-wei Li, the Museum began their collection in ichthyology.

After studying the herpetology collection strategy and the strategies utilized by other fish specimen warehouses in Taiwan, the Museum decided to place emphasis on the collection of freshwater fishes in Taiwan. Freshwater fishes are usually smaller in size, meaning less manpower and fewer resources are needed to handle them. In addition, compared to marine fishes, Taiwan possesses even more species of freshwater fish, making them more representational of the country. In addition to field trip collection, the Museum also obtained specimens through collaborative collection methods, through purchase, donation or exchange. Apart from freshwater fishes, the Museum also collected marine fish specimens. However, due to a limited budget and manpower, the Museum was unable to conduct large-scale or highly technical collections. Many supplementary fish specimens were collected at the same time the staff was



▲ ***Rhodeus ocellatus ocellatus***, a wide-spread freshwater fish in eastern Asia

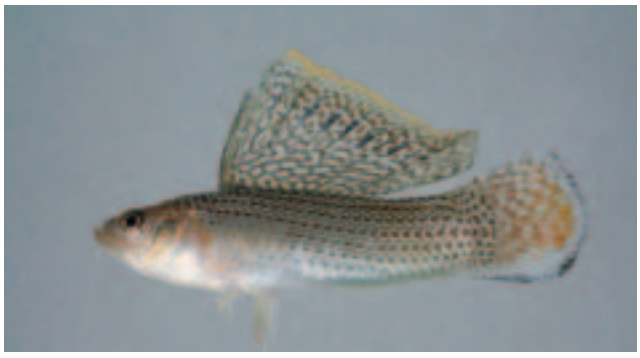
gathering other specimens. For example, they collected intact fish specimens as they searched for invertebrate specimens beneath piles of unsorted fish in a fishing port.

By the end of 2006, the Museum had collected specimens numbering over 1,500, making up a total of 4,800 pieces. In response to an invitation by the Research Center on Biodiversity of Academia Sinica, the Museum published fish specimen data on the Fish Database of Taiwan website (http://fishdb.sinica.edu.tw), and established links with other ichthyology databases to integrate information on fish specimens nationwide.

Fish specimen collection is a task that the Museum cannot accomplish alone. Hence, the Museum has built a network of fish fans that exchange information and specimens. In fact, anglers, students and teachers as well as field researchers donate many of its specimens. This network enables the Museum to plant its roots on the island and record details of Taiwan's natural history in the present time. In August 2004, Museum staff accompanied Japanese scholar, Watanabe Katsutoshi, to conduct research on Taiwanese freshwater fish. Dr. Watanabe specializes in taxonomy and the evolution of East-Asian Bagridae. By comparing his samples of Bagridae collected from Japan and Mainland China with the specimens collected by the Museum, the Museum gained a deeper understanding of taxonomy and the differentiation hypothesis of Bagridae in Taiwan. The collaboration has helped the Museum to overcome the difficulties brought by inadequate manpower and helped to increase the number of specimens. At the same time, Dr. Watanabe assisted our staff to identify specimens and bring in new technology and concepts that has changed the Museum's approach towards collection. The Museum also worked with the Department of Environmental Engineering and Science of Feng Chia University, with the Endemic Species Research Institute and the Eastern Marine Biology Research Center. It frequently exchanged specimens with these institutions, provided assistance in the identification of specimens, and sent its researchers to participate in collaborative collection.

Freshwater fishes from Mainland China and Taiwan share a profound connection. In regards to taxonomy, location and the evolution of freshwater fishes in Taiwan, there are often difficulties with insufficient samples. Samples from neighboring areas are often required for comparison. Consequently, the Museum collaborated with the Institute of Hydrobiology of the

▲ ***Pararasbora moltrechti***, an endemic, rare cyprid in Taiwan



▲ An introduced species with exaggerative dorsal fin, ***Poecilia latipinna***

▲ Collection of ichthyology in the Museum

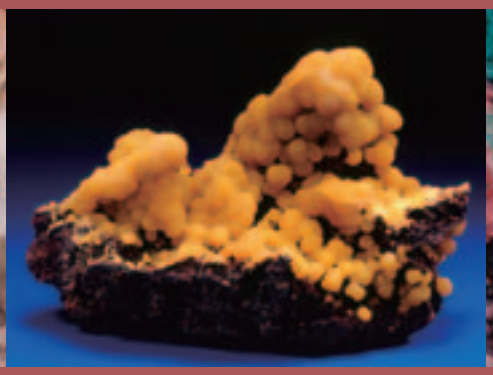
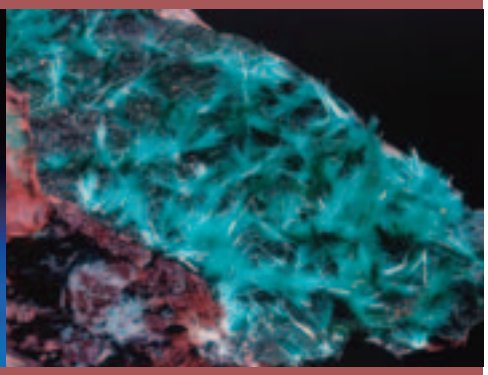
Chinese Academy of Sciences and Zhejiang Museum of Natural History to collect off-island fish specimens in locations that included Kinmen, Zhejiang, Northeast China, the Lake Biwa river system of Japan, and the southern tip of Hokkaido.

Compared with other museums or institutions, there is still much room for improvement. However, at this budding stage, we may hold higher standards in the collection of specimens and data management. Hence, specimen data included on the Internet is updated quarterly, while complete information and photographs of each specimen are provided whenever possible in order to provide easy access to this information. Apart from the above-mentioned specimens, some others worth mentioning include *Ranzania laevis* of the South-east waters, Frilled Shark of Gueishan Island, Formosan Landlocked Salmon donated by Shei-Pa National Park, and Syngnathidae from fresh water creeks. There are also many endemic species such as *Rasborinus formosae, Squalidus*

▲ Searching specimens from unsorted bottom trawl gatherings in Dasi fishing port

iijimae, Puntius snyderi, Gobiobotia cheni, Liobagrus formosanus, Crossostoma lacustre, parasbora moltrechti, Aphyocypris kikuchi, Pseudobagrus brevianalis and more. These samples are retained for ichthyologists' reference.

Geology Department

Milestones (2005-2006)

2005

- The Department carried out the "Plan for Upgrading the Service of National Social Educational Institutions", in which the content of exhibition in the Geology Hall was re-planned and the displayed specimens were procured.
- The Department prepared the special exhibition "Puncturing, Shearing and Grinding- The Diversity of Mammalian Teeth"
- The Department carried out the subprojects of National Digital Archives Program: Invertebrates Fossil and Metamorphic Rock.
- Staff of the Department visited the US to purchase specimens from Tucson, Arizona for 2005 Annual Tuscon Mineral Specimens Collection Plan.
- Dr. Cheng, Yen-nien and Dr. Sato in Japan published "A Pair of Shelled Eggs Inside A Female Dinosaur" in "Science" journal and received positive response from the international community.
- Staff of the Department went to Sichuan and Yunnan in China for investigation of population succession of paleofauna and collection of specimens.
- Staff of the Department went to Taiping Island in Spratly Islands for geological investigation of coral reefs.
- Staff of the Department went to Shanxi, Hebei and Inner Mongolia, China to collect Cenozoic volcanic rocks and mantle xenoliths.
- Staff of the Department went to West Qinling Mountains, China to collect rock specimens.
- The Department made and assembled skeleton specimen of a modern alligator.

2006

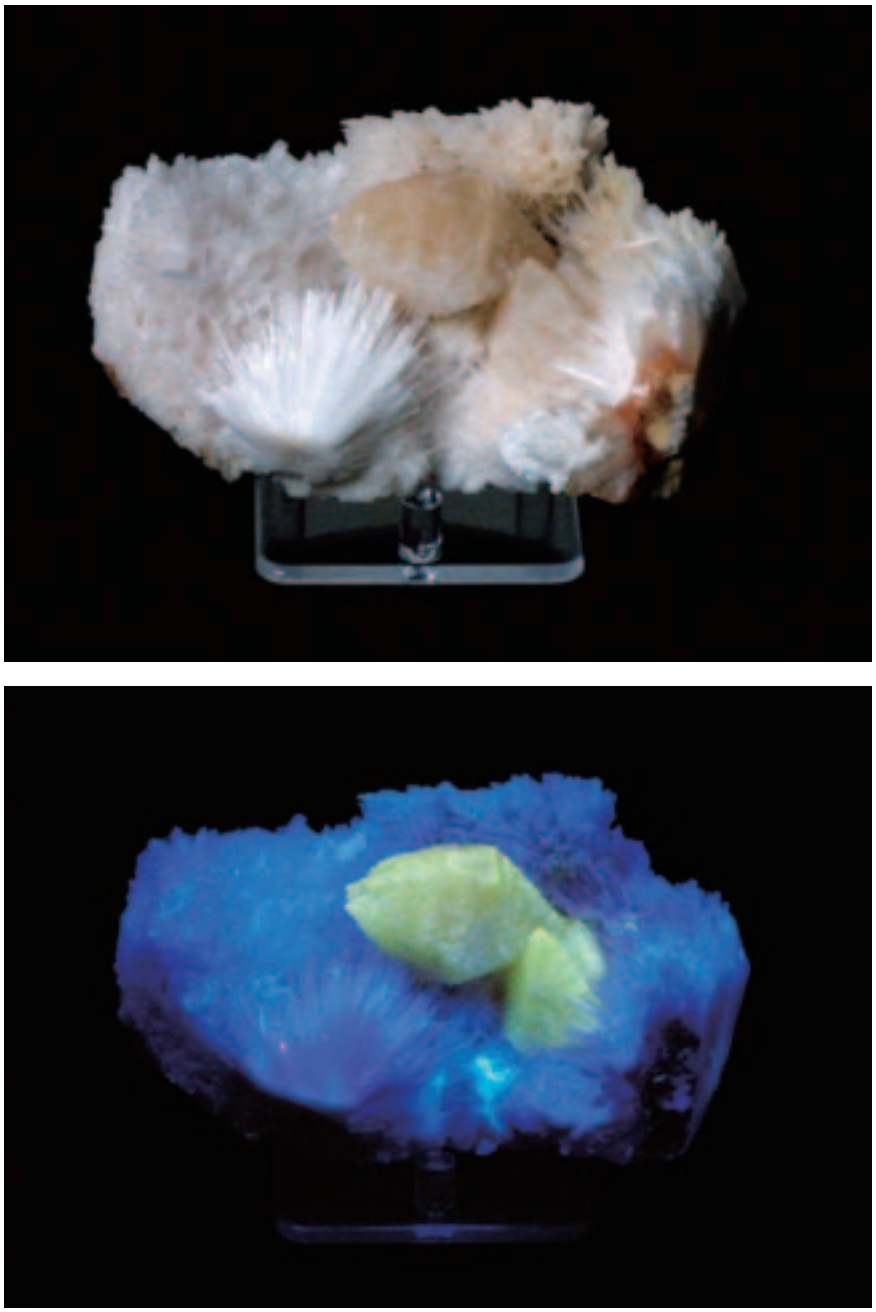
- The Department carried out the subprojects of National Digital Archives Program: Sedimentary Rock and Fossil Plant.
- Staff of the Department visited the US to purchase specimens from Tucson, Arizona for 2006 Annual Tuscon Mineral Specimens Collection Plan and took a trip to visit geological exhibitions in Natural Science Museum of Los Angeles County.
- The Department curated the special exhibition "Puncturing, Shearing and Grinding: The Diversity of Mammalian Teeth" and design associated activities of science education.
- Dr. Cheng, Yen-nien published a paper in Naturwissenschaften, the German journal, about the fossil of the first archosaurian with aquatic specializations: Qianosuchus mixtus.
- The Department produced skeleton specimen of pilot whale (Globicephala macrorhynchus).
- The Department cleaned and mounted a Penghu fossil crocodile.
- Staff of the Department visited Yunnan and Guizhou areas in China to collect specimens and conduct research on Mesozoic Diapsida reptiles.
- The Department participated in preparation of the theme exhibition in Chelungpu Fault Preservation Hall in Jhushan.
- The Department arranged to receive Professor Takahashi Keiichi from Japan who visited the Museum for academic exchange and geology fieldtrip.

▼ A special exhibition on the diversity of mammalian teeth in the museum, 2006

Collection and Research Results

I. Important Collection

1.Rocks and Minerals Division



▲ Flourescene of powellite from Jalgaon, India. (above) Daylight, (below) longwave ultraviolet. Width 11 cm.

By the end of 2006, the Division registered 2,733 rock and mineral specimens during the past two years. These specimens were either collected by our own staff, purchased in the US or donated by from experts, scholars and individuals.

For collected specimens, the staff of the Division continued to collect rock and mineral specimens in Taiwan. At the same time, we also carried out the annual specimen collection project in China and collected nearly 800 Precambrian and Late Cenozoic rock and mineral specimens from China. For scientists, the evolution of continental crust at the first 4 billion years of Earth history (Precambrian epoch) has always been a mystery. It is necessary for us to find traces from rock specimens of the Precambrian epoch to find the truth. On the other hand, late Cenozoic basalt rocks and xenoliths brought to the earth' s surface by the magma are important evidence for us to explore recent volcanic activities and the interior of the earth. Thus, as staff of the Department took part in the Integration Project of Qilian Mountain funded by National Science Council and carried out the annual specimen collection project in China, we also collected Precambrian rock specimen exposed in northern Qinghai-Tibet Plateau and late Cenozoic basalt rocks and xenoliths from North China, hoping that the quality and quantity of collection can be improved and have more opportunities to exchange

▲ **Halotrichite from Golden Queen Mine, California, USA. Width 6 cm.**

specimens with other museums.

In terms of procured specimens, in addition to scatter procurements of gems, the staff of the Division also visited annual Tucson Gem, Mineral & Fossil Show to look for and purchase specimens whose species, habits and morphology are absent in our collection. In total, we procured 80 pieces mineral specimens suitable for the Museum. These specimens have the following features: 1. they are specimens that could show the beautiful color of minerals; 2. they are specimens that have unique shapes; 3.they are minerals that represent different groups in crystal chemistry; 4. they are specimens that could present the development and formation of minerals; 5. they are gemstones or semi-precious gemstones; 6. they are main pieces with great exhibition effect and are representative for mineral exhibitions.

For specimens from donation, Professor Yang, Houng-yi from National Cheng Kung University donated over a hundred pieces of rock specimens collected from all over the world. Professor Tsai, Ching-lang from National Cheng Kung University donated over 200 pieces of metamorphic rock specimens in Taiwan area. Professor Chen Ju-chin from National Taiwan University donated 44 pieces of gneiss thin sections. Mr. Li Long-sin donated 5 gemstones and agatized wood specimens. Mr. M.F. Makki donated 33 rock specimens from India. Dr. Trusdell from United States donated 4 pieces of solidified volcanic lava from Hawaii. Professor Hwang, Shyh-lung from National Dong Hua University donated thin section of the newly named Tohdite specimen to the Museum. (Ho, Kung-suan, Tung, Kuo-An)

2. Paleontology Division

The Paleontology Division continues to collect the types of specimens that are lacking in our collection. We also endeavor to develop the characteristics to our collection. Since 2003, the Museum has obtained several main pieces of Mesozoic marine reptiles such as Ichthyosaur, Nothasaur, Mosasaur, Thalattosaur, and crocodile fossils.

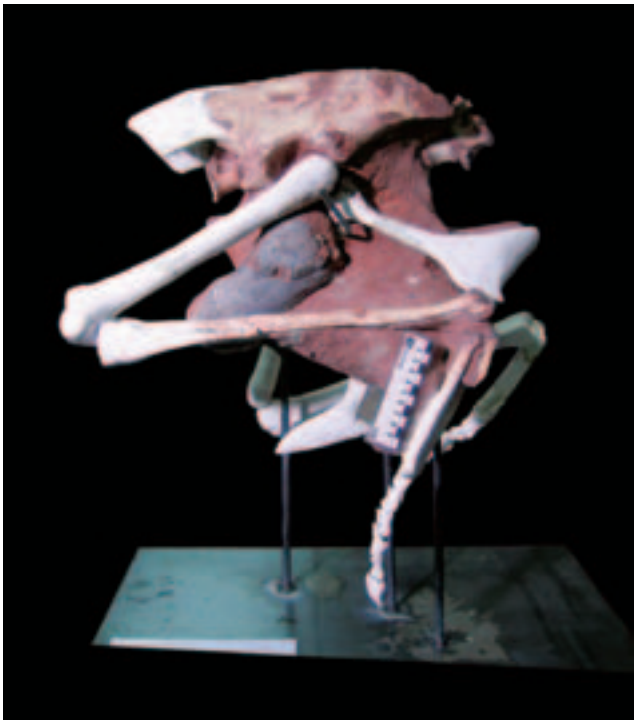
In early 2006, a crew from the Division was dispatched to Tucson Mineral and Fossil show in the U.S. to collect the specimens for exhibitions. They purchased 135 fossil specimens, including the skull of mastodon, the fossil of American alligator, the casts of dinosaurs, and a batch of wonderfully prepared trilobites.

In April, 2006, the Museum received a fossil crocodile from Penghu County Government. This is the first nearly complete fossil crocodile found in Taiwan area. The specimen has been well prepared and the study of the fossil is in progress. (His-Yin Shan)

▲ Hadrosaur skull(cast), *Saurolophus* sp., Cretaceous, Mongolia

▲ Triceratops skull(cast), Cretaceous, Mongolia

II. Major Research Results



▲ A Pair of Shelled Eggs Inside A Female Dinosaur

In the past two years, our research team successfully put together a team with scholars from Canadian Museum of Nature(CMN), National Science Museum, Tokyo (NSM) and Institute of Vertebrate Paleontology and Paleoanthropology(IVPP), Beijing to conduct research on fossils of Mesozoic marine reptile, which included taxonomy, reproductive biology, ontogeny and evolution. The results has attracted attention from the international academic community.

In 2005, we published an article "A Pair of Shelled Eggs Inside A Female Dinosaur" in "Science"(vol. 308, 15 April 2005, p. 375). This was the first direct evidence about the reproductive strategy of theropod dinosaur and a missing link between the prototype of Archosauria and advanced types of birds. Our team continued to study how Oviraptoroid Dinosaurs hatched eggs in nested grouping and their parenting behavior. It is expected that the result would again catch attention from the scientific community.

We published two papers in 2006 and both papers were selected as cover stories of professional journals and recognized by the scientific community. The first paper described the fossil of a Triassic Archosaurian from China which was a new taxa named Qianosuchus mixtus. The paper was published in German well-known journal Naturwissenschaften .(Naturwissenschaften 93: 200~206, 15 March 2006). This was the first fossil of a prototype archosaurian that may have lived in marine environment. The other paper described ancestral fossil of plesiosaurs found near Cha River area in the southwest of Guichou Province in China. The brand new pistosaurs was named Yunguisaurus liae and the paper was published on Journal of Vertebrate Paleontology(JVP) in United States.(Journal of Vertebrate Paleontology 26(2): 100~105, June 2006). This was the first specimen of pistosauroid found in China and the most complete single specimen in the world. Researchers of our team are working on detailed description of the fossil and the first draft is expected to be completed by the end of 2006. The result of the research will provide important information for the research of the whole lineage of the plesiosaurus group. (Cheng, Yen-nien)

Important Events

I. Academic Research

1.Petrology and Geochemistry of Basic Granulite Xenoliths in the Penghu Islands

Human beings have two ways to understand the interior of the earth, one is direct and the other is indirect. The former uses drilling, but it is only possible to drill to a certain depth of the earth's surface layer. The latter uses geophysics, such as seismic wave, gravity, magnetism and geotherm to indirectly capture messages from deep under the earth. In addition, the xenoliths were rapidly transported to the earth's surface by basaltic magma, which may provide some information about the constituents, properties and deep geological process of the interior of the earth.

From the late Cenozoic basalt in Taiwan and Penghu Islands, we found xenoliths originated from upper mantle and lower crust in over 30 different localities. These xenoliths can be divided into three categories: peridotite, pyroxenite and granulite. Generally speaking, the sizes of xenoliths found in different localities may vary. The bigger ones can be as large as 40cm and the smaller ones can be only a few millimeters in size. Despite the fact that the xenoliths have different shapes, they are mostly round and oval. This is because when xenoliths was taken out of the earth's surface by the magma, the surfaces of the xenoliths are often corroded by the magma as the two differs a lot in terms of their compositions and temperature.

When we studied basic granulite xenoliths found in the Penghu Islands, we can see that the xenoliths can be divided into two-pyroxene granulites, and garnet granulite with textures ranging from meta-igneous cumulates to metamorphic granular. Two-pyroxene granulites have mineral assemblages of orthopyroxenite, clinopyroxene and plagioclase with accessory alkali feldspar, olivine and Ti-Fe oxide minerals. They are basic but heterogeneous in bulk chemical compositions. Major- and trace elements and the Sr-Nd isotopic ratios of this group of granulite resemble those of late Cenozoic in Southeast China basalts and it is suggested that this group of granulite was formed by crystallization and metamorphism of the underplated basaltic melt. Garnet granulite xenoliths contain clinopyroxene, garnet, plagioclase, interstitial amphibole and/or green spinel. From chemical evidence, we suggested that this group of granulite may be formed by crystallization of tholeiitic picritic magma under high pressure. Sr-Nd isotopic differences between two-pyroxene- and garnet granulites indicate these two groups of granulites are not cogenetic. The equilibrium temperature of two-pyroxene granulites is 800 to 975°C and 1,000 to 1,180°C for garnet granulites. Judging from former studies of paleotemperature in the Penghu Islands, the former granulites may originate from lower crust and the latter may originate from upper mantle. Therefore, the two-pyroxene granulite xenolith from northern Penghu Islands can be used to constrain the nature and compositions of the lower crust beneath the continental margin of SE China. Furthermore, it is suggested that there is transition layer beneath the Mohorovicic discontinuity (Moho) of Penghu Islands. This transition layer consists mainly of garrnet granulite, pyroxenolite, spinel-lherzolite or harzburgite. (Ho, Kung-suan)

▲ 2-pyroxene granulite from Peiliao, Penghu Islands

2. The Origin of Diverse Columnar Joints in the Volcanic Necks on the Penghu Islands, Taiwan

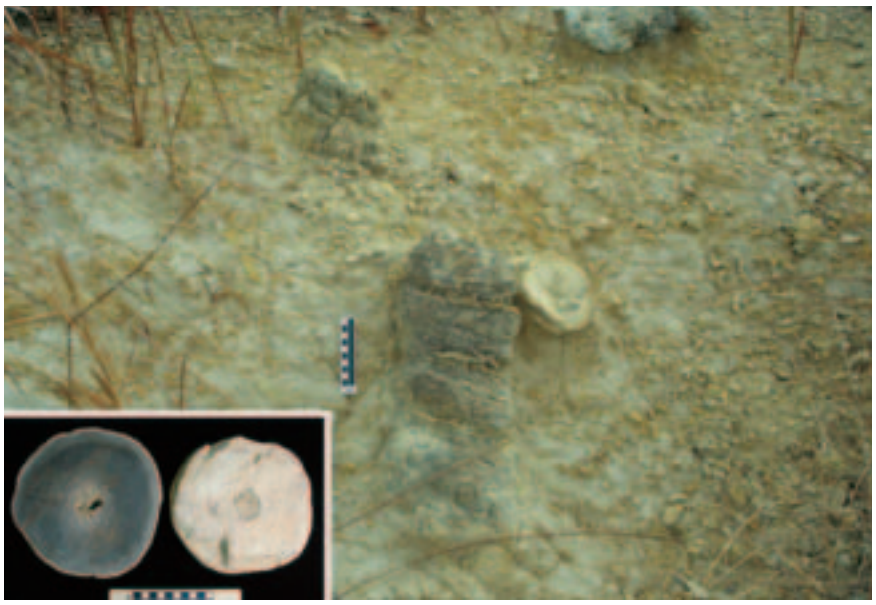
The diverse columnar joints in the volcanic necks and maar in Penghu Islands are well preserved that they are considered the best example among all volcanic areas in the world. It is thus important to protect these precious natural heritage and educate people about their significance.

According to the precedence of volcanic activities, plate tectonics and geographical region, Taiwan and its neighboring areas are divided into three volcanic areas: West, East and North. Back in the Miocene Epoch over 20 million years ago, South China Sea continued to expand and formed many half-graben faults along the continental margin. The heat and crack effect generated by the tectonic expansion of the South China Sea led to a series of volcanic activities in the Pescadores and Western Foothill of Taiwan Orogen. In Penghu, basalts can be found almost everywhere with an exception of Huayu. These basalts occupy large area and are well-preserved which make them the best representative of West volcanic area in Taiwan.

Columnar jointing is a special landscape of volcanic rock. When lava erupted from the earth surface or penetrated into strata, the temperature would drop, which caused lava to contract and form columnar jointing. During a volcanic eruption, lava would flow to the surface of the earth through the conduits. These conduits are usually formed by the solidified magma; hence, they are very strong and weatherproof and they can last for a long time. These typical columnar joints in volcanic neck can be found in Yuanbeiyu and other areas in Penghu. At the base of the volcanic neck is usually a round craterlet surrounded by radical columnar joints and whose shapes usually depend on the size of conduit, the thickness of lava flow, the composition of magma and the original terrain. Basaltic volcanic necks in Penghu have diverse shapes, making them great materials for local geo-science education. The volcanic necks are very important for geological study; hence, it is essential not to over exploit the area and protect the natural heritage.

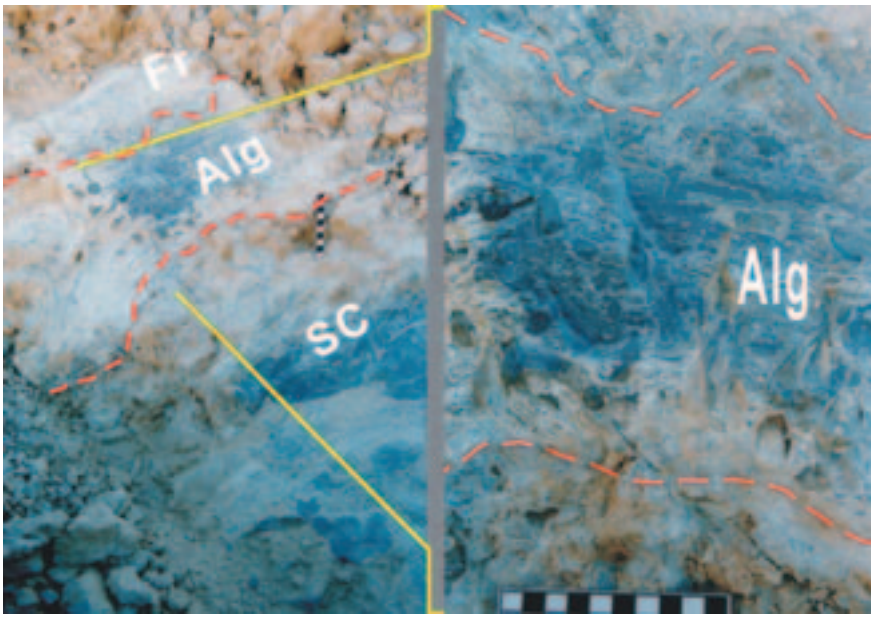
This study described eight (8) typical examples of volcanic conduits among the Penghu Islands. (1) Touchinyu: basaltic dike with horizontal to clino-columnar jointing in a tuffaceous agglomerate wall. (2) The Yuanpeiyu, Hsiyu-Taichi, Peichilongyu A-form cone shaped topographic feature with straight columnar jointing.(3) The Hutoushan and Fengkuei trapezoid tower landform also has straight columnar jointing. (4) The Niaoyu and Maoyu (Cat Isle) conduits denote the feather pinna type showing the remains of the upwelling lava flow. (5) The Yuanpeiyu conduit is a pleated-skirt configuration of columnar jointing. (6) The Chihsi-Hsiyu conduit exhibits a watermelon-peel shaped columnar jointing. (7) The Chinyu and Tungchiyuconduits present a Helianthus annuus configuration and (8) the Chimeiyu and Yuanpeiyu conduits display a radial fan shape columnar jointing basalt configuration. Even though there are only small columnar jointing in volcanic necks on Yuanbeiyu, Niaoyu, Maoyu and Siyuchihsi, the structure of the radial horizontal columnar jointing surrounding the cratelet on the erosion platform indicate that this volcanic neck has a complete structure with the body, the base and maar. This amazing work of nature can be compared with the Devil's Tower in Wyoming, USA. Hence, we suggest that the authorities should work to preserve this natural landscape and transform the spot into a tourist attraction free of human destruction. It could become a tourist landmark for Penghu basalt or a volcano geologic park. Or, it is also possible that this spot can be combined with Paleolithic factory of Austronesian culture in Chimei and application can be submitted to the United Nations Educational, Scientific and Cultural Organization for this area to be put in the list of the Protection of the World Cultural and Natural Heritage. (Juang, Wen-Shing)

3. The Initial Development of Coral Reefs in Siliciclastic Paleoenvironments, Southwestern Taiwan



▲ Dolomitic carbonate pipes observed at the Hsiaokangshan. The insert shows cross section of a carbonate pipe.

Pleistocene scleractinian reefs in southwestern Taiwan developed on several local structural highs that were closely associated with anticlines and thrust faults in a Plio-Pleistocene foreland basin. This study in 2005 and 2006 focused on the abrupt facies changes from the underlying terrigenous mudstone of the deep-water facies upward into the reefal limestones of coral reefs, including the Takangshan(TKS), Hsiaokangshan(HKS), Panpingshan(PPS), and Fengshan(FS). To reveal the initial mechanisms of reef development, the study examined the lithologies and vertical facies changes of 17 outcrops and 43 borehole cores from quarries of these reefal limestones and performed petrographic and isotopic studies. In addition, 3 outcrops in the Chiahsien area were involved into this study, which including Ssutehsiang, Paiyunhsiangku, and Niupu. Purposes of this fieldwork have two folds. One is to compare the specific occurrences of carbonate-cemented mudstones in TKS, HKS, PPS, FS, and those in the Chiahsien area. The other is to recheck Hayasaka's descriptions(1932) about the unique occurrences of fossil lucinids bivalves and fossiliferous marls of Chiahsien and the southeastern Shoushan. Various occurrences of dolomitic mudstone were observed from 10 outcrops and in 17 borehole cores, containing massive dolomitic mudstones, carbonate pipes, dolomitic cobbles, and dolomitic pebbles. The $\delta^{13}C$ values of 149 samples ranged from –53.7 ‰ to –10.9 ‰, indicating that the carbonate cements of these mudstones were all cold-seep carbonates in origin. Majorities of the cold-seep carbonates and funnel-shaped structure packed with dolomitic cobbles were precipitated and formed within the fine-grained siliciclastic mudstones. The wide



▲ Massive cold-seep (SC) was directly encrusted by scleractinian corals and coralline algal (Alg), then overlaid by bioclastic limestone (Fr). The encrustation of coral *Porites* is indicated by red dotted lines.

occurrences of seep carbonates in the study area suggesting the hydrocarbon seeping occurred extensively. The compactness and association of large lucinid bivalves in massive cold-seep carbonates further indicate pronounced, long-lasting seepage of methane occurred antecedently the development of Takangshan Reef. A schematic model was proposed to illustrate the occurrences of various lithologies and lithofacies associations. The erosional surfaces on siliciclastic mudstones, funnel-shaped structure, and the massive cold-seep carbonates might have been occurred concurrently during a tectonic unstable time in SW Taiwan. The deposition of fossiliferous mudstone interfingered with the conglomerate lithofacies, representing the rapid facies transition from siliciclastic (non-carbonate) into carbonate environment. The root of this rapid facies change was presumed to be tectonic movement, probably related to the westernward thrust migration in the Pleistocene foreland basin. The exposed massive cold-seep carbonates provided hardgrounds for the encrustations of corals as well as coralline algae and might have played a crucial role in the initial development of coral reefs in a non-carbonate paleoenvironment of active tectonic setting. With the result of this study as my doctoral dissertation, I received my doctoral degree at the Institute of Oceanography in National Taiwan University in July 2006. (Wang, Shih-Wei)

4. SHRIMP Study of Gneiss in Longshoushan Mt., Northwestern China

SHRIMP (Sensitive high Mass-resolution Ion Microprobe) was used to examine three genisses collected from Longshoushan Mt. to determine the age of Longshoushan Group. Comparison of the age histograms of the detrital zircons with the ages of the igneous rocks on the surrounding old massifs suggest that the detrital zircons were younger than 1724±19 Ma and the sediments of the Longshoushan Group were most likely derived from the Alaxa Block and Tarim Craton. This implies that the affinity between Alaxa Block and Tarim Craton was strong and that they might have been a unified craton during middle-early Proterozoic time. Moreover, five Precambrian basement rocks collected from Central-south Qilian block were examined and the determined age of the zircon indicated that these Precambrian basement rocks collected from Central-south Qilian block probably appeared in Proterozoic era. This was significantly different from North China block in mid- to late Proterozoic era when it was a stable platform. The age histogram of Qilan block was similar to that of Yangtze block. From evidence of Nd isotopic dating (TDM), lithostratigraphy and paleoecology, it is concluded that Central-south Qilian block did not rift from North China block and converge with the block later. Instead, it may have stronger affinity with Yangtze block and the two were components of Gondwanaland in Neoproterozoic. They probably rifted from Gondwanaland at the end of Sinian and became continental segments in Palaeo-Tethyan area. Then, they converged with Alaxa block to form North Qilian Fold Belt in early Palaeozoic era. Ancient Qilian Ocean was part of Paleo-Tethyan ocean and the ophiolite in north Qilian was affiliated to the ophiolite in Paleo-Tethyan. (Tung, Kuo-An)

II. Major Academic Exchanges

In the past 2 years, I conducted researches on the origin, development and evolution of Quaternary mammals in Taiwan. I also continued to excavate and collect fossils of Quaternary in Taiwan, including excavation of cetacean fossils in Szekou area of Hengchun, biostratigraphic investigations and fossil collection in Ts'ai-liao river in Tainan County as well as fossil identification and analysis in Ts'ai-liao Fossil Museum of Tainan County. In terms of international collaborative research, I cooperated with vertebrate paleontology department of Lake Biwa Museum for a comparative study of Quaternary mammals in Taiwan and Japan, exploring the influence of climate change and lower sea lever in the Ice Age on animal population structure and characteristic change. In 2006, a research team was formed with Japanese scholars to conduct a primary paleobiostratigraphic investigation and collect fossils in Hsin-Hua Hill. We plan for a long-term collaborative research in the future for systematic and serial investigation of the area. I also continued the research on Quaternary mammal fossils of Penghu Channel. Taxonomic characteristics of the fossils were discussed and the fossils were used to compare with fossils discovered in neighboring countries (such as China, Japan and Southeast Asia) for differences and evolution affinity. In 2006, I cooperated with vertebrate paleontology scholars of Natural History Museum of Los Angeles County to conduct a research on Carnivora

▲ **Molars of *Palaeoloxodon huaihoensis* from Penghu Channel, Late Pleistocene**

mammals in Penghu channel and explore their taxonomic characteristics. The fossils were used to compare with Carnivora fossils of China to trace their evolutionary origin and features. In the first year of the cooperation, the study on Quaternary *Crocuta crocuta ultima* in Taiwan was completed and the results were published in various seminars and international academic journals. (Chang, Chun-Hsiang)

▲ **Mammalian fossils exhibited in the museum**

III. Attending International Academic Conferences

In June 2005, I attended Romblon International Meeting. In November, Dr. Graciano P. Yumul, JR, undersecretary of Department of Science and Technolgy (DOST) of the Philippine, was invited to visit Taiwan and attended Geodynamics and Environment in East Asia International Conference and 5th Taiwan-France Earth Science Symposium. In July 2006, for Taiwan and the Philippines to collaborate on geosciences, several scholars and I went to the Philippines to visit DOST and University of Philippine to discuss possibilities of cooperative research. In August and September 2006, I attended International Sedimentological Congress held in Fukouka, Japan to exchange ideas with geoscientists around the world. (Gong, Shou-yeh)

IV. Overseas Business Trips

In January 2006, our staff went to Tucson Mineral and Fossil show in the U.S. to collect specimens. They also paid a visit to Natural History Museum of Los Angeles County and Page Museum-La Brea Tar Pits to see the collections and exhibitions. In this trip, they obtained many information relating to our business and those would be helpful to our future development.

▲ International cooperative research on fossils in the museum

V. Implementation of Digital Archives

Over the past 20 years, the Department continued to expand its collection of specimens. At present, we have accumulated more than 40,000 geological specimens. Bearing the categories and characteristics of these specimens in mind, the Department gradually implemented the Digital Archives Project of Geology in phases. This project aimed to expand, update and correct the original collection system of geological specimens. At the same time, representative collections were selected with digitalized description and images for each subproject. Upon completion of the digital database, multimedia technology was used to integrate, manage and maintain the database which is accessible through the Internet for everyone to browse through the information, make inquiries or look for reference. It is expected that the database would be helpful for teaching, research and education of geology.

By the end of 2005, Digital Archive Project of Geology has completed various sub-projects, including Mineral, Vertebrate Fossil, Invertebrate Fossil, Igneous Rock, Metamorphic Rock and Cored Obtained from Geological Drilling. A total of 677 units, 3,070 digital specimens and 7,278 digital images have been completed. In 2006, the Department continued to implement two sub-projects, i.e. Sedimentary Rock and Plant Fossil. By the end of the year, the first stage of the five-year Digital Archive Project was completed. A link to the result of the Digital Archive Project is available on the website of our Digital Museum.

Anthropology Department



▲ Salvaging excavation of No. 144 City Government difei land area

The Anthropology Department is divided into three divisions: Ethnology, Archaeology, and Physical Anthropology. Based on our shared basic concept and methodology of culture, the three fields together comprise museum anthropology by integrating the essential natures of the humanities, biology and social sciences.

The most important tasks of museum anthropology are: to collect and engage in systematic research in terms of the regional integrity; stay in synchronous with the trends and effects of the contemporary cultural studies; display the diversity of cultures and interactions among them; introduce the unique adaptive patterns of different ecological environments; protect the cultural heritage that has been endangered, and promote and develop a better place for cultural preservation and evolution. Museum anthropology in Taiwan must possess the ability to "bring the far-reaching world culture back to life for Taiwan's aborigines whose past has long been forgotten."

A museum is a symbol of society. It reflects subtle socio-cultural phenomena. Each part of a museum is closely inter-related. In addition to collection and research, the scope of studying museum anthropology covers the communication fields of exhibition and education. In fact, the themes for the permanent exhibitions at both the Life Science Hall and the Human Cultures Hall (Austronesians, Chinese spiritual life and Oceania) determine the Anthropology Department's personnel recruitment and collection policies.

At present, the collection put together by the Anthropology Department includes three categories: (1) ethnographic specimens of Austronesians (Taiwan and New Guinea) and the ethnic minorities in southwest China; (2) house and temple construction elements, religious artifacts, scripts, pictures, tapes, and videotapes of religious rituals of the Chinese living in Taiwan, Fujian and Guangdong Provinces; (3) archaeological specimens found in mainland China, Southeast Asia and Taiwan.

Based on the above-mentioned efforts, the recent research projects that center on Southeast Asia, Mainland China and insular Southeast Asia include the following themes:

1. Salvaging studies on archaeology, ethno-archaeology and archaeology of abandoned aboriginal sites;
2. Studies of paleoanthropology in China;
3. Central Taiwan's archaeological studies on topics including regional ethnography of aborigines and interdisciplinary integration;
4. Collection and research of the artifacts of the Han Chinese in Taiwan;
5. Collection of ethnographic specimens of the ethnic minority groups in southwestern China;
6. Establishment of ethnographic database regarding Austronesian peoples in Taiwan and ethnic groups in South-east Asia;
7. Studies on museum anthropology.

The key mission of museum anthropology is to properly manage and utilize natural and artificial objects, and even more important, provide the ability to introspect. Based on ecological, social and human ethics, museums attempt to explore the general principles of "how" they exist and operate. They also need to think about the reason of"why"they exist. Pragmatism

in anthropology enables the professionals of anthropology to serve in museums and bear in mind the political practice of knowledge.

At present, the Anthropology Department of NMNS focuses on collection and research of indigenous specimens in Taiwan. Even though the Department already has a conceptual plan to construct comprehensive museum anthropology (for instance, establishing divisions by world geographic and cultural areas and setting up a laboratory for material culture studies), the plan itself has been limited by the Museum's existing organization and budget. Therefore, the Department has to seek support and resources from both public and private sectors in every possible way; as well as continuously proceed with exchanges and collaboration efforts with domestic and international universities, art colleges, museums and other research institutions.

In addition to their dedication to the digital archives program and research, the two divisions of the Anthropology Department are actively involved in tour guide training programs before the launch of special exhibitions hosted by the Science Education Department, on-site demonstrations for the Naturalist Center, submitting essays for MNMS Newsletter publications, and speeches for tour exhibitions. The researchers of the Department dedicate themselves not only to providing precious specimens for exhibits and their background information for the permanent exhibitions, but also to participating in renewed projects and the composition of introductory statements. In recent years, the research teams have actively devoted extreme efforts in exhibition planning, specimen collecting and exhibiting digital value-added animation for annually large and small special exhibitions.

▲ An unfinished and a finished Yami canoe house

Important Events

1. Restoration of Hsiao Lai's face unearthed from Hui Lai Archaeological Site and the face of Egyptian mummy.
2. Division Staff assisted in the maintenance and rotation of specimens in exhibit entitled "The Lost Prehistoric Hui-Lai Man."
3. The Department implemented the 2005/2006 Digital Archives Program tasks for the digital subproject of archaeological studies in Central Taiwan.
4. An emergency excavation was performed in Nan-Shih-Keng archaeological site of Salu Township, Taichung County.
5. A test excavation of Guogou and Bengkan archaeological sites near the Hanbao-Caotun Route of the East-West Expressway was completed.
6. A project entitled "The Prehistory and Ethnology of the Northwest Area of Yushan National Park" implemented.
7. Department Staff assisted in the preparation of a special exhibition entitled "The Journey of Human Life."
8. An archeological excavation of Jhongjhou Archaeological Site was completed.
9. The "Project for Singang Outdoor Museum" was carried out.
10. The Council for Cultural Affairs of the Executive Yuan was assisted in guiding senior high school students to learn more about archaeological sites in Taichung.
11. The Department assisted in the preparation of several special exhibitions including "Facing Difference—A Special Exhibition on Human Face," "Oceania," and "Under the Stars—A Special Exhibition of Bats."
12. Also assisted was The Sanyi Wood Sculpture Museum with the preparation of an exhibition entitled: "Past and Present."
13. The Department assisted the Li Mei-shu Memorial Gallery with the freeze-technique processing of their specimens for the purpose of pest eradication.
14. It also assisted Wangjia aborigines in Beitou to clean and collect specimens.
15. Department Staff restored a jade burial suit with bronze thread for "The Journey of Human Life."
16. They also demonstrated the repair process of the jade burial suit in front of an audience.
17. The Department assisted the Naturalist Center to arrange archaeological specimens for display.

Milestones (2005-2006)

2005

- The Department made preparations for a new warehouse to accommodate textiles and other specimens and housed a temporary exhibition of the Miao people at that location.
- The Nan-shih-keng archaeological site in Salu Township Taichung County was excavated as well as the Guogou archaeological site near Caotun Township in Nantou County.
- Additionally, the Department excavated the Bengkan archaeological site near Nantou City of Nantou County.
- The Department prepared an Exhibition of Musical Instruments from the National Palace Museum and the Chimei Museum.

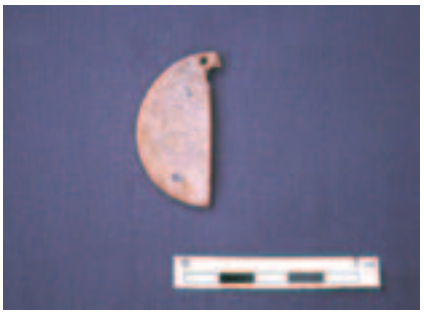
2006

- The Department carried out an environmental assessment plan for the new City Government building in the Phase 7 Land Readjustment Area in Taichung.
- Commissioned by the National Science Council, the Department implemented several archaeological subprojects in Central Taiwan to digitalize specimens of Fan Zih Yuan Culture, Taichung Park and Niu Ma Tou Culture near Henan Road.
- A digital value-added project for the National Science Council was completed.
- Renovations for the Chinese Agriculture Hall were planned.
- The Department continued to conduct the archaeological excavation of No. 144 in the City Government difei land area.
- Archaeological excavations were continued at the Jhongjhou archaeological site in Tainan County.
- The Department prepared the "Terracotta Army of the First Emperor of China II."

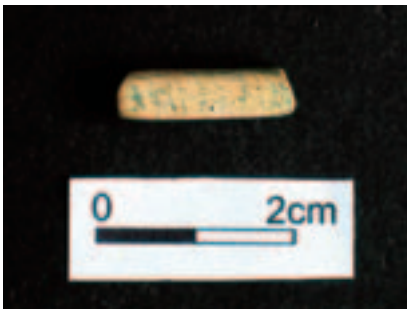
Collection and Research Results

1. Excavated archaeological specimens from the Hui-Lai Site were collected, registered and duplicated.
2. The Department prepared both midterm and final reports of the test excavations taking place on the land designated for the new buildings of the Taichung City Government.
3. In 2005, a total of 8,279 archaeological specimens were registered.
4. In 2006, a total of 5,628 archaeological specimens were registered.
5. Specimens for "Oceania" were prepared.
6. The Museum received donations from Mr. Nelson Ning-sheng Liu that included including specimens collected in New Guinea and photos taken by Max Chi-wei Liu.
7. The Department obtained a batch of Yami pottery pots, a series of African artifacts, and a number of artifacts originating from the Miao people.
8. The Museum received a donation of religious artifacts from Donglong Temple.
9. Mr. Shih, Shih-yuan donated a batch of religious artifacts to the Museum.
10. The Museum obtained sets of bracket from the Wunde Temple in Lugang.

▲ Niahosa Site in Alishan



▲ A broken jade ornament unearthed from Yingiana Site



▲ A broken jade bracelet unearthed from Yingiana Site

A New Archaeological Discovery in Alishan

During the Japanese colonial period, Mr. Mori Ushinosuke discovered chipped grounding stone implements and ceramics in six localities upstream of Zenwun Stream. The Tsou people once inhabited five of these localities. In the 1930s, the Folk Customs and Ethnology Classroom of Imperial University, Taipei (the predecessor of the Department and the Graduate Institute of Anthropology, National Taiwan University) conducted a large-scale research project focused on Taiwan's mountain aborigines. Numerous stone axes and hoes were discovered, nine of which were found in the archaeological sites of Alishan Village.

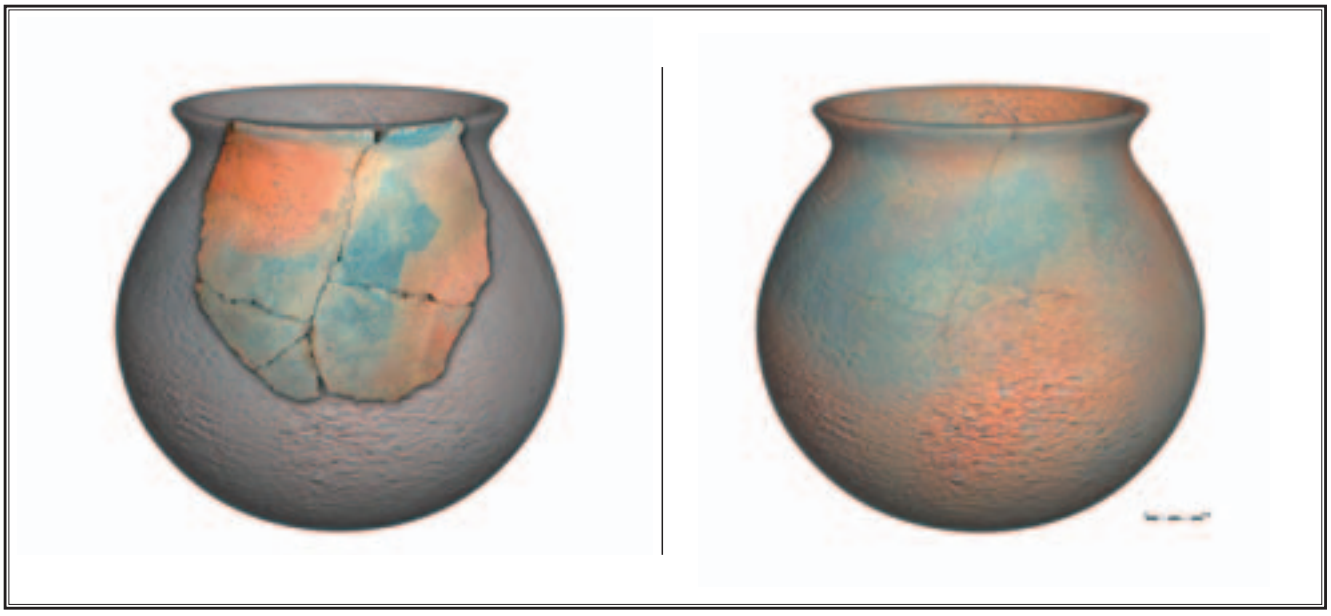
In 1941, excavating at Vuyio, an archaeological site of the Tsou people, Mr. Kano Tadao discovered several slate coffins. At both Vuyio and Yingiana sites, red and black ceramic sherds with cord-marked patterns and thick, plain, quartz-grained ceramic sherds were discovered. There were also stone implements that included thin-chipped stone axes, flat grounding adzes, narrow adzes and grounding arrowheads. Kano Tadao believed that ancestors of the Tsou people once used these artifacts.

Archaeological efforts in Alishan area slowed in the aftermath of Taiwan's Retrocession but resumed in 1993. Researchers from the Institute of History and Philosophy of Academic Sinica performed a systematic archaeological exploration along the upper Zenwun River discovering another 15 sites. They also re-excavated the Yingiana site. Since 1997, researchers at the Department have routinely conducted investigations and test excavations in this mountain area. To date, more than 40 sites have been recovered. A test excavation took place in an area bordering of the Vuyio site (originally discovered by Kano Tadao in 1941) called Daimaeyayan (spelled as Tamayayana in the Tsou language). To

ensure the chronological sequence of the prehistoric cultures of Mount Ali, archaeologists conducted a series of large-scale excavations at the Taptuana3 and Niahosa sites between 2002 and 2003. For the first time, these efforts confirmed the existence of prehistoric cultures in this mountainous region These cultures can be classified into two layers: The Yingiana Phase I, or early cultural layer, is characterized by red cord-marked wares (about 3,800 years B. P.) while the Yingiana Phase II, also called the later cultural layer, features plain red and brown wares (900 B. P. to 200 B. P.).

The red cord-marked pottery from the mid-Neolithic Age, Phase I (the second cultural layer) represents the earliest human culture in Alishan. According to carbon-14 dating, the Yingiana Phase I is approximately 3,800 years old meaning that the aborigines who owned the red cord-marked pottery moved inland from the coastal terraces approximately 4,000 years ago. They were everywhere, expanding from hills, mountains, and even river terraces. These findings have contributed greatly to the body of research documenting prehistoric peoples' upland expansion on the island.

Plain red and brown sand wares belonged to a cultural group that closely interacted with its neighbors. In addition to remains similar to those unearthed in Yingiana Phase II, jade ornaments and bracelets, originating exclusively from the Peinan Culture, were discovered at the Veiyo site in the late Neolithic Age. At Niahosa site, researchers uncovered serpentine arrowheads, an uncommon find west of Taiwan's Central Range. As this evidence indicates, those who created the plain red and brown wares around Mount Ali in the late Neolithic Age had had frequent interaction with the people of the east coast.



▲ A computer reconstructed 3-D images of plain red and brown sandy pot

New Prehistoric Discovery in Taichung City: Hui-Lai Archaeological Site

In terms of administration, Hui-Lai Archaeological Site is located in the Situn District of Taichung City. Geographically speaking, it is situated on the west side of the Taichung basin at an elevation of 70 meters looking west over the Dadu basin and Nantun District. Since 2002, the Archaeology Division of Anthropology Department has been excavating and investigating archaeological sites at the intersection of Shihjheng Road and Huilai Road and the No. 144 City Government difei land area at the intersection of Shihjheng and Henan Roads. The finds include artifacts from the Niu Ma Tou and Fan Zih Yuan cultures. Hui-Lai Site includes properties on which is presently located the Shin Kong Mitsukoshi Department Store, Tiger City shopping mall in addition to the land designated for the City Government's new buildings. The remaining unearthed area covers at least 150,000 m^2.

The artifacts of Hui-Lai Site were discovered near the Fazih River. The random excavation in the vicinity of Huilaicuo Section along Henan Road indicates that the Hui-Lai archaeological site was once a village of dwelling for a huge local population of Niu Ma Tou. In 2004, the jade rings and ceramic shards representing the Ying Pu Culture were discovered in land designated for new City Government buildings. The jade rings had been made from materials available in Hualien. At the No. 144 City Government difei land area, a large quantity of raw stone materials and stone tools such as hammers and knives were discovered, indicating that ironwares were not common, regardless that it was the age of metal. Those who lived in the village 1,000 years ago were primarily agriculturalists that fished, hunted, and gathered to supplement their food supply. Ash pits, animal bones, carbonated unpolished rice, and 23 unearthed prone human burials reveal this fact. The discoveries serve as first-hand evidence for scientists probing into the lifestyles of villagers in the Taichung basin, particularly in the Fazih River vicinity.

Animal specimens excavated in Hui-Lai Site have been identified as birds, rabbits, deer, Formosan Reeve muntjacs, European badger and mongoose urva. The European badger are members of the Mustelidae family, long extinct in Taiwan.

Was the ancient Taichung basin, lake or wetland? Further, in-depth investigation is required to answer this question. Information related to paleoecological settings should be collected to understand both the cultural and environmental contexts of the Hui-Lai archaeological site. The relationship between the Niu Ma Tou culture and the red cord-marked pottery culture in the northern and southern areas must be explored, as well. Further, the relationships between the Ying Pu and Fan Zih Yuan cultures, and the Iron Age should be examined in detail.

From the outset, the excavation of the Hui-Lai archaeological site has involved a large number of individuals including the general public, central and local educational authorities, the Mayor and mayoral candidates, archaeologists from other institutions, borough wardens, students ranging from primary through to the university level, local cultural heritage workers, news and magazine publishers, mass communication professionals as well as members of the archaeological team. The whole event has truly been a magnificent illustration of "archaeological efforts in the metropolis."

While the excavation was still underway, the Museum launched two exhibitions entitled "The Lost Prehistoric Hui-Lai Man" and "The Story of Ancient People in Taichung." Activities such as "A Root-Seeking Trip in Taichung" and "Life-long Learning: A Journey to the Past—Archaeological Class" were presented in a bid to boost the public's appreciation and pride

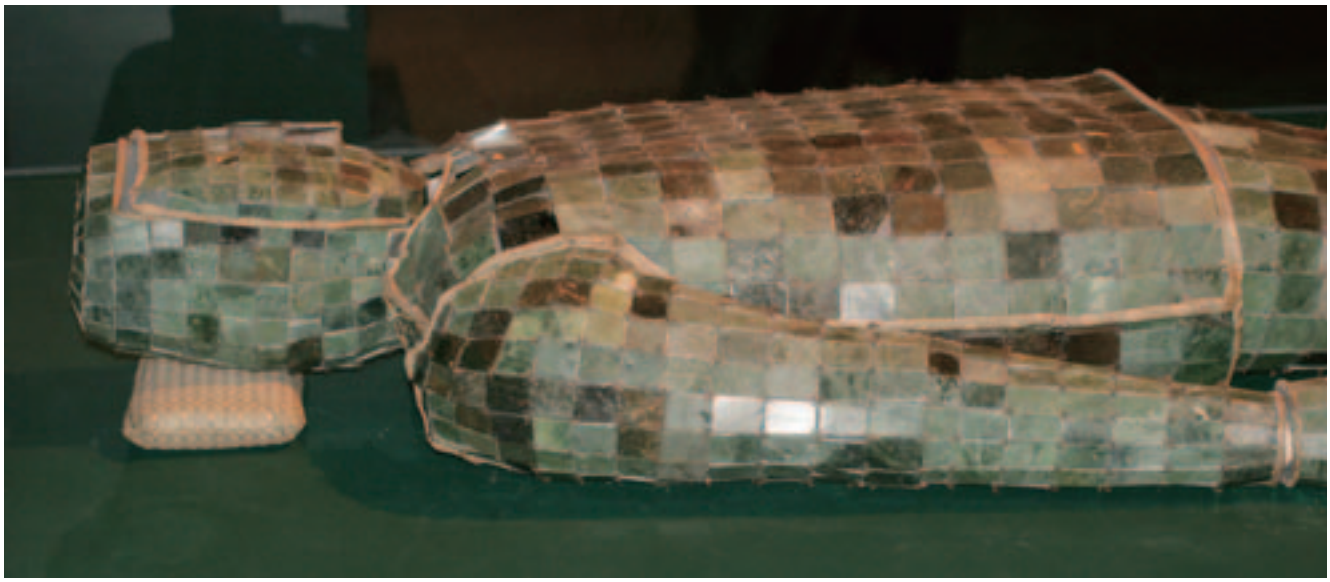
for Taiwanese cultural heritage. Through these carefully planned classes, the general public gained insight into the natural science of archaeology and the study of prehistoric cultures in Taiwan. Touring the archaeological site, allowed visitors to visualize the knowledge they had otherwise accessed only in books. The Department hopes to instill respect for cultural heritage in the younger generations so that people understand the importance of preserving these archaeological sites.

The Face of Hsiao Lai

On September 30th, 2003, Hsiao Lai became the first boy excavated by the Museum in Hui Lai Site. Through radiocarbon dating method, it was determined that age of the boy is 1,250 ±40 BP. The central Taiwanese public, voting during a special exhibition entitled: "The Lost Prehistoric Hui-Lai Man," chose the name "Hsiao Lai."

For the first time, Mr. Lin Jian-cheng, a well-known creative artist and wax sculptor, attemped to restore human skulls excavated from the archaeological site. These included the skull of six-year-old Hsiao Lai. Based on the boy's skull measurements, Mr. Lin first drew a picture confirming the boy's bone structure. Then he added muscle, cartilage, gland and fatty tissue. He adjusted the detailed features, formulated skin texture and cast the face. Next, he added hair, eyes, eyelashes and skin to the cast and Hsiao Lai's face was complete. Once released to the media, the face of Hsiao Lai was to become well known in Taiwan.

Restoration of a Jade Burial Suit with Bronze Thread



Near the end of 2005, the Museum obtained a collection of scattered jade pieces from a jade burial suit originating from the Han Dynasty. Lab examinations revealed that the jade was Serpentine, once known as Hsiuyen jade in ancient China. There are four varieties of jade burial suit that vary according to the thread used in their creation. These included gold, silver, bronze and silk thread burial suits. From the remaining thread in the holes, the Museum confirmed that the jade burial suite was of the bronze variety. The Museum spent three months repairing the suit in front of a captive audience.

A jade burial suit is a ceremonial costume in which emperors and some nobles in China's Han Dynasty were interred. According to information listed in the "Etiquette Record of the Book of Later Han," emperors would be buried in suits of gold thread, princes, princesses, dukes and marquises in suits of silver thread, while the suits of sons and daughters of princes and princesses were made of copper thread. However, archaeological evidence reveals that this system was not established until the East Han Dynasty. For instance, King Liu Sheng and Dou Wan of the West Han Dynasty were buried in jade burial suits fashioned with gold thread while the suit of King Nanyue used silver thread. This information contradicted facts stated in the Book of Later Han.

It is possible that the custom of employing jade in the making of burial suits began in the Warring States Period. Excavation of burial sites from the period revealed descendants wearing masks and clothes decorated with jade. This may be the so-called "Han Jhu Lin Shih"(put jade in your mouth and cover yourself with scale-shaped jade pieces) mentioned in the book "Master Lu's Spring and Autumn Annals" and quite likely the predecessor of the jade burial suit of the Han Dynasty. In all probability, Han Dynasty aristocrats used jade in their burial suits because they believed it would help keep the body in a good state for the pursuit of eternal life. Unfortunately, archaeological evidence shows that this goal was not accomplished. Despite the suits the bodies of the aristocracy decayed as any other. The custom of using jade was popular during both Han Dynasties but terminated when Cao Pi, Emperor Wen of Wei, prohibited the custom. No jade burial suits have been discovered from after the Han Dynasty.

The construction of a jade burial suit requires one to carve and polish the jade into small pieces of varying shapes. Then holes must be drilled at the four corners of each rectangular, square, trapezoidal, triangular or polygonal jade piece. The pieces are then woven together with gold, silver, copper or silver thread. Most jade burial suits were custom-made when the wearer was still alive. A finished suit consisted of 12 components including the front and back sections of the vest, a mask, a hat, two sleeves, two gloves, trousers and shoes. A simpler jade burial suit might comprise only the mask, gloves and shoes. Each component could be placed on a body separately making it easy both to wear and to remove.

Judging from the quality, color, craftsmanship and preservation of the jade pieces, the Museum is certain they once belonged to the same Han Dynasty burial suit and are not random jade pieces. However, as the Museum did not discover the jade pieces in its own excavation, it is not possible to know the exact position of each piece. Furthermore, the jade pieces were fragmented and not well preserved making the restoration process difficult and complicated. In addition to collecting relevant literature, staff of the Department also visited the National Museum of History, the Kung Long Mineral Museum and the Chimei Museum to inspect the jade burial suits of these institutions. Ultimately, the restoration process included the following steps:

1. Adhere and fix fragmented pieces

Many of the jade pieces were broken and fragmented making it necessary to glue together some of the pieces. As a result of the epoxy resin used to repair cracks in the jade, some sections appear to be white.

2. Number, measurement and registration

Each jade piece was given a number and measured for length, width, thickness and weight. These figures were compiled on a sheet with property information and entered into the collection system. Of the 1,434 documented jade pieces, 1,086 were complete, 55 were complete after repair, 165 were repaired, 41 repaired with glue and 87 were fragmented and irreparable. Despite similarities, each jade piece was different in shape and size.

3. The making of a foam board model

Foam boards were cut to construct models matching each jade piece and each model was allocated the same number as the authentic jade piece.

4. The making of a human body model

Styrofoam was used to construct a human body model in which the head, body, arms, hands, legs and feet could be repositioned at any time. Then, the model was covered with gauze. As it was difficult to use Styrofoam to make fist-shaped hands, the Department chose to use a plaster cast of real hands.

5. Putting the foam board models together

Using archaeological information as their basis, staff of the Department attempted to find the most suitable location on the human body model for each numbered foam board model. Following that, the board models were cut to complement the jade pieces that were missing. Each foam board model was also given a number. After several adjustments, a burial suit of the foam board models was completed.

6. Putting the jade pieces together

The jade pieces were arranged according to the matching numbers of the foam board models and placed on the most suitable location according to the shapes, sizes and positions of the holes. It was similar to assembling a puzzle but much more difficult. Many adjustments were necessary before the final positions were decided upon. Even so, the feeling remains that some jade pieces were not placed accurately, particularly on the mask, gloves and shoes.

7. Production of missing pieces

Colored resin mixed with plaster was used to make a large piece of imitation jade, which was cut into small pieces. The sizes and shapes of these small pieces were similar to the missing foam board models. After grinding, drilling and sand blasting, over 900 imitated jade pieces were completed. They were similar to jade in appearance but more transparent so by looking closely, one should be able to tell the difference.

8. Connecting the jade pieces

Once the positions for each jade piece and imitation jade piece were confirmed, copper thread was used to weave together the pieces through the small holes at the four corners and to sew them on the background gauze. Most imitation pieces were placed in corners or to the rear for aesthetic purposes. It required two months to connect all the jade pieces with copper thread and tie thousands of knots with the copper thread.

9. Silk border strip and liner

After each component was connected, it was necessary to use silk as a border strip. To wrap the edges of the jade burial suit, silk like that used to make a silk box was employed. Also, to prevent the suit from subsiding, resin was used in the liner to duplicate the Styrofoam human body model.

After restoration, the jade burial suit was placed in the exhibition hall of "The Journey of Human Life." It might be compared with the neighboring mummy from Egypt as both Ancient Egyptians and Han Dynasty Chinese sought immortality. What were their similarities and differences in terms of how to reach their goals? Also, from the quality of the suit and the complicated process required for its construction, one can visualize both the luxurious life of the aristocrats and the strict etiquette system they adhered to.

Miao's Dangling Leg Houses

Dangling Leg Houses, the traditional architecture of Miao dwellings, hold unique characteristics. Dangling Leg Houses use wood selected from local areas and take up only small areas of land. They are spacious, beautiful, cool in the summer and warm in the winter. They are popular among the Miao mountainous communities in Guizhou, Hunan and East Sichuan.

The Dangling Leg House displayed by the Museum comes from Jhanghua Village, Pinglyue Town, in Jinping Prefecture, Guizhou Province, close to the Cingjian River. In the restive mountain style with a holding wooden frame, the house is over ten years old. With a floor space area of 85 ping (280 m^2), it encompasses three stories. The ground floor is used to raise livestock such as cattle, swine and chickens as well as storage space for compost and firewood. The second floor is used as living quarters, and contains three halls. In the middle is the main hall, where ancestor-worship ceremonies, meals and the receiving of visitors take place. The two side halls are divided into bedrooms, guest rooms, a heating room, and storage rooms according to need. The top floor is the attic where clothes are hung to dry and grain is stored. There is much furniture inside the house, including baskets, a wooden bed, a wooden cabinet, a bamboo basket and a square, threshing bucket.

The house was originally built on a slope. Before construction begins, a two-story platform is built, and the stairs made from solid pebbles to ensure strong resistance and protection. The house is then built atop the solid two-story platform, approximately 100 m^2. Looking from the side, the outermost post hangs from the top floor and seems to be suspended in midair without reaching the bottom floor. This creates the "dangling leg" effect from which the houses get their name.

The roof is constructed of China fir and used to prevent the outer wall from deterioration caused by heat and rain. The dangling legs are decorated with carved golden paws for aesthetic effect. The cozy patio in front of the main hall is furnished with a long leaning bench, known as a "beauty bench." This is the favorite place of the Miao people, where they rest, appreciate the scenery, and welcome their friends.

New Collection of the Miao People

In order to strengthen the folk collection of minority groups in Southeast China, in 2004, the Ethnology Division of the Anthropology Department purchased more than 1,000 pieces of a Miao collection that included embroidery, clothing and one Dangling Leg House. The Miao collection came from Hunan, Guangsi, Guizhou, Yunnan, Sichuan, Hainan and other provinces, but the richest collection drew from southeastern Guizhou, where the majority of Miao people reside. Southeast Guizhou located east of Yunguei Terrain is the diving line for the Yangtze River and Jhujiang River. The water area is simply divided into the Cingshuei River system in the north and Duliou River system in the south. The Anthropology Department's early collection comes primarily from the Cingshuei River Area and includes more than 400 pieces, mostly from areas in Shihbing, Taijiang, Danjhai and Leishan. In particular, the Museum possesses a rich collection of embroidered pieces from the Shihdong area. The recent 2004 additions not only increases the number of clothing and embroidered products from the Duliou River System but also enriches the Museum's clothing collection from areas in South Guizhou, northwest Guizhou, northeast Guizhou, Yunnan, and the like.

The most recently collected Miao clothing was categorized with the 1985 ethnological cultural system dividing the Miao clothing into more than 80 styles each with one or two specimens per style. The styles were titled according to the names of their administrative villages and townships. This categorization method is based on the Miao language. Separate groups of the Miao people are distinguished by the distinct colors used in the women's clothing. Nevertheless, the issues addressing the relevance of different groups as well as the definition and formation of styles remain unsolved. Compared with the earlier collection of 400 Miao specimens, categorized according to their villages, the new method of categorization eliminated complexity. Nonetheless, the future requires more detailed information a better understanding.

The Dangling Leg House stored by the Ethnology Division is the first and only of its kind in Taiwan held by a museum collection of the Miao. The Museum was able to purchase the House as the village where it resided was forced to move due to the construction of a water dam.

The Museum's rich collection of embroidery, utensils, clothing and the Dangling Leg House indicates that the Department is determined to conduct cross-cultural research. The material culture of the Miao people embodies significant elements of their traditional and modern life styles. In addition, the underlying symbolic system reiterates the thinking patterns and cultural logic of the Miao people. The beautiful and rich cultural resource properties are not only works of art but also provide a record of the Miao people's migration history.

Collection Management Department

The Era of Joyful Harvest

For a museum, what matters is not the architecture, but its collection. This is what we have emphasized in the past. Without the collection and knowledge, the museum does not exist. Hence, collection and research constitute the essential core of a museum and the rapid expansion of collection somehow reflects this meaning.

The National Museum of Natural Science had routinely added approximately 30,000 to 40,000 specimens to its collection every year but the yearly increase has risen to over 60,000 pieces these years. In 2005, we had collected 113,116 specimens only then 67,628 specimens were added to our collection in 2006. Consequently, by the end of 2006, the Museum had collected 832,277 specimens. The growth is close to double the average number over the years. In particular, the insect specimens donated by Professor Sato, which was registered as the collection in 2006, showed the scale and integrity of insect specimens in the Museum. Overall, it was an era of joyful harvest for the Museum.

The significant increase in our collection was the efforts made by all staff of the collection and research departments. To achieve this outcome, the Museum followed a specific processing strategy. The Collection Management Department(hereafter as CMD) is in charge of the coordinated meeting in which all five departments determine the collection goal for the year. Based on different characteristics, functions, and responsibilities, each department then decides the number of specimens to be registered. The registered amount monthly provided by CMD is issued as a reference for each division. Then, the progress would be reviewed at the quarterly coordinated meeting. Generally speaking, the Museum was able to achieve the goal because nobody was afraid to challenge themselves and everyone worked to improve both their spontaneity and coordination.

▲ The 2005 International Workshop on Integrated Biodiversity and Natural Specimens Database was held in the Museum

Important Events

I. Upgrade of the Collection Management System

▲ Visitors can get closer with the collections from "Behind the Scene Exhibition"

As the collection of the Museum continued to grow over the years and the Museum had more opportunities for interchange, the workload of the CMD also increased. To enhance collection management, it was necessary to reinforce the digitalized collection management system. Consequently, the Museum started a project to upgrade it in August 2005. We have improved on-line registration as well as access control for the operational flow. To make the system more user-friendly, various intelligent operation interfaces are offered. We have also strengthened the system security and added more functions, such as "automatic response for unreturned specimens", "renewal for borrowed specimens", "inventory", various search, and statistical functions. A web search function was also added to the system for staff catching the updated information for all collections. The Museum started to use the upgraded system at the end of 2006.

II. 2005 International Workshop on Integrated Biodiversity and Natural Specimens Databases & Forum of Species 2000 Asia–Oceania

Museums in the West have started a new trend in collection management known as a "visible collection", which means, specimens collected by the museums are presented to the audience in a suitable and friendly way. The National Museum of Natural Science also allocated a place along the pathway of our exhibition galleries as a "behind the scenes exhibition". Visitors can now see how researchers work with specimens in the room and also talk to researchers. Moreover, in the past few years, important and representative collections have established digital archives in order that the general public may look for information. This is a way for the Museum to actively present its collection.

To share this development with more people and to encourage people involved in the value-added industry, the "2005 International Workshop on Integrated Biodiversity & Natural Specimens Database & Forum of Species 2000 Asia-Oceania" was held in the Museum. At the conference, domestic and international researchers developing digital archives of natural science shared their experiences and works with all the participants.

Some organizations in Taiwan have accumulated lots of information for digital contents. These databases are considered to create value-added products for sharing the knowledge. In the future, these databases can be offered to the general public or to information industry enabling them to design materials and game software. At present, the Museum has accumulated over 820,000 specimens and our digital archives, which are divided into thirteen divisions, are accessible by the general public.

The establishment of digital archives means that specimens should be becoming cultural properties instead of keeping in the ivory tower. To share this concept with others, the director of CMD also presented a paper at the conference emphasizing the mission and the importance of a knowledge-sharing society.

III. Installation of Temperature and Relative Humidity Dataloggers in Collection Storages

Instant monitor and display of temperature and humidity dataloggers were installed in 18 collection storages in the Museum. Once any temperature or humidity in storage is extraordinary, a warning will be sent for the staff to take action. Thus collection would not be damaged due to abnormal temperature or humidity. The changes of temperature and humidity in the storages can be monitored through the Internet and the system offers a variety of functions, such as "records of measurement", "inquiry" and "print report" for the staff to track the information and analyze the data in the future.

▲ The director of CMD introduced the presenter at the conference

IV. Seminar on Museum Collection Policy and Its Modernity

▲ The handbook of Seminar on Museum Collection Policy and Its Modernity

What do we mean by collection policy for a museum? How does a museum formulate its collection policy? Will the collection policy remain the same? What are the goals and values behind the collection policy? The collection policy of the National Museum of Natural Science covers a wide range of aspects but the definition and function of a "collection policy" have not yet aroused any discussion in the academic community. As we review our collection policy, is there any possibility to guide us to collect specimens in a prioritized goal? How can we coordinate this new policy and our existing collection policy?

When the National Palace Museum established its southern branch, its collection extended from the Greater China area to Asia. Consequently, the original collection policy for the NPM to represent Chinese culture was not suitable for the southern branch and it was necessary to adjust its collection policy. Established in the Japanese colonial period, the National Taiwan Museum made efforts to improve its management. Nowadays the NTM has made a new definition to its collection policy, which is helpful for both the present and future development. The National Museum of Prehistory fought hard to retrieve artifacts of Peinan and it also seemed that its policy responded to the social expectation. Those information that we can take as reference yet also leave something for everyone to think about.

"The Seminar on Museum Collection Policy and Its Modernity" held in December 2006 to explore the role and influence of a collection policy in the development process of a museum. We also observed how museums in Taiwan changed or adjusted their goals as they expanded, increased collection or worked in different circumstances. The drafting of a collection policy, the actual implementation of a collection policy, and a collection strategy that suits the features of a modern museum and the changes of social movement were also being discussed in the seminar.

V. Participation in Special Exhibitions

The Department is responsible for the following tasks in accordance with the needs of various special exhibitions: planning the transportation route for loan exhibition, providing information of exhibition environment and artifact conservation for curator(s), coordinating and supervising the packaging, shipping, handing-over and safety of exhibits, monitoring the status of exhibits during the exhibition, cleaning and recording the exhibits. In 2005, the Department participated in the preparation of the special exhibitions "Cheng Ho's Expedition" and "Dinosaurs Under Auroras". Also the Department helped to prepare the special exhibitions "When Dog Comes Across Man—A Special Exhibition for the Year of Dog", "Puncturing, Shearing and Grinding- The Diversity of Mammalian Teeth" and "Terracotta Warriors and Horses II" in 2006.

▲ A speaker presented in the Seminar on Museum Collection Policy and Its Modernity

VI. Revising the Handbook of Research and Collection Management

2005

1. Revision of "The Regulations on Specimen Evaluation of the National Museum of Natural Science". To improve the evaluation mechanism, the Specimen Evaluation Committee is responsible for determination, acquisition, safekeeping and reduction of precious movable properties.

2. The Department worked with the Science Education Department to promote the registration management system for "specimens for science education". The system of science education specimens will be gradually integrated into the system of collection management.

2006

To improve management on loan, the Department revised the regulations on specimens loaning. Based on the regulations and agreement, the Museum will track overdue specimens.

VII. The Museum Received the Award for "the Outstanding Group in Cross-Strait Communications of Technology and Sports"

▲ The award for "the Outstanding Group in Cross-Strait Communications of Technology and Sports"

The Museum has always made efforts in research of ecological conservation. To share our research results, we produced two special exhibitions: "The Fairy on the Cliff—Special Exhibition of *Lilium speciosum* Thunb. var. *gloriosoides* Baker" and "Rediscovering *Formosan macaques* in 2004 and 2005. Moreover, to highlight Taiwan's efforts and achievements in ecological protection and to enhance cross-strait exchanges between museums, the Foundation of the Museum found suitable institutions to co-organize the two tour exhibitions in China. From November 2004 on, the two exhibitions have traveled to major museums of natural history and science and technology in Beijing, Tianjing and other places.

The two tour exhibitions helped to make the Museum known to the museums in Mainland China and established a good reputation. In particular, participants recognized the Museum's efforts to arrange science education speeches to accompany the two tour exhibitions and share our experiences in education activities with museums and teachers from elementary and high schools in Mainland China.

After the tour exhibitions came to an end, the Museum and its Foundation seeked cooperation of educational activities. The Museum organized a summer camp for cross-strait high school students in 2005. This was the first time that cross-strait museums cooperated to organize an activity for high school students. In 2006, a delegation of Taiwanese high school students visited Mainland China to participate in a summer camp to explore nature. These activities allowed cross-strait students to understand the environment they have each grown up with and learn to respect and care for each other.

"When people go beyond the boundary of races and cooperate for better development, communications, and integration of science and humanity, civilization will have the energy to keep improving and everyone will benefit from the progress." This is true for today's cross-strait science education as well. The reason that the Museum chose to organize cross-strait activities was closely related to our goal, our characteristics and our missions. When we combine professionals of research, exhibition and education and the Foundation, we formed an excellent team that helped to enhance cross-strait exchanges over the years.

Milestones (2005-2006)

2005

- "The Fairy on the Cliff–Special Exhibition of *Lilium speciosum* Thunb. var. *gloriosoides* Baker" and "Rediscovering *Formosan macaques*" traveled to Beijing Museum of Natural History, Tianjing Museum of Natural History, Dalian Natural History Museum, Fuzhou Museum of Science and Technology, Nantong Museum of Science and Technology, Wuzi Museum of Science and Technology, Shaoxing Museum of Science and Technology, Jiujiang City Library and Zhejiang Museum of Natural History and Beijing Botanical Garden. (2005~2006)
- The Museum cooperated with the Foundation and Beijing Museum of Natural History to organize a summer camp for cross-strait high school students in 2005, inviting students from Beijing and Taichung to participate in a ten-day exploration camp in Taiwan.
- The Museum cooperated with the Research Center on Biodiversity, Academia Sinica to hold the "2005 International Workshop on Integrated Biodiversity & Natural Specimens Database & Forum of Species 2000 Asia-Oceania", inviting institutions from home and abroad to publish papers about digital archives.
- The Museum arranged for Beijing City Association of Science and Technology and relevant research institutions to visit the National Palace Museum and the National Science and Technology Museum to see how museums in Taiwan are managed.

2006

- Mr. Timothy Ambrose led three other British museumologists on a visit to the Museum.
- Mr. Shun Xiangrun, the board director of the Chinese Association of Natural Science Museums, led a delegation to visit the Museum.
- The Museum cooperated with the Foundation and the Beijing Museum of Natural History to organize a summer camp for cross-strait high school students in 2006, inviting students from Taichung City to visit Beijing and Changbai Shan and explore nature with students from Beijing City.
- The Museum cooperated with the Foundation and Shaoxing Museum of Science and Technology to organize a summer camp of technology and culture for cross-strait high school students in 2006, inviting students from Shaoxing and Taichung City to participate in a ten-day exploration camp in Taiwan.
- Fuzhou City Science Technology Museum and Fuzhou Museum of Science and Technology visited museums in Taiwan to observe how museums in Taiwan are managed.
- The Museum received the award for the "Outstanding Group in Cross-Strait Communications of Technology and Sports" from the Mainland Affairs Council.
- The Museum held a Seminar on Museum Collection Policy and Its Modernity.

Statistics of Specimen Collection

■ Specimen Collected and Registered in 2005

ACCESSION	Zoology Department	Botany Department	Geology Department	Anthropology Department	TOTAL
Collection	29,181	3,988	2,542	7,953	43,664
Purchase	246	6,035	234	1,599	8,114
Donation	51,889	1,794	724	14	54,421
Exchange	278	4,554	0	0	4,824
Other Activities	605	23	53	28	709
Total	82,191	16,394	3,553	9,594	111,732

Plant sections	3 species	178 slices
Plant sections	7 species	11 bottles
Living plant	282 species	
Fungus Species	95 stub	
Sporopollen on glass slides	1 species	50 slices
Timber	4 species	0 slices
Seeds	161species	
Other specimens		777

· In 2006, a total of 112,509 specimens were added to the collection.

■ Specimen Collected and Registered in 2006

ACCESSION	Zoology Department	Botany Department	Geology Department	Anthropology Department	TOTAL
Collection	37,817	7,877	2,499	8,151	55,832
Purchase	543	960	202	5	1,710
Donation	2,049	2,681	317	43	5,090
Exchange	72	3,765	0	0	3,837
Other Activities	3,131	0	0	0	3,131
Total	43,612	15,283	3,018	8,199	70,112

Plant sections	62 species	2,790 slices
Plant in solution	106 species	891 bottles
Living plant	3 species	

Fungus Species		87 stub
Sporopollen on glass slides	242 species	2,050 slices
Timber	0 species	67 slices
Seeds		95 species
Animal tissue in liquid nitrogen	294 species	1,306 tissues
Alcohol preserved animal tissue	101 species	1,298 tissues
Other specimens		8,587

・In 2006, a total of 78,699 specimens were added to the collection.

■ Museum Collection by December 2006

ACCESSION	Zoology Department	Botany Department	Geology Department	Anthropology Department	TOTAL
Collection	339,257	68,307	16,937	61,630	486,131
Purchase	55,589	55,133	7,948	8,987	127,657
Donation	124,601	28,617	19,298	2,908	175,424
Exchange	2,082	29,189	4	0	31,275
Other Activities	5,218	203	1,633	3,133	10,187
Total	526,747	181,449	45,820	76,658	830,674

Plant sections	1,004 species	24,097 slices
Plant in solution	1,581 species	8,190 bottles
Living plant		2,219 species
Fungus Species		2,151 stub
Sporopollen on glass slides	867 species	7,194 slices
Timber	343 species	1,025 slices
Seeds		439 species
Animal tissue in liquid nitrogen	294 species	1,306 tissues
Alcohol preserved animal tissue	108 species	1,298 tissues
Other specimens		47,919

・The Museum has 878,593 specimens by December 2006.

Collection and Research Results

1. Cockcrowing: An Exhibition of Phasianid Birds

The exhibition was organized by the CMD and it was the first time that the Department acted as the curator of a special exhibition. For the special exhibition, we built a 26 meters long, 4.7 meters high birdcage to display 14 kinds of pheasants all together. Meanwhile, the Museum was displaying traditional Hmong feet-hanging tower, it was designed to simulate the daily life of the Hmong people and how they raise their livestock under the feet-hanging tower, and so over 30 breed chickens of 9 different species were displayed under it. With pheasant specimens in the Museum, the special exhibition was divided into three different themes, including "diversity of phasianid birds", "breeding of chickens" and "invasive ring-necked pheasant" to celebrate the Chinese lunar year of chicken.

▲ A place of Cockcrowing Exhibition

2. Establishment of Natural Ecology Hall for Taiping City: Training of Volunteers and Sustainable Operation Scheme

In 2004, the Museum was entrusted by the Taiping City Office to complete the plan for collection research and management of the Nature Center of the Taiping City Exhibition Hall. In 2005, to implement the plan, the Center started work on the fundamentals and the strategy of a sustainable operation. Consequently, the Center has again entrusted the Museum to train its volunteers and help the Center establish the mechanism of a sustainable operation.

The Museum prepared two types of courses for the staff of the Center, including "volunteer training" and "sustainable operations". In the two workshops, lectures, demonstration and hands-on activities were organized to combine theory and practical experiences.

The project was completed in September 2005. Generally speaking, participants were able to learn from the Museum's experience in managing the Museum and applied our workflow and procedures. It is very likely that they will become important talents for the Center in the future.

▲ Participators were discussing at the workshop

3. Joyful Harvest: The Biggest Donation Ever (December 2005)

▲ A large number of the insect specimens were donated by Professor Satô

At the end of 2004, the Museum shipped over 50,000 insect specimens from the residence of Professor Sato, then, the second shipment arrived at the Museum on December 30th, 2005. The staffs of the CMD and the Zoology Department went to Japan to make sure that both shipments were packed properly. In total, Professor Satô donated over 117,000 insect specimens to the Museum, making it the biggest donation ever for the Museum.

Most of the specimens are Coleoptera. A large number of the specimens were collected by Professor Sato, but some were collected by other famous entomologists, such as Chujo Michio, Arita Yutaka, Obayashi Nobuo and Ishihara Tamotsu, as well as those received in exchange with famous Japanese and international entomologists from 1940 to 1960.

4. Creative Value-Added Application of Digital Archives, National Science Council: E-Book of Taiwan Folk Belief and Native Culture (June 2006~May 2007)

(1) Origin

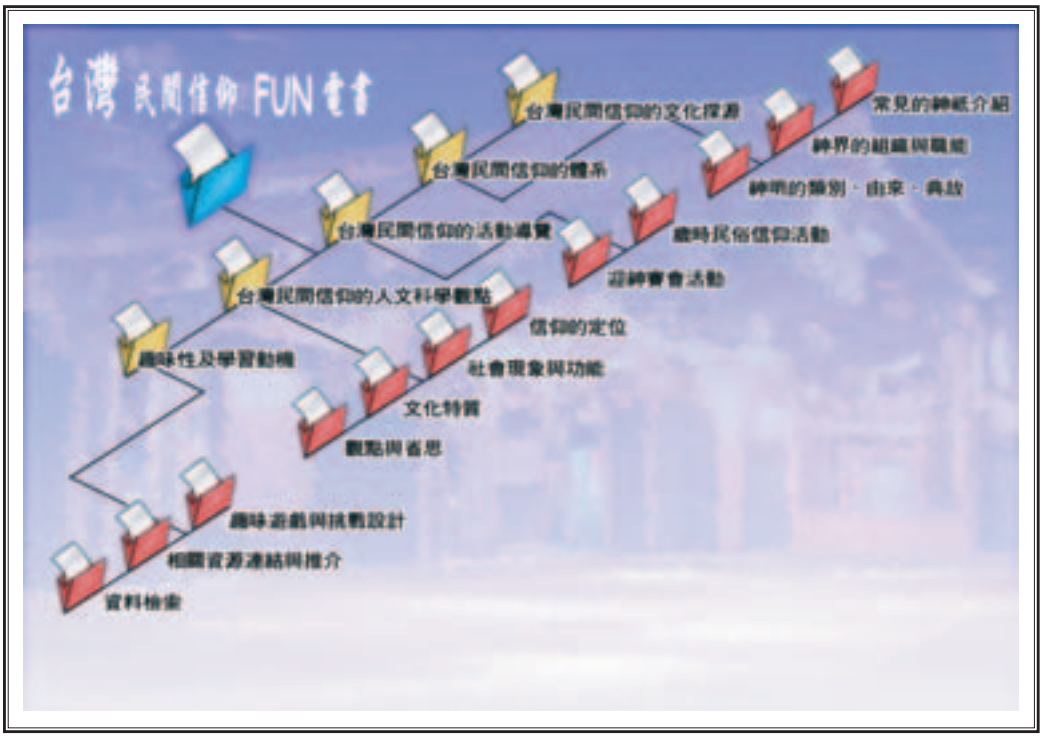
Several years ago, the Museum joined the National Digital Archives Program and started to promote a digital archives collection. The content of our digital archives are provided to academia and industry for value-added applications, so that we can share the knowledge with more people and promote a digital content industry. Our content is particularly suitable for digital exhibition, multi-media teaching materials and games. Chou Ming, the Director of the CMD, has accumulated a lot of material about folk art and folk religions in Taiwan, so he selected deities and artifacts in folk religion to be applied in an electronic publication of local culture. In November 2005 the National Science Council reviewed the project and the formal proposal was submitted in December of that year. Once the proposal and the list of items were approved, the Museum started to work on the research and production of the e-book, which is scheduled for completion in May 2007.

(2) Project Objective

The objectives of the project were to promote scientific and cultural recognition of "folk religion in Taiwan" to prevent superstition and to share knowledge with the society. Materials stored in the digital archives can be used to develop a value-added applications digital collection. The Museum cooperated with digital content industry to develop such applications, which serve as a good example of collaboration between the industry and the collection institution. By combining digital content and value-added applications, the digital content industry would have more potential as they can now create teaching materials for knowledge and culture. These materials are great for digital learning about the folk culture of Taiwan. They can also motivate more people to learn about the local culture.

(3) Idea

The digital book combined the traditional idea of "flipping pages" with multimedia entertainment in one product, which changed the stereotyped idea of an e-book. The product kept the traditional idea of "book" as readers have to use the mouse or finger touch to flip the pages, which gave them a sense of reading traditional books. At the same time, audio/visual clips were imbedded in the pages, so readers can enjoy the special effect. The interaction between the book and the reader made it a real "3D book". We believe that the book will attract a lot of attention, and so we name it "The Fun Book of Folk Religion in Taiwan".



▲ Content of the Fun Book of Folk Religion in Taiwan

921 Earthquake Museum of Taiwan

At 1: 47 am, September 21st, 1999, a violent earthquake measuring 7.3 on Richter scale struck Taiwan and devastated Nantou and Taichung Counties. The official death toll stands at 2,415, with 11,305 people injured, 29 missing. The overall financial loss was estimated at NT$300 billions. The earthquake was one of Taiwan' s worst natural disasters in the last 100 years. To commemorate those killed and injured in the disaster and to remind the government as well as the general public of the importance of disaster prevention and disaster relief measures, the central government and local governments gathered a group of experts to inspect the area around the epicenter. After complete investigation, it was decided that a museum would be established near the fault at the field of Guang Fu Junior High School in Wufong Township, Taichung County, so that the original site of the earthquake can be preserved. At the same time, information about the disaster can be preserved and used by the general public and schools for earthquake education. After an inter-departmental coordinate meeting convened by the Ministry of Education in February 2001, the 921 Earthquake Museum of Taiwan was established to commemorate those affected by the disaster and to educate the public.

The main objectives of the 921 Earthquake Museum of Taiwan are: (1) to make earth sciences and earthquake knowledge accessible to the public; (2) to preserve the earthquake site and the collective memory of this disaster; (3) to educate the public about the importance of earthquake preventing measures and disaster relief plans and (4) to promote earthquake research in Taiwan. In the Museum, there were multi-faceted exhibitions and educational activities related to natural sciences, humanistic concern and historic records. When visitors set foot in the museum, they would first regard earthquake as natural phenomenon, then they would experience how the power of nature can bring disasters and finally, they would acquire correct concepts regarding disaster prevention, self protection, and aid-giving. Moreover, they would also come to understand the relationship between earthquakes and human beings and how life eventually continues after being struck by a terrible natural disaster.



Guided Tours

Walking into the Museum, visitors would be astonished by Chelungpu Fault. As they continue the tour, they would learn how to respect the nature and live with it in harmony. The guided tour allows visitors to understand why we have set up the Museum, as well as the philosophy and concept behind our exhibitions, consequently, the Museum can educate the public about earthquake sciences and disaster prevention. For the biennium of 2005-2006, we have not only taken reservations for guided tours from schools and organizations in general, but also arranged temporary guided tours for groups with different needs so that visitors can get an insight of our exhibition in a limited time. In 2005, 329,525 participants attended 3,513 guided tours; in 2006, 3,458 guided tours were given to 264,309 people.

Science Education Activities in 2005

The 921 Earthquake Museum of Taiwan aims to promote education of earthquake sciences through interactive exhibitions, earthquake relics and multimedia. Our educational activities are designed in such a way that they are close to our daily life, entertaining and informative, so people can experience the power of nature and establish correct concepts of disaster prevention for the future. The Museum also integrated various social resources by cooperating with communities, schools and organizations to promote education of earthquake science. In 2005, a total of 12 science activities were held with 460 participants; a total of 582 earthquake activities were held with 50,731 participants.

1. Teacher Training Seminar for "Tsunami"

It was fortunate that Taiwan escaped the impact of the great tsunami in Southeast Asia in 2004, but the event was an important reminder that everyone has to have correct and complete knowledge about tsunami and disaster prevention, so that we can take action before disaster strikes. Through the seminars, teachers from elementary, junior, senior and vocational high schools, military training instructors, disaster-prevention authorities, as well as Museum guides and volunteers visited schools to disseminate knowledge about tsunami, hoping that such knowledge would be available to everyone and people can understand the importance of disaster preparedness.

▲ CPR (cardiopulmonary resuscitation) demonstration

2. Earthquake Week Activities

In conjunction with life-long learning program, the Museum prepared a series of activities for people to learn earthquake science, experience the power of nature and develop disaster prevention concepts. Meanwhile, these activities also encourage community to care for each other and take positive attitudes toward life impacted by natural disasters. These entertaining yet educational activities offer a great opportunity for families to learn together. The programs included (1) "Swinging Spaghetti House" Competition: As they worked to build a model house with spaghetti, participants gradually understood the concepts of anti-seismic structures. A total of 256 groups participated in 28 contests. (2) "Earthquake Magnitude Scales" Interactive Activity: Participants jumped on the vibration board to create vibration. A precise instrument would measure the strength of the vibration, so participants can see how earthquakes are divided into different magnitude scales. 4,813 participants attended a total of 15 sessions. (3) Scientific Demonstration: "Soil Liquefaction": To raise public awareness of disaster prevention, the Museum prepared live demonstrations to introduce the mechanism and prevention of soil liquefaction. Model experiments were used for participants to understand the mechanism that led to soil liquefaction and the disasters caused by soil liquefaction. 4,866 participants had attended 15 demonstrations. (4) "Buildings and Earthquakes" Science Demonstration: The demonstrations illustrated how earthquakes of the same magnitude can cause different impacts and damages to the same building when the building was built on different grounds. A total of 4,949 participants have attended 15 demonstrations. (5) "Earthquake Simulation Car": The car can simulate earthquakes of different magnitude, so participants can understand more about the impact of earthquakes. (6) "Earthquake Disaster Prevention: Open Sesame" Quiz Game: A quiz game was designed with concepts related to earthquake disaster prevention for participants to establish correct concepts of earthquake disaster prevention as they had fun during the game.

3. September 21st Earthquake Life Education Lectures of 2005

The lectures were bidding to help the victims walk out of the plight with courage, learn how to contribute to the society with gratitude, transform their traumatic memory into reflective and positive life lessons. The lectures included: (1) My Body and My Mind—The stories of 921 quake victims; (2) Open Your Heart for Hope—Consultation for post traumatic syndrome; and (3) A Life after the Quake–Interpersonal communication lessons.

4. First Anniversary of the 921 Earthquake Museum of Taiwan and the 6th Anniversary of the 921 Earthquake.

The 921 Earthquake was a wake-up call for people in Taiwan and a reminder for people to pay attention to disaster prevention. A variety of activities were organized at the anniversary to attract more people and to educate the public about the significance of disaster prevention, disaster relieving and rescuing measures. The activities included:

- National Swinging Spaghetti House Contest

Participants used spaghetti, cotton ropes, cardboard, hot melt glue and other simple tools to build a two-story model house, whose stability was then put to test on a small vibrating plate. The contest is to conceptualize anti-seismic structure. The preliminary and final competitions were held in northern, central and southern part of Taiwan, and the earthquake simulation test was held in these three places at the same time. The best three houses were then selected in the final and winners would be awarded with prize.

▲ Spaghetti house making

- Quiz Game: "Who Knows the Most about Earthquake?"

  Quiz game based on earthquake knowledge can reinforce public cognition. The activity was held during guided tours and on holidays. Participants with the right answer can challenge further and get bigger prize.

- U19 (Under19) Art Creation

▲ Youth art creation

The Museum cooperated with the National Cultural Association to promote youth art creation activity. With "connection" as the theme, teenagers and children under 19 painted the wall around the 2nd phase construction of the Earthquake Park. Participants could express their ideas as they worked together to complete the artwork.

- Convention of Cultural Creative Industry for Community Reconstruction

  Central part of Taiwan was devastated six years ago by the earthquake, but the local cultural industry did not disappear, instead, the locals have worked even harder to reconstruct and develop this area. To commemorate the 6th anniversary of the 921 earthquake, a convention was organized to signify the achievements of cultural creative industry reconstructed after the disaster, so people can witness the vitality of Taiwan.

- Demonstrative Performance of Rescue Dog and Dog Agility Contest

  After the 921 earthquake, the outstanding sensibility of rescue dogs helped rescue team in search of victims at various disaster sites. These rescue dogs were definitely indispensable in a rescue mission. Hence, the Museum invited China Kennel Club to present a demonstrative performance of rescue dogs and a contest of dog agility, so people can see how these dog heroes rescued people and understand more about the capabilities of these rescue dogs.

▲ Youth art creation

▲ Convention of cultural creative industry for community reconstruction

Science Education Activities in 2006

To promote earthquake education, the Museum have created much more dynamic and interesting activities to attract visitors. We also organized outdoor ecological exploration in which experts and scholars led senior high school students and teachers of elementary and high school schools to Hawaii for an in-depth scientific tour. Local ecologists also led participants to visit Shihkang Dam, Pifong Bridge, Sanyi Faults (Tunnel No. 4), and Chelungpu Fault in the 921 Earthquake Museum of Taiwan. In 2006, 19 science education activities had attracted 932 participants and 79,402 participants had attended 3,297 earthquake educational activities.

1. Message from the Center of the Earth—Scientific Exploration in Hawaii

With museum experiences accumulated over the years, the Museum organized an overseas scientific exploration tour to Hawaii for the first time in 20 years and led 25 senior high school students and teachers of elementary and high schools to Hawaii, the window of world evolution. Participants visited the world's largest observatory, Hawaii Volcanoes National Park, Mauna Kea Observatory and Pacific Tsunami Warning Center. The power of nature surely vibrate everyone.

▲ Scientific exploration in Hawaii

2. Earthquake Challenges

The challenges included knowledge about earthquake, disaster prevention and rescue. After obtaining the challenge cards, participants went to the five challenge points and completed the challenges with assistance from the staff. These challenges included (1) quiz game of basic earthquake knowledge; (2) create your own earthquake of required earthquake intensity; (3) test your knowledge about first aid; (4) look for the tectonic plate in which we are; and (5) check your must-bring items in the earthquake kit. Winners received gifts from the Museum.

▲ Earthquake Museum guide

3. Earthquake Puzzle

In this entertaining yet educational game, families would acquire more knowledge about earthquake disaster prevention. First, parents assisted their children to complete the puzzle in limited time. Winners can try the quiz game based on earthquake knowledge. As family members worked together to win the compeititon, parental relations can be reinforced.

▲ Earthquake puzzle solving

4. 921 Kaleidoscope

▲ Spaghetti house making

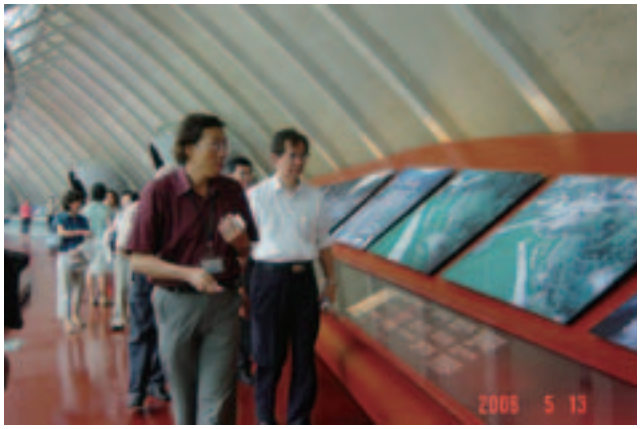
Simple models and objects were used to inspire participants to gain more knowledge about earthquake science. These hands-on experiments with current exhibits in the Fault Conservation Hall, along with periodic science demonsrations made it easier for visitors to get insight into the exhibition. The 921 Kaleoidoscope also used clear expression to introduce the seven major tectonic plates on the planet, types of volcanoes and their influence on human beings, the cause of tsunami, the relationship between soil liuquefaction and buildings stability, the relationship between buildings and earthquake, the natural phenonenom of a fault and the types of fault. In the Museum, earthquake intensity was created with a special instrument. Visitors would also see how Central Weather Bureau obtained information of earthquake, types of seismic waves, how the seismic wave progresses, the formation of the island Taiwan, and myth about earthquakes around the world.

5. 2006 Seminar for Seed Educators of Earthquake Sciences and Disaster Prevention

▲ Seminar of earthquake science

Scholars were invited to give lectures, which included theoretical classes at the first phase, i.e. basic knoweldge of earth science, and practical classes at the second phase, i.e. geological and seismic disasters and disaster prevention. Participants also took a field trip to observe different geologic formations. Afterwards these participants, mostly teachers of elementary and high schools and volunteers, were trained to educate others in schools, communities and other social educational institutions and promote disaster prevention education.

6. Second Anniversary of the 921 Earthquake Museum of Taiwan and the 7th Anniversary of the 921 Earthquake



▲ Earthquake Museum guide

With earthquake prevention and disaster relief as the theme, the Museum transformed earthquake knowledge into simple and easy-to-understand activities, so people can have more knowledge about earthquake science and earthquakes. Once they have the knowledge, people would be aware of the danger of earthquakes and learn more about how to survive an earthquake, how to protect themselves and help others. The activities in 2006 included:

- Save Yourself, Help Others—Earthquake Prevention and Disaster Relief

  Through challenges, films, information boards, photos and exhibits, visitors can get a better idea about earthquake prevention, survival techniques as well as the principles of disaster relief and learn to save themsevles and help others. Rescuers participating in disaster relief actions for 921 Earthquake were invited to share their experiences and feedback with the participants.

- Earthquake Legend in Japan

  In Japan, it was believed that an earthquake was caused by the uprising of catfish, so a popular art of catfish painting was developed in the Edo Era. With slide shows and billboards of catfish painting and description by docents, participants came to see the influence of the earthquake on Japanese life and culture.

- Street Artist Performance

  Despite the impact of 921 Earthquake, the vitality of Taiwan remained. Street artists from all over Taiwan came to tell a story of rebirth.

- Quiz Game of Earthquake Knowledge

  Through the quiz game of earthquake knowledge, participants have more understanding about earthquake sciences and earthquake disaster prevention.

- Hands-on Science: Making of a Simple Seismograph

  After listening to a lecture, students learnt to make a simple seismograph so that they can understand the principles of seismograph and the relationship between an earthquake and a seismic wave. The completed seismograph would be tested on the vibration table. Different vibration amptlitudes were also recorded to compare different intensity.

- Products for Disaster Preparedness

  To promote the concept of disaster preparedness, the Museum imported dozens of creative disaster prevention products from Japan to be displayed in the Fault Conservation Hall. These products included an "earthquake kit" suitable

▲ Earthquake biennial poster

for households, a "straw filter" that can ensure the safety of drinking water after the disaster and a "fire blanket" which can cut off the supply of oxygen, thus smothering the fire, or can be used as a washable towel. There were also preserved foods for survival. The exhibition taught the public what they need to survive an earthquake and guided them to reconsider if ordinary objects can be used as disaster prevention products and learn to be prepared for a disaster.

- Imagnation: Creative Disaster Prevention Products

  Participants were asked to use their imagination to write down a list of objects that can be useful before, during and after an earthquake. They can draw or write these disaster prevention products on the creatvie bulb cards to be hung on the wall. After everyone reviewed these creative ideas, they could put a stamp on the idea that they would like to support. This activity encouraged brainstorming to generate ideas for disaster prevention.

7. Earthquake Science to School

The activity was brought to school campus, so elementary students can understand earthquakes further. Students were asked to take part in the "Swinging Spaghetti House" competition and the quiz game "Who Knows the Most about Earthquakes?" to learn about anti-seismic structure and earthquake science. The activity also taught children disaster prevention. The activity had been held in 8 elementary schools, serving 600 students and teachers.

▲ Spaghetti house vibration test

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