林業特刊第二十七號

自然文化景觀調查研究計畫成果提要集(三)

Summary of Reports on Studies and Investigation of Nature/Culture and Landscapes (3)

(1990)

行政院農業委員會印行
中華民國七十九年六月

1. 台灣地區商業性昆蟲資源利用之調查----------楊平世
Survey on the commercial utilization of insect resource in Taiwan----------Ping-shu Yang

2. 屏平與南鳳山地區的鳥類調查----------金恆標 何華仁 張乃航
Birds observed in the San-ping and Nan-feng-shan regions of southern Taiwan----------Hen-biou King, Hua-jen Ho, Nai-hang Chang

3. 泰雅族狩獵組織之研究-兼及其運作與野生動物間保育關係-陳澤裕
A study on the hunting organization of Taiya tribe-its operations and relations with the conservation of wildlife----------Ze-yu Chen

4. 台灣山產動物疾病調查研究初報---曾秋菊 張志成 翁仲男 朱瑞民
A preliminary disease survey of captive wild animals in Taiwan-----C. C. Tseng, T. C. Chang, C.N. Weng, R.M. Chu

5. 泥岩惡地地景保留區之研究----------王鑫
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6. 澎湖柱狀玄武岩地景保留區調查----------王鑫
Columnar basalt of penghu islands----------Shin Wang

7. 台灣地區校園美化之研究--吳功顯 葉慶龍 陳慶雄 鍾玉龍 陳朝圳
Research on campus beautification in Taiwan area----------Carson Wu, Ching-long Yeh, Ching-hsing Chen, Yuh-lurng Chung, Chau-tzuhn Chen

中 文 部 份

Chinese Summary

序

本會自民國七十三年九月接辦自然文化景觀工作以來，每年均由各研究機構及學術單位提出研究計畫大綱，由本會自然文化景觀審議小組審定後，交由各執行單位執行。各項研究計畫，均照預定進度辦理，已有顯著成果。為便於社會各方共同了解，多方探討，以促進今後自然文化景觀工作之推展，特邀請各計畫執行人，撰擬執行結果之中、英文提要，由本會彙整，編印成集。其中除了本會提供之七十九年度自然文化景觀有關計畫一覽表及自然保育大事紀外，共有二十四篇報告，包括保護區維護部分八篇，教育宣導部分九篇，資源調查及研究部分七篇。每篇並附有作者之聯絡地址，以便日後讀者可直接和計畫執行人討論。而英文部分，除可供國外人士研究參考之用外，將有助於促進國際間學術之交流。

本會於本年六月七日舉行自然文化景觀調查研究計畫成果研討會，本書於召開之時問世，富有重大意義。諸承各位計畫執行之專家學者及參與編纂工作同仁共同辛勞，使本書得以順利出版，享能敬致謝忱。付梓前夕，謹綴數語，是為之序。

行政院農業委員會副主任委員

林享能　謹識

兼自然文化景觀審議小組召集人

中華民國七十九年六月

Preface

Soon after taking over the management of part of nature conservation along with its formal inauguration in September 1984 , the Council of Agriculture set up within itself a committee for screening and financing research projects concerned with nature conservation. All projects are implemented following approval by this committee.

A workshop is held annually to ensure a careful evaluation of such nature conservation projects. All project managers are requested to report on their studies. For FY1990 24 summary reports of the research projects in both Chinese and English are included in the present collection.

In addition to a list of the nature conservation projects supported by the Council of Agriculture and another of major nature conservation events in FY1990, there are eight summaries on the management of protected zones, nine on publicity and education, and seven on resources investigation and research.

The publication of the collection is aimed at publicizing some of the important efforts this country has made in the interests of nature conservation and in furtherance of international exchanges of research findings.

Meanwhile a workshop on the findings of the research projects takes place on June 7, 1990. The project managers and other experts will have the opportunity to thoroughly exchange views on subjects of common interest so that better endeavors may be made to advance the cause of nature conservation in this country.

Special thanks are due to all the project managers and all my colleagues involved in the compilation of the present collection.

Ling Shiang-nung
Vice Chairman, Council of Agriculture
Convenor, COA Nature Conservation
Committee
June 7, 1990

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行政院農業委員會[1]

	計畫名稱	執行機關
一.1	櫻花鉤吻鮭棲息地巡邏保護	武陵農場
一.2	櫻花鉤吻鮭族群生態研究	台灣大學
一.3	武陵農場魚類教育中心初步規劃	台灣大學
一.4	七家灣溪櫻花鉤吻鮭保育區水域農藥殘留監視	台灣省農業藥物毒物試驗所
二.1	蓮華池地區自然資源保育計畫	台灣省林業試驗所蓮花池分所
二.2	台灣地區進口鳥類之疾病研究計畫	台灣省鳥嘴谷鳥園管理處
二.3	宜蘭縣蕃金洋地區台灣山羌棲息地之選擇及其植被分析	輔仁大學
二.4	台灣七種本土中、大型哺乳動物之繁殖及生長生物學之研究	台北市立動物園
二.5	台灣野生動物疾病防治計畫	養豬科學研究所
二.6	台灣區野生動物資料庫(一)兩棲類(2)	師範大學
二.7	台灣長鬚山羊之生態研究(三)--排遺之腐爛分解和行為研究	師範大學
二.8	台灣獼猴之族群生態研究	台灣大學
二.9	台灣獼猴野外供餌之研究(二)	台灣大學，林務局羅東林管處
二.10	台灣山羌之生態及行為研究(四)	師範大學
二.11	台灣黑熊之生態調查及其經營管理策略	中華民國自然生態保育協會
二.12	台灣地區鷺鷥資源的現況及其對水產養殖資源影響之調查	中華民國自然生態保育協會
二.13	大肚溪口鳥類保護計畫	彰化縣政府
二.14	穿山甲之繁殖保存研究	台灣省林業試驗所

1 台北市10728南海路三十七號

	計畫名稱	執行機關
二.15	鐘萼木之復育試驗研究	台灣省林業試驗所
二.16	台灣地區稀有及危機植物之保育評估研究	東海大學
二.17	水青岡生態調查保護	台灣省林業試驗所
二.18	台灣野生茶樹種源保存及利用	台灣省茶業試驗所
二.19	森林溪流淡水魚類保育工作計畫	台灣省林務局
二.20	恆春半島之沈積地質景觀調查	成功大學
二.21	台南縣境內新化丘陵區之化石地質景觀及基礎地質調查	成功大學
二.22	基隆海蝕地形保護	基隆市政府建設局
二.23	南澳湖泊及原始闊葉樹林保護區經營管理計畫	台灣省林務局羅東林管處
二.24	東亞國際候鳥繫放先驅計畫	中華民國野鳥學會
三.1	關渡自然保留區管理維護計畫	台北市政府建設局
三.2	鴛鴦湖自然保留區管理維護計畫	退輔會森林開發處
三.3	哈盆自然保留區管理維護計畫	台灣省林業試驗所
三.4	苗栗三義火炎山自然保留區管理維護計畫	台灣省林務局新竹林管處
三.5	淡水河口紅樹林自然保留區管理維護計畫	台灣省林務局羅東林管處
三.6	坪林台灣油杉自然保留區管理維護計畫	台灣省林務局羅東林管處
三.7	大武事業區台灣穗花杉自然保留區管理維護計畫	台灣省林務局台東林管處
三.8	紅葉村台灣蘇鐵自然保留區管理維護計畫	台灣省林務局台東林管處
三.9	大武山自然保留區管理維護計畫	台灣省林務局
三.10	恆春自然保護區之經營研究	林試所恆春分所
三.11	大武山區自然資源之調查	中華民國自然生態保育協會
三.12	自然保護區生態基準資料庫之建立	台灣大學
三.13	公告自然保留區之植被調查	台灣省林業試驗所
三.14	蘭嶼角鴞之生物研究及保育	中央研究院
四.1	七十九年度自然生態保育技術改進計畫	台灣省政府農林廳技術室
四.2	自然保育圖書資料中心	中華民國自然生態保育協會

	計畫名稱	執行機關
四.3	自然生態保育巡迴展覽與演講	省立博物館
四.4	溪頭自然生態研習活動計畫	台大實驗林管理處
四.5	七九年度青年自強活動鴛鴦湖自然生態保育研習	救國團宜蘭團委會
四.6	全國各大專院校加強推動生態保育活動計畫	救國團
四.7	七九年度寒暑假期青年自強活動生態保育環境維護研習會	救國團
四.8	自然文化景觀宣揚工作計畫	中華民國自然生態保育協會
四.9	製播'錦繡大地'廣播節目宣導自然文化景觀保育	幼獅廣播電台
四.10	台灣地區校園環境景觀之保育技術研究	屏東農專
五.1	台灣山產動物疾病調查研究	養豬科學研究所
五.2	珠光鳳蝶復育工作及蝴蝶資源之調查	北市成功高中
五.3	台灣地區山地鄉對野生動物資源利用的調查	師範大學
五.4	桃園池沼稀有水生植物之移植復育	台灣省林業試驗所
五.5	桶后溪之水棲昆蟲資源及生態研究	台灣大學
五.6	桶后溪魚類資源之生態調查	台灣大學
五.7	清水溝溪魚保護	南投縣瑞峰國中
五.8	花東海岸山脈地景調查	台灣大學
五.9	新豐紅樹林調查保護	新竹縣政府
五.10	七九年度台中縣鷺鷥鳥調查保護計畫	台中縣政府
五.11	七九年度台中縣巨木調查保護計畫	台中縣政府
五.12	台灣特有飛蝨種類之調查研究與復育試驗	文化大學
六.1	第二次野生動物疾病控制研討會	養豬科學研究所
六.2	瀕臨絕種動物輸出入關口管制人員講習計畫	台北市立動物園
七	七十九年度自然保育業務推動計畫	農委會林業處

貳．七十九年度自然保育工作紀要

(78.7 ~79.6)

行政院農業委員會[1]

78年

7.27 (三) 余主任委員核准七十九年度自然文化景觀生態保育計畫，共七大細部計畫，六十七項子計畫。

8. 4 (五) 本會依野生動物保育法公告了六百種以上之保育類野生動物。

8.31 (四) 本會自然文化景觀審議小組暨技術組舉行第三十次聯席會議。

9. 7 (四) 本會邀請各縣(市)政府、警察局及相關公私立單位、學者專家等，舉行「野生動物保育工作座談會」。

9. 8 (五) 本會遴派中央研究院動物研究所副研究員兼本會自然文化景觀審議小組技術組委員劉小如博士代表參加民國七十八年九月八日至十三日於美國 South Dokoda 舉行之 IAFWA 1989 年年會。

9.13 (三) 本會邀請櫻花鈎吻鮭復育總主持人張崑雄教授，台大動物系林曜松教授及櫻鮭復育地武陵農場張民善場長於七十八年九月十三日~二十二日赴日本考察櫻鮭解說教育中心之規劃與經營管理，以作為國內櫻鮭保育之參考。

10. 5 (四) 本會印製精美的「保護野生動物須知」中英文彩色摺頁，分送各機場、港口、郵局、觀光區、僑務單位、新聞單位等，以利宣導。

10. 7 (六) 本會遴派林業處保育科李科長三畏，並邀請師範大學生物研究所王教授穎及台灣大學動物系李副教授玲玲赴瑞士參加華盛頓公約組織(CITES) 第七次會員國大會。

10.18 (三) 本會函請內政部等十六個相關政府單位，惠允各編列新台幣五百萬元整之預算，以供籌設野生動物保育基金。

10.21 (六) 「野生動物保育法施行細則草案」經邀請相關單位、學者專家及本會法規會等八次討論後，再經本會委員會議通過，報請行政院審議。

10.30 (一) 本會自然文化景觀審議小組暨技術組舉行第三十一次聯席會議。

11. 4 (六) 本會與養豬科學研究所假台北市立動物園舉辦為期二天之「第二屆野生動物疾病控制與管理研討會」。

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1. 台北市10728南海路37號

11. 7 （二） 本會與農林廳假林試所舉行為期二天之第一梯次「自然保育研討會」。

11. 9 （四） 本會與中央研究院、台大動物系假武陵農場舉辦「中日櫻花鉤吻鮭研討會」。

11.15 （三） 本會與農林廳假林試所舉行為期二天之第二梯次「自然保育研討會」。

11.15 （三） 本會邀請有關學者專家舉行「大貓熊飼養繁殖計畫座談會」。

11.28 （二） 本會自然文化景觀審議小組暨技術組舉行第三十二次聯席會議。

12. 5 （二） 省農林廳邀請本會、學者專家及有關單位研商如何加強珍貴稀有動植物之保護繁殖事宜，以確保本土動植物資源。

12. 6 （三） 救國團邀請本會及有關單位研商七十九年冬令青年自強活動，其中本會補助辦理鴛鴦湖自然保留區及生態保育環境維護研習會，本會將派學者專家前往演講。

12.13 （三） 本會與台北市立動物園合辦為期二天之「瀕臨絕種動物輸出入關口管制人員講習會」。

12.15 （五） 本會邀請學者專家前往野柳實地勘查海洋世界飼養馬來熊、老虎等動物之場所並赴淡水評估貓熊食用竹子之情形。

12.19 （二） 本會邀請有關單位及民間中醫師及中藥公會、學者專家座談有關犀牛角及其產品之管理。

12.19 （二） 省農林廳邀請本會、學者專家及有關單位研討加強珍貴老樹及行道樹保護，並赴現場觀摩。

12.20 （三） 經濟部邀請本會及有關單位研討我國野生動植物進出口管理制度及作業程序，決定由國貿局成立專案小組參考華盛頓公約及國內相關法規詳加研擬辦法，以建立制度。

12.21 （四） 本會邀請有關單位及學者專家研商農業部動物研究所之功能與組織，以健全動物（含野生動物）之調查研究、檢驗（疫）、生理醫學等之研究。

12.22 （五） 為保育野生動物維護自然生態平衡，特依野生動物保育法第九條設置基金，本會特邀請有關單位座談，將函報院准予設立基金，並將其「野生動物保育基金收支保管及運用辦法草案」一併報核。

79年

1. 5 （五） 本會完成編印保育類野生動物圖鑑--台灣產鳥類部分，一套二張，分贈全國有關單位、學術單位及鐵、公路局等張貼，以加強宣導。

1. 8 （一） 本會與省立博物館於仁愛高農舉辦巡迴演講及巡迴展覽。

1. 9 （二） 本會與省立博物館於台中高農舉辦巡迴演講及巡迴展覽。

1.11 （四） 亞洲週刊駐華特派員Mr. Paul Mooney 來華了解我國漁業、森林及野生動物保育情形。

1.13 （六） 美國國會助理第二團一行九人來華訪問。

1.19 （五） 市政廣播電台蒞本會專訪野生動物保育情形，促使國人對政府執行情形及政策有更進一步了解。

1.21 （日） 本會與中華民國自然生態保育協會合辦「知性之旅--桃園台地之旅」。

1.22 （一） 本會派員前往墾丁參加與救國團合辦之「生態保育環境維護研習會」，並對自然生態及野生動植物保育作專題報告。

1.22 （一） 本會與台大實驗林管理處舉辦為期三天之「彰化縣七十八年度科學資優學生研習營活動」。

1.25 （四） 行政院法規會初步審查完竣「野生動物保育法施行細則草案」。

2. 2 （五） 本會派員參與台北市政府建設局委辦關渡自然公園解說設施整體規劃研究期中座談會。

2. 2 （五） 本會與救國團於二日至十日合辦二梯次之「七十九年冬令青年自強活動鴛鴦湖自然生態保育研習營」分別為教師組及一般組，成效良好。

2.16 （五） 本會邀集專家學者及有關機關研商「修訂保育類野生動物名錄」及「生態保育區、自然保留區經營管理要點」。

2.16 （五） 本會派員參加國貿局召開之「研討保育類野生動物及其產品與珍貴稀有植物進出口簽審規定等有關事宜會議」。

2.18 （四） 本會與中華民國自然生態保育協會合辦「客家之旅」。

2.22 （四） 本會自然文化景觀審議小組暨技術組舉行第三十三次聯席會議。

3. 3 （六） 本會應民間團體之邀請參加有關野生動物保育座談會。

3. 4 （日） 本會應民間團體之邀請參加有關野生動物保育座談會。

3. 5 （一） 本會召開大貓熊飼養繁殖計畫專案小組第一次審查會議，已達初步共識。

3.14 （三） 本會與進出口業者進行座談。

3.15 （四） 「野生動物保育法施行細則」已於行政院第二一七三次院會中決議准予修正核定。

3.16 （五） 本會會同苗栗憲兵隊將查獲違法販賣之大海龜於苗栗外埔漁港予以放生。

3.18 （日） 本會與中華民國自然生態保育協會合辦第一次「金瓜石之旅」。

3.20 （二） 本會應邀參加台中縣政府舉辦第一梯次之野生動物保育座談會。

3.21 （三） 本會舉辦為期一週之調查人員講習會，資料並將編印成圖鑑，以供日後進行調查時之用。

3.23 （五） 本會應邀參加台中縣政府舉辦第二梯次之野生動物保育座談會。

3.25 （日） 本會與中華民國自然生態保育協會合辦第二次「金瓜石之旅」。

3.30 （五） 本會邀請美國奧立岡大學森林資源專家，Prof. George H. Stankey 來華訪問一週，了解國內森林及保育問題，並舉行演講及研討會。

3.31 （六） 本會公告「野生動物保育法施行細則」。

4. 6 （五） 本會假台中自然科學博物館舉辦為期一天半之「第二屆自然保育研習會」，邀請自然保育義務工作老師暨相關單位人員參加。

4.14 （二） 南非共合國開普省自然及環保廳長 Mr. P.J. Le Roux 來華訪問。

4.17 （二） 本會自然文化景觀審議小組暨技術組舉行第三十四次聯席會議。

4.24 （二） TRAFFIC-JAPAN 代表 Mr. Tom Milliken 來華訪問我國自然保育工作推動情行。

5.19 （六） 荷蘭王父來訪。

5.22 （一） 本會會同海關、水警隊、新聞媒體、國際保育組織等單位暨荷蘭王父、張政務委員豐緒假基隆南榮公基進行走私沒入之象牙及其製產品等之銷燬。

5.30 （三） 本會自然文化景觀審議小組暨技術組委員，由本會副主任委員兼該小組召集人林享能領隊，赴澎湖勘查自然保留區或野生動物保護區預定地。

6. 2 （六） 本會與台北市立動物園假該園舉辦「動物園經營與管理研討會」。

6. 7 （四） 本會於台大思亮館國際會議廳舉行「第三屆自然文化景觀調查研究計畫成果研討會」。

6.22 （五） 為落實野生動物保育法之執行，本會特召開「野生動物保育法執行週年檢討會」。

淡水河口紅樹林自然保留區管理維護計畫

黃忠和[1]

一、執行目的

淡水河口紅樹林分布於淡水至竹圍間淡水河岸，主要構成植物爲紅樹科（Phizoporaceae）水筆仔屬（kandelia）之水筆仔（Kandelf eandela Drace）純林。本區最大的價值在其知性的功能，因爲水筆仔是少見的胎生植物，紅樹林及其中共同生活的各種生物構成極爲特殊的生態系，也是最佳的户外生態實驗室。

本計畫執行的目的在保護紅樹林供爲科學研究及教育對象，使社會大衆認識大自然的奧秘，進而培養愛護自然生物及國家鄉土的優美情操，達到寓教於樂的最高目標。

二、執行情形

㈠環境整理

淡水河口紅樹林屬河川地，入口常年爲附近民衆丟棄垃圾及上游堆積廢棄物致環境髒亂不堪、惡臭難忍，對研究人員及參觀者造成嚴重的不便與困擾。本處定期僱工整理環境，但限於經費僅能針對局部民衆易到達處進行垃圾清運工作以改善環境衛生，提供區內動植物及參觀者更佳的環境品質。

㈡巡視保護

爲保持區內紅樹林自然生態體系原始狀況，避免遭受人爲干擾破壞，本處不定期經常派員巡護，防範破壞情事的發生。

㈢解說服務

本處經常應一般民衆學校、機關申請派員做有限度的引導參觀，或配合辦理知性活動並蒐集整理有關紅樹林特殊生態現象資料，提供解說服務，並灌輸民衆愛護自然保育生態之觀念。硬體設施方面已完成製作大型紅樹林自然保留解說牌兩面，警告說明牌四面，爲維護參觀人員安全設置柵欄198m。

㈣擬訂經營管理計畫

爲有效經營管理紅樹林自然保留區，達成保育、學術研究及自然教育之多重目標，擬訂經營管理原則及策略，並對實際執行訂定分區計畫、資源保育計畫、公共設施計畫、解說系統計畫、遊客服務計畫，預計五年內投資48,000,000 元經費，以期落實計畫之執行。

三、結果與建議

㈠本區最迫切的問題在於淡水河上游的垃圾每逢大雨或颱風過後即堆積於紅樹林下，雖然目前本處定期僱工局部清理，但是無法徹底乾淨，惟有期待淡水河系污染整治

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問題解決後，居下游的紅樹林保留區再積極配合於外圍設置網柵以攔阻廢物進入，並清撿卡在紅樹林的垃圾，才是維護全區清潔的治本之道。

㈡淡水河口紅樹林自然保留區位於大台北都會區邊緣，慕名而來的民衆甚多，本處常應中小學校師生及親子團體要求引導參觀並提供解說服務。亟需建立一套完整的解說系統，提供參觀者正確完善的環境解說與自然生態系資訊，達成本區提供户外生態教室的目的。

㈢定期巡視發現取締破壞紅樹林生態環境行爲是保留區管理維護之基本也最重要的工作，因本區交通方便，爲避免附近民衆及遊客之干擾，仍應加强巡視工作。

坪林台灣油杉自然保留區管理維護計畫

黃忠和[1]

一、執行目的

台灣油杉（Keteleeria formosana Hayata）爲台灣之固有種，於本省呈不連續分佈於島之南北兩端，南部族群分佈於枋寮山克拉油社附近海拔900公尺，大武山之大竹溪台東林區管理處第30林班海拔500公尺之向陽地帶。北部則散佈姑婆寮溪、金瓜寮溪之分水嶺，礁溪、石牌之分水嶺及坪林沿高壓稜線上，海拔300至600公尺之處，部分學者認爲此一特殊分佈現象，或是由於台灣與大陸原本相連，直至台灣海峽陷落，地理隔離，遂成爲一獨立種，再加上在北美、歐洲及日本本州第三世紀地層中，已發現油杉之化石，因此；台灣油杉極具生態地理學及植物分類學之研究價值。

坪林台灣油杉因本身毬果天然不孕性種子佔多數，且四周環境雜木叢生，天然競爭下幼苗生存不易，再加上分佈低海拔，農業發展的結果使天然林遭受嚴重破壞，僅臨孤立木數十餘株，本區雖曾辦理放租，但在租地合約中明訂保護台灣油杉，本區設立之目的在於保護台灣油杉，避免遭受人爲的干擾破壞，期能循自然演進過程，保護台灣油杉，以爲科學、教育研究之用。

二、執行情形

㈠標示牌整理

本保護區分爲三小區，78年度依農委會規定之型式、規格製作大型標式牌兩面，設置於文山事業區28、29林班明顯適當處，並分別於三個小區出入口明顯處設置解說牌，提醒民衆不得進入保留區內進行違反文資法規定之行爲，這些解說牌因位處山地，受天候及人爲影響而損壞，故加以整理維修，使其充分發揮公告，警告及解說的功能。

㈡現場巡邏保護

巡邏保護爲保護區管理維護之基本工作，由於本區租地造林佔大部分（94.2%）且鄰近茶園易受人爲干擾，本處派專人巡邏保護，除發現一株林內小苗遭人折斷外，其餘無任何破壞台灣油杉之情形發生。

㈢步道整修

原於區內各母樹間開設步道9,960公尺，因山區坡陡且多雨屢有損壞，本年度雇工整修，以利巡視員巡護及生態習性現察研究。

㈣租地造林木材積調查

本區租地造林佔全區94.2%，爲維護保留區之原始狀態使區內生態體系任其自然，實施租地造木材積調查，以爲日後價購造林木收回林地之依據。

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(五)擬訂經營管理計畫

爲有效經營管理坪林台灣油杉自然保留區，達成科學教育及自然保育之目標，擬訂經營管理原則及策略，並對實際執行訂定分區計畫、資源保育計畫、公共設施計畫、解說系統計畫、遊客計畫、預計五年內投資8,700,000元經費，以期落實計畫之執行。

三、結果與建議

(一)本區目前最重要的工作爲收回租地造林地，由於保護區內大部爲租地造林地，無法制上承租人進入保留區從事農耕及撫育工作，因此爲維護保留區之自然狀態，本年度已實施租地造林木材積調查，期能早日編列預算價購造林木收回林地。

(二)台灣油杉現存不多且幼苗不易發生已瀕臨絶滅，是否應於保護區周邊之緩衝地帶實行復育工作以延續油杉族群或保持原狀任其自然，應請學者專家研究評估之。

(三)本區邊臨茶園，人類活動頻繁，仍應加巡視，以避免破壞行爲之發生。

鴛鴦湖自然保留區管理維護計畫執行報告

楊一統[1]
朱保華

前言

鴛鴦湖位於森林開發處棲蘭山林區之大溪事業區第 89、90、91林班內。亦即新竹縣東南方尖石鄉大漢溪集水區之上游，海拔分佈在 1,650～2,432 m 之間，全區面積約 374 公頃，湖水面積 3.60公頃，沼澤面積 2.20公頃。四周爲價值極高之檜木林所被覆，自然生態仍屬完整。

該區於民國58.年在國科會支助下，由森林開發處與省林業試驗所合作，進行調查規劃，至62.年完成後即設立保護區，爲本省最早創設之自然保護區，設立後之管理及維護工作均由森林開發處獨立負擔。

民國75.年 6.月 27.日政府依據文化資產保存法公告爲「自然保留區」，並指定森林開發處爲管理機關，在農委會專款支助下繼續執行管理維護工作。保留區之主要保護對象爲湖泊、沼澤、紅檜、東亞黑三稜等，其他植物有水生植物群落，濕生植物群落及中生森林群落（以紅檜及扁柏爲主），共達 100 餘種。另有鴛鴦及野鴨等珍禽鳥類已發現者有 14.種，此外並有山鹿、飛鼠、猴群等動物出沒。

目的

㈠由於科技之進步及人口之增加，加速人類開發自然資源之速度，而在人類尚未完全瞭解生育地之環境及自然資料保育之重要性以前，自然環境遭受嚴重破壞之情形處處可見，因此具有代表性生態體系之鴛鴦湖地區尤有保留之必要。

㈡提供學術界對自然科學教育及自然資源保育與環境改善之研究，諸如：

1. 地質、土壤及氣象之變化。
2. 各種植物群落之組織結構及演替過程。
3. 集水區經營及溪流水污染狀況。
4. 山地地形及地形湖泊之發育情形。
5. 地下水化成土作用。

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6.水禽類與候鳥生態。

7.新紀錄植物來源之探討。

執行情形與成果

㈠設置管制站：在森林開發處 100 線林道約17.公里鴛鴦湖入口處設置管制站一處，並派駐專人嚴格管制人員進出，未經森林開發處同意並發給「進出證」者不得進入。

㈡設置標示牌：在鴛鴦湖入口處設立標示牌乙座，其內容包括：保留區名稱、主要保護對象、面積、地點、管理機關及設置日期等。

㈢設置解說牌：設於鴛鴦湖入口處，其內容包括：位置、地況、湖泊、氣候、植物群落、鳥類及新紀錄植物。

㈣設置公告牌：在北橫公路森林開發處 100 線林道入口守衛站及鴛鴦湖入口處各設乙座，其內容包括：主旨、依據及公告事項。

㈤進入鴛鴦湖自然保留區者，必須事先向森林開發處提出申請，經審查同意並發給「進入證」。入山時將進出證交由管制站查驗，並辦理登記後始得進入，出山時交回管制站存查。

㈥雇用巡邏及維護工人二人擔任區內巡邏及維護工作，並每週填報週報表，以瞭解動態，並作管制作業之參考。

㈦由於嚴格實施管制及管理維護工作，遊客已顯著減少，使本區得以繼續維持自然狀態，管理維護工作已獲得實質效益。

檢討與建議

㈠加強宣導教育與協調警方協助執行取締工作：鴛鴦湖正式成立保留區後，慕名而來之遊客仍然有之，森林開發處管理人員因責任所在，予以勸阻，時常未能獲得諒解而發生爭執甚至動粗，安全頗受威脅。

㈡確定管理人員之身分：保留區之成立雖訂有管理取締法則，惟管理人員未具司法人員身分，違犯者之處理在執行上有所困難。

㈢建議適度開放參觀以兼具自然環境教育功能。

苗栗三義火炎山自然保留區管理維護計畫

林阿杉[1]

前言：由於工商業的迅速發展，人口增加，大自然不斷地遭受人類無情的挖取與破壞，以致其生態體系受到嚴重破壞，已無法挽回大地原來面貌。爲我們對後代子孫延續生存的前瞻，自然生態保育乃維繫人類社會持續文明發展，維持人類生命永續生存的不二法門。

一本計畫執行的目的：

苗栗三義火炎山是因它那崩塌突兀的許多尖銳山峯及無數深窄山谷的獨特地理景觀，及在此惡劣環境的嶺線上蘊育著本省最大面積的原生馬尾松林植群，這片原生馬尾松林以其強韌耐力，至今在險峻的礫石或石壁上仍能生生不息，且蒼茂盎然，此種具有特殊地形及生態體系景觀彌足珍貴，有鑑於此，經專家調查審議通過，由行政院農業委員會依據「文化資產保存法」於75.年 6. 月27.日公告列爲自然保留區，期以法律來保護此一淨土，避免遭受人爲的破壞，以提供國人對自然科學教育及學術研究的實習教室。

二執行情形：

依據省府「加強自然生態保育工作方案」本計畫之執行分五年完成，執行期限自七十七年七月一日起至八十二年六月卅日止，工作內容包括：㈠境界勘查、範圍測量、埋設界標。㈡自然保留區管理維護計畫之擬定。㈢基本資料之收集和建立。㈣步道新闢及維修。㈤派員常川巡邏以防止盜採木、竹及狩獵。㈥保留區內動、植物生態調查，建立檔案資料。㈦解說資料、簡介編印等。至七十八年度止執行成果如下：

1. 完成本區 219 公頃04 之境界測量，同時在地形突出及明顯轉角處計14.處埋設水泥柱界標。

2. 完成景觀區內（ 76 公頃 83 ）胸徑 8 公分以上樹木之每木調查工作，分析本區內植物群相計有松樹、楓香、樟樹、相思樹、烏桕、車桑仔、羅氏塩膚木等 35,869 株，立木材積 4,354 m^3 87 。

3. 在嚴重崩塌而地勢險峻具有危險性區段施設安全圍籬 200 公尺。

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4. 設置解說牌兩座，分別置於高速公路北上泰安休息站之觀景樓及區內明顯處，期以解說達成國民對自然生態保育觀念之共識。

5. 由本處三義分站派巡視人員三人常川巡邏，平均每月在20次以上，以防不法事件發生。

本期（七十八年七月一日起至七十九年六月卅日止）計畫執行工作有：區內植物生態調查及解說報告、標牌設施、現場巡視、開設步道及安全設施等，至目前已完全者有：

1. 製作解說牌一座，設置於新中苗六線道公路旁，期藉解說而收生態保育之目的。

2. 在區內五支卵石河流狹窄山谷入口，各豎立警告牌一面，勸導民衆勿進入，以免發生意外，及在登山步道入口處立牌標明此保留區地勢險峻，地質脆弱，易於崩塌，無本處工作人員引導切莫攀登以免發生危險等之標示牌，以提醒民衆注意生命安全。

3. 在區內沿平坦坡面開闢1,280公尺的步道以利巡邏外，對前往作學術研究工作者之安全亦有所幫助。

4. 委託學術研究機構辦理植物生態調查工作，將在近期內完成調查報告。

5. 在登山步道兩旁常見樹木根部立樹名和學名牌，俾利外界人士對樹種之辨識。

6. 在崩塌懸崖具危險區段約300公尺用直徑2公分之尼龍繩設安全圍攔。

7. 爲防止不法事件發生，繼續由本處三義工作站巡視員每月巡邏20次以上。

8. 製作幻燈片作爲解說教育之教材，及編印自然保育資料，贈送民衆喚起國民對自然保育觀念之共識。

需要繼續進行工作：爲建立此自然保留區的完整永續資料，除依「文化資產保存法」加強其保護措施以防止外力加予的破壞外，對此地區地理景觀的變動及生態體系的演替，將擬定計畫每二年辦理一次動、植物的生態體系調查，又每隔5～10年或發生重大災變後辦理一次地理調查，以瞭解各種生態體系的演變，作有系統的資訊資料。

三結果與建議：

「苗栗三義火炎山自然保留區」迄今得以保持其原來面貌，主要有「文化資產保存法」及「台灣地區自然生態保育方案」之法令依據可供主管機關作爲經營管理外，保育界人士不遺餘力共同致力於保育觀念之宣導及落實自然保育工作的結果。

建議事項：「苗栗三義火炎山自然保留區」與新中苗六線公路之間，有一塊狹長的

河床地，在此河床地之東面有國產砂石廠，而靠苑裡鎮之水門建有一間廟宇，雙方開扣河川地利用，此舉對火炎山之景觀影響頗鉅，輿論迭有反映，本處亦曾函請主管之苗栗縣政府查處，但效果不彰。又附近居民更利用此河床地傾倒垃圾，製造髒亂，對環境造成污染，建請農委會以上級主管機關之立場，督促主管單位對此河床地加以管理，以保護此區自然生態景觀避免遭受人爲的破壞。

台東紅葉村台灣蘇鐵自然保留區管理維護計畫執行報告

陳　守　發[1]

一、前　言：

台灣蘇鐵（*Cycas taiwaniana*）係裸子植物，爲常綠木本棕櫚狀小喬木，葉羽狀叢生於頂端，長約 1 至 2 公尺，邊緣不反捲，成倒傘狀，花單性雌雄異株，雄毬花成長圓錐形，長約 50 至 60 公分，雌毬花成卵圓形，長約 20 至 30公分，每一毬果可產生 100 至 200 粒左右之種子，種子橢圓形直徑 2 至 3 公分長約 4 至 5 公分，台灣蘇鐵樹形優美係大衆所喜愛之庭園植物。

蘇鐵一般稱之爲鐵樹是一種原始植物，發育在中生代距今約一億四仟多年之時代，是地球經過幾次大變動倖存下來少數古老植物之一，可說是一種古老的活化石，目前台灣蘇鐵自然生長者已非常少，尤其是大面積群落生長者更是稀少，本保留區台灣蘇鐵原始生長分佈面積廣達二百九十多公頃更爲珍貴。

二、執行目的：

本區於日據時代即已發現此樹種，本處經於民國六十四年及六十七年派員前往現場從事生態調查，本處爲保存本地區原始天然生台灣蘇鐵及其生態環境，除保存天然植物不處分主副產物外並派員加強巡護觀察等工作，防止盜取台灣蘇鐵以保存此天然植物資源。

本保留區之成立目的是在使此珍貴稀有之活化石—台灣蘇鐵永續生長，以供科學及教育研究之用。

三、野生動物資源：

㈠位置範圍

本區台灣蘇鐵分佈地點在延平事業區 19 ， 23 及 40 林班沿鹿野溪兩岸地區面積 290 公頃 46 ，東西狹長達 7 公里之長，北岸分佈比南岸多，海拔高約 300 公尺至 900 公尺左右，台灣蘇鐵群落大多分佈在鹿野溪兩岸之開曠山坡上，峭壁及崩塌地亦有生長，分布地區甚廣，但以延平第 19 林班接近 23 林班處生長最多，本保留區之地質以頁岩板岩爲主並夾有砂岩互層，結構脆弱很容易崩塌，土壤爲砂質壤土含石量很高，排水性

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良好而較乾燥，極適合台灣蘇鐵之生長。

㈡人文交通

由台東市乘車經延平鄉之紅葉村可到達卑南上圳入水口之水壩管理站，約30公里行車時間需 1 小時，然後沿鹿野溪右側之人行步道步行約 6 公里可到達本保留區之入口處，目前附近建有一護管站房，再往前步行約 10 公里可到達延平 19 林班接近延平 23 林班處，係本區台灣蘇鐵分佈最多之地區，往南渡河可達延平 40 林班，但雨季時水流湍急無法渡河，若欲再前往延平 23 林班需渡河數次並需步行 3 至 4 小時，唯雨季因河水極深無法渡水，乾旱季節涉水亦相當危險艱苦。

㈢氣象

本區雨季從 5 月至10月，乾季從11月至翌年 4 月，乾雨季各佔半年劃分相當明顯，全年降雨日數約 130 天，年降雨量約 2,300 公厘，年平均溫度爲攝氏 23 度，最熱爲 7 月平均溫度爲 28℃，最冷爲 1 月約 17℃，4 月至 8 月吹東南風，9 月至翌年 2 月多吹東北風。

四執行情形與成果：

本保留區於民國75年 6 月27 日由行政院農委會正式公告爲「大武事業區台灣蘇鐵自然保留區」，復於民國 77 年 9 月 7 日由農委會依文化資產保存法公告台灣蘇鐵爲「珍貴稀有植物」而加以保護。

本處爲瞭解本保留區內台灣蘇鐵現況情形，經於民國 76 年 12 月份派員從事現況調查及施行每木調查工作，共計調查台灣蘇鐵 800 株，除每株懸掛壓克力號碼牌外並詳記胸高直徑及樹高等資料以供林木生長研究之用，經統計結果以樹高分析其高度，未滿 1 公尺者計 121 株佔 15.12％，1 公尺以上未滿 2 公尺者計 349 株佔 43.63％，2 公尺以上未滿 3 公尺者 252 株佔 31.50％，3 公尺以上未滿 4 公尺者計 62 株佔 7.75％，4 公尺以上未滿 5 公尺者 14 株佔 1.75％，5 公尺以上者 2 株佔 0.25％，全林最高者爲5公尺 20 公分。

台灣蘇鐵在本區呈部落群居分佈，單株生長較少，台灣蘇鐵屬陽性樹種，喜陽光照射不喜寒冷潮濕及遮蔭等特性，因此在開曠之山坡上生長最多，海拔高約 300 公尺至 900 公尺左右，分佈以東南向及南向居多，林木覆蓋鬱閉及林地潮濕之地區甚少發現其生長。

本保留區經派員查勘結果爲保存台灣蘇鐵之生態環境，將附近之原始濶葉樹林擴大劃入保留區內，保留區面積共爲 290 公頃 46 ，本處在桃源林產物檢查站旁及紅葉村內

各設立大型標示牌一座，並於保留區入口處興建一所護管站房。

本保留區每月由大武工作站派員加强巡視並於區內設置巡邏箱，由巡視人員簽寫巡邏卡回站後填寫巡視日記簿以便查核，隨時由本處派員前往督導觀察等工作，經查尚未發現有盜伐之案件發生，本處將再繼續加强巡視及觀察等工作，以保存此稀有珍貴之自然資源，以供科學及教育研究之用。

五檢討與建議：

㈠台灣蘇鐵自然保留區僅提供作爲科學及教育研究之用而不開放觀光與旅遊，以免大批遊客湧至本保留區參觀破壞其生態環境而影響台灣蘇鐵之生育。

㈡台灣蘇鐵自然保留區係甲種山地管制區，建議警政單位加强管制非法入山檢查工作，違者依法從嚴究辦。

㈢加强宣傳及教育工作，教導學生及一般民衆瞭解自然保育之重要性，進而養成全民愛護稀有珍貴植物之觀念。

大武事業區台灣穗花杉自然保留區管理維護計畫執行報告

陳　守　發[1]

一、前　言：

台灣穗花杉（*Amentotaxus fomosana*）係裸子植物爲常綠小喬木，葉爲寬大之線形，長約5至9公分寬約0.5至0.8公分葉對生反捲，背面有兩條白色氣孔帶甚爲明顯爲其特徵之一，花雌雄異株，雄花多數懸垂如穗集成柔荑花序，每穗長可達5公分，雌雄花每三、四月間同時開花，毬果於六、七月間成熟，種子具有長柄，橢圓形，直徑約1公分長約2公分，成熟時外面包有一層紅色的假種皮，有甜味，鳥類及松鼠等喜食之。

台灣穗花杉產於台灣南部之大漢山及姑仔崙山一帶，係台灣特有植物，目前因原始森林遭到破壞，台灣穗花杉之數量已非常稀少，因此成立台灣穗花杉自然保留區更具有實質之意義。

二、執行目的：

本處於民國六十二年間辦理林相變更材積調查時，在大武事業區第39林班發現此稀有樹種，因此未劃入處分區域範圍而加以保留，當時本處爲免破壞此樹種之生態環境，將附近近百公頃之林班均未予處分而很完整的保留下來，此項保留在生態保育史上可以說是一件很大的貢獻，當時除不再處分主副產物外，並派員加强巡護防止盜伐盜取之案件發生，以保存此稀有天然植物資源。

本保留區之成立目的是在使此珍貴稀有植物台灣穗花杉永續生長，以供科學及教育研究之用。

三、環境及現況分析：

㈠位置範圍

台灣穗花杉自然保留區位於中央山脈南段之大漢山東南面山坡，鄰近屏東縣界與潮洲事業區第19林班相毗鄰，保留區面積爲86公頃40，台灣穗花杉分佈於海拔1100公尺至1,500公尺，此地區之林相均爲濶葉樹林，林相尙保存原始狀態。

㈡人文交通

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本區位於台東市西南方約90公里之深山中，交通極爲不方便，人煙稀少，人跡罕到，因此人爲之干擾較少。

十幾年前本處大武事業區從事林相變更時，由大武林道可直接通達大武39林班，現在因該地區已完成造林工作且歷經十幾年，原有林道因年久失修已不能通車，目前需從台東市經由屏東縣之水底寮（約 130 公里），再經由大漢林道前往，於大漢林道 23 公里處（本處於76年在該處設置一面標示牌）循人行道步行 4 公里可達本保留區台灣穗花杉之生長地點，全程共需 157 公里（車行 153 公里，步行 4 公里）。

㈡氣象

本區氣溫適中而多雨，年平均溫度約 16℃，一月份平均溫度爲 10℃，七月平均溫度爲 20℃，雨季爲每年 5 月至 9 月，乾季爲 10月至翌年 4 月，年平均雨量約爲 2,500 至 3,000 公厘，本區溫度較高經常有大霧，尤其一過中午卽濛上大霧，能見度甚低，視線極爲不佳，春夏兩季吹東南風，秋冬多東北風。

四執行情形與成果：

本保留區於民國75年 6 月27日由行政院農委會正式公告爲「大武事業區台灣穗花杉自然保留區」，復於民國77年 9 月 7 日由農委會依文化資源保存法公告台灣穗花杉爲「珍貴稀有植物」而加以保護。

本處爲瞭解本保留區內台灣穗花杉現況情形，經於民國76年 2 月份派員從事現況調查及施行每木調查工作，共計調查台灣穗花杉 421 株，除每株懸掛壓克力號碼牌外並詳記胸高直徑及樹高等資料以供林木生長研究之用，經統計結果以幼齡木及小徑木居多，2 公分至 8 公分者，合計 329 株佔 78.15％，10 公分至 18 公分者合計 68 株佔 16.15％，20 公分至 36 公分者合計 24 株佔 5.7％其中最大者爲 36公分，未發現有更大者。

台灣穗花杉在本區域呈部落群居分佈，甚少發現有單株生長者，分佈在天然濶葉林呈被壓狀態構成第二層樹冠，喜蔭性萌芽力甚强，根際部常有二株以上之萌蘗，唯尚未發現有純林分佈或優勢木者。

本保留區經派員查測結果爲保存台灣穗花杉之生態環境，將附近之原始濶葉樹林擴大劃入保留區內，保留區面積共爲 86 公頃 40，本處在大漢林道 23 公里處及保留區入口處各設立大型標示牌一座。本保留區每月由大武工作站派員加强巡視並於區內設置巡邏箱由巡視人員簽寫巡邏卡，回站後填寫巡視日記簿以便查核並由本處隨時派員前往督導觀察等工作，經查尚未發現有盜伐盜取之案件發生，本處將再繼續加强巡視及觀察等工作，以保存此稀有珍貴之自然資源，以供科學及教育研究之用。

五、檢討與建議：

㈠台灣穗花杉自然保留區僅提供作爲科學及教育研究之用而不開放觀光與旅遊，以免大批遊客湧至本保留區參觀，破壞其生態環境而影響台灣穗花杉之生育。

㈡台灣穗花杉自然保留區係甲種山地管制區，建議警政單位加強管制非法入山檢查工作，違者依法從嚴究辦。

㈢加強宣傳及教育工作，教導學生及一般民衆瞭解自然保育之重要性，進而養成全民愛護稀有珍貴植物之觀念。

大武山自然保留區管理維護計畫執行報告

陳　守　發[1]

一、前　言：

大武山自然保留區面積四萬七千公頃，範圍涵蓋利嘉、知本、太麻里、金崙及大溪等五個集水區，本地區地理景觀特殊林相完整而茂密，除小部份係造林地外，絕大部份皆係未開發之天然濶葉樹林，區內無濫墾地及租地，係全省目前面積最大林相最完整之天然林地。

本保留區內高山峻嶺人烟稀少，河川多而險峻，因目前植被尙保持天然狀態，野生動物在此棲息繁衍極爲適合，因此野生動物之種類與數量均極爲豐富，尤其許多珍貴稀有及瀕臨絕種之動物尙生存於本保留區內。

農委會認爲本省原有之中低海拔天然林大部份已遭破壞，致使野生動物棲息場所不斷的縮減，復以嚴重的捕獵壓力，使得本省野生動物的處境愈來愈危險，如不卽時加以適當保護，終有一天自然界之生態平衡無法控制，國家的寶貴生物資源也將因而失去，因此農委會刻意的加以規劃予以保護，將本地區劃爲「大武山自然保留區」。

二、執行目的：

農委會依據「文化資產保存法」於民國77.年1.月13.日正式公告爲「大武山自然保留區」，本保留區主要保護對象爲野生動物及其棲息地、原始森林、高山、湖泊等，面積四萬七仟公頃，位於大武事業區第2.～10.、12.～20.、24.～30.林班及台東事業區第18.～26.、35.～43.、45.～51.林班合計50.個林班。

本保留區成立之目的是在保護本區內一切野生動物，使本保留區成爲野生動物生存之樂園，使珍貴稀有及瀕臨絕種之動物永續繁衍生存，爲後代子孫留下珍貴生物資源並提供科學及教育研究之用。

三、環境及現況分析：

農委會經於民國76.年及78.年聘請專家教授數次深入保留區內實地調查野生動物生長情形，經調查結果顯示本區內動物資源極爲豐富，至少有25.種哺乳類、37.種鳥類、21.種爬蟲類、10.種兩棲類及6.種魚類等，其中有部份係屬於「野生動物保育法」第四條列爲

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保育類而應加以保護者，哺乳類有台灣黑熊、水獺、台灣獼猴、穿山甲、黃喉貂、白鼻心、石虎、台灣水鹿、山羌、台灣長鬃山羊等11.種。鳥類有藍腹鷴、帝雉、鴛鴦、大冠鷲、竹鳥、畫眉、金翼白眉、冠羽畫眉、烏頭翁、台灣紫嘯鶇等10.種。爬蟲類有百步蛇、錦蛇、雨傘節、眼鏡蛇、龜殼花、南台草蜥、蛇蜥等7.種，兩棲類有莫氏樹蛙、褐樹蛙等二種。蝴蝶有黃裳鳳蝶一種。

負責調查之專家學者因保留區面積遼濶及受地形、交通、氣候、時間及人力等因子之影響未能作全面之調查，因此大武山自然保留區可能孕育著更多更豐富的動物資源。

四執行情形與成果：

本計畫執行的方法分爲違獵器具之拆除與巡邏，自然保育教育宣導及自然保留區之經營管理三方面進行。

㈠違獵器具之拆除與巡邏

1.執行情形

⑴本保留區目前由大武工作站及知本工作站僱用山胞組成「大武山野生動物巡邏隊」並由員工領隊從事巡邏工作，分6.條路線不定期巡視，每月每路線巡視一至二次以上，每次巡視3.至4.天，在各巡邏路線上設置巡邏箱，由管理處不定期派員抽查，另每季會同當地警察人員巡邏以加強取締違獵工作。

⑵巡邏隊巡邏主要任務係巡護林地、保護森林、取締違法狩獵、毒電魚、拆除獵具、陷阱、獵寮及採摘植物等，減少捕獵壓力，以保護本保留區內之野生動物。

2.執行成果

⑴巡邏隊查獲違獵器具之種類及數量甚多，主要的有獵寮、電魚器具、魚網、獸鋏、吊索、捕獸籠、鳥仔踏、獵槍之彈藥、捕蝶網等，其中部份置於大武站及知本站展示，其餘由本處集中保管。

⑵本區未列入保留區以前狩獵及毒電魚活動極爲公開，目前已甚少發現狩獵及毒電魚情形。

⑶目前巡邏隊所查獲之獵具及工寮已大爲減少，因此可知本區之獵捕壓力已大爲減少。

㈡自然保育教育宣導

1.執行情形

⑴本處於各主要入山道路設立大型標示牌，以宣傳自然保留區之重要性及提醒民衆愛護野生動物之意識，另在捕獵及毒電魚較嚴重地區設置小型警告牌，以使出入人員有所戒懼而防患未然。

⑵派員參加當地村民大會，宣導保育新知及政令，呼籲民衆切勿違法狩獵，共同維護天然資源。

⑶提供新聞稿供當地傳播媒體作爲宣傳素材廣爲報導。

⑷商請當地警察派出所及入山檢查哨嚴格查禁違獵案件。

2.執行成果

⑴目前在各主要入山道路設置大型標示牌七面，獵捕較嚴重地區設置小型警告標語牌約60面。

⑵由大武及知本工作站派員參加村民大會，宣導保育政令及保育觀念。

⑶提供新聞稿蒙各類報社、廣播電台採納，使社會大衆對自然保留區的發展有更深廣的認識。

㈢自然保留區之經營管理

1.執行情形

⑴現階段保留區之經營管理乃依據文化資產保存法第52條規定「自然保留區禁止改變或破壞其原有自然狀態」之原則經營管理。

⑵停止保留區內一切之開發案件。

⑶本保留區除提供科學及教育研究外不開放觀光、登山旅遊等活動以免野生動物之生活受到干擾。

2.執行成果

⑴本處爲配合保留區之成立將預定編列爲79.年度伐木計畫之台東事業區第38.，39.林班，面積565 公頃取消處分，並將大武事業區第9.10.13.20.24.林班已標售之黃藤自77.年度起停止採取，本處以身作則維護自然保留區之生態完整，頗獲社會各界之讚佩。

⑵76.年11.月派員會同警方强制拆除比魯溫泉地區之非法帳蓬出租業之違建工寮及其設備，以減少該地區人爲之干擾。

⑶駁回保留區內一切礦區租地，設置水權及採取副產物之申請以保持植被之完整，以利野生動物之棲息與生存。

五檢討與建議：

㈠建議制定適當法令禁止一般民衆擅自進入保留區，因爲民衆進入保留區最容易破壞生態環境及干擾野生動物之生存。

㈡建議恢復設立森林警察使自然保留區及森林保護工作更能有效執行。

㈢加强取締山產店非法販賣保育類野生動物，目前山產店林立生意鼎盛且大部份皆以販賣保育類野生動物爲主，建議警政單位依照「野生動物保育法」規定嚴加取締山產店違法宰殺、買賣、陳列、交換保育類野生動物。

自然保護區生態基準資料庫之建立

謝長富

一、前　言

隨著經濟之發展，人口之激增，對於人類賴以維生之自然資源需求亦大幅提高。多年來過度之開發使自然資源日趨匱乏，加上高度之工業化更引起環境之惡化而危及人類之生存。有鑑於此，自然保育之呼聲日高，而保護區之設立亦由各相關單位積極推動中，自然保護區具有多方面之功能，不僅提供科學研究及教育之用，亦可做爲對照區以評估土地開發經營時所造成之種種影響面及影響程度。

目前及未來台灣地區所設立之自然保護區包含有各種稀有及面臨絶滅危機生物之生育地與不同之代表性體系。對各保護區之現況評價以及建立基準背景資料，正是目前主管機構積極進行之重要工作之一。

本研究之目的在奠定基準資料庫之結構，並實際加以運用，所完成之軟體稱之爲植物資源資訊系統 PRIS Ver. 1.0。其功能在協助地區性植物資源之調查、植被資料分析、稀特有植物族群特性及其生育地現況之評估、植物分佈及其相關資料之擷取處理等。期望能對未來台灣地區自然資源之經營有所助益。

二、資料庫之結構

PRIS是以個人電腦爲基礎所建立之一套軟體系統。硬體設備包括 PC/XT 或 PC/AT 相容之機種及其周邊設備如 EGA 或 VGA 相稱螢幕、24針列表機、繪圖機、數位板、硬碟等標準配備。另外爲處理影像資料，加裝騰龍彩色繪圖卡及彩色影像掃描機。

軟體方面除PRIS所提供之功能外，尚結合 dBASE Ⅲ、AUTOCAD 及 CLIPPER 等套裝軟體，一併運用。

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PRIS以兩大部分所組成。第一部分提供植被特性分析之功能、第二部分則著重在植物特性之資訊處理方面。亦即前者是以區域爲導向，而後者以主題爲導向。

三、資料庫之功能

（一）植被特性分析

植被特性分析之功能在分析及展現一區域植被之組成及結構，其執行過程可區分爲下列諸步驟：

1.資料結構之設定：包括植被調查之項目。

2.原始資料之處理：包括各資料之輸入、修正、列印及合併。

3.學名整理及名錄之製做：能產生調查地區或是樣區之中英文植物名錄，且依一定之次序排列。

4.產生分析用之種～樣區矩陣：其數值可選用底面積、覆蓋度、覆蓋面積、樹冠體積及重要值等，同時能加以標準化或一致化。

5.產生樣區間或種間之相似矩陣，以做爲進一步分析之用。

6.優勢度及組成分析。

7.歧異度分析：包括各種歧異度指數之計算、優勢度～歧異度曲線以及種分佈指數～重要值之相對圖形。

8.散佈分析：能濃縮原始資料，藉著低度空間之圖形，將樣區間、種間、或樣區與種間之關係顯示出來，並且探討與環境因子間之相關性。

9.歸類：依據種在各樣區之值量特性，而以圖表方式表現出樣區間或種間之樹狀結構關係。

10.相關分析：能檢視兩變數間之回歸關係，如樹高與 DBH、樹齡與 DBH之關係。

11.族群結構：檢視 DBH，年齡及高度之分佈類型，以顯示一地區木本植物社會之族群結構，並推測未來該社會之演替趨勢。

12.分佈類型：製做植物各植株之分佈圖，並且分析其分佈類型。

（二）植物特性資料之處理

植物之特性極多，資料項之收集須視目標而定。一般言包含分類地位及名稱（學名及俗名）、稀特有之狀態、地理分佈、生育地之物化及生物特性、植物體形態特徵、經濟或生態價值、繁殖特性以及生存壓力等。以上諸特性可經由現場調查、圖書雜誌之記

載、標本館及博物館所存放標本之檢視而收集之。同時這些資料需詳加歸類，系統化存檔，始能有效地加以擷取運用，做爲資源評估、保育經營與環境影響評估之依據。

PRIS第二部份即在處理植物之特性，其執行過程及功能如下：

1.資料項之規劃：包含通用架構之設計，以適應不同之需求。資料項之輸入、更正、顯示等均包含在規劃之內。

2.圖形及影像資料處理：地理分佈、生育地之特性（如地質、氣候、土壤）植物之形態特徵、景觀等均需以圖形及影像之方式加以展現，才具生動性。因此圖形及影像先利用周邊設備加以製做及輸入。

3,資料庫查詢：設定一項或多項條件做爲查詢資料庫之依據，並配合圖形及影像之輸出，以符合使用者之需求。

四、結論與建議

本研究雖獲致初步結果，但正處於開發階段，各項規劃仍有不妥或不盡理想之處，有待進一步之修正與發展。爲使研究與實驗配合，目前正著手將現有各自然保護區之調查資料逐步加以區分規劃並進行建檔工作。在建檔過程中，同時檢討PRIS軟體系統之缺失從而加以修正或增加一些其他方面之功能，使其日臻完善。

紅樹林保育推廣示範

陳明義* 林信輝 林昭遠
呂金誠 沈競辰 洪丁興

臺灣西海岸紅樹林分布於淡水、東港之間，具保安與科教價值，唯部分紅樹林已消失或滅種。本紅樹林保育推廣示範計劃進行三年，執行要項包括臺灣紅樹林現況調查、保護林區之指定、保護措施之研擬、新植或復育地點之選定、解說摺頁及明信片之編印以及宣導推廣等。執行成果摘要如下：

一、高雄灣紅樹林由盛而衰，目前僅在旗津陸上殘存數株海茄苳與欖李大樹，原存之細蕊紅樹與紅茄冬已滅絕。全臺灣較大的欖李與五梨跤群落目前亦僅見於臺南市四草與四鯤鯓。歸納臺灣紅樹林急速消失之主要原因爲：

1. 沿海地區港口、工業區、火力發電廠、社區等之爭地。
2. 魚塭經營方式改變，漁民不再倚重紅樹林之護岸與防風功能。
3. 沿海居民不再依賴紅樹林提供薪材、染料等。

二、建議亟待加强保育之紅樹林，由北至南爲：

1. 淡水河口竹圍、挖仔尾與關渡紅樹林(水筆仔)。
2. 新豐紅毛河口紅樹林(水筆仔、海茄苳)。
3. 東石沿海紅樹林(海茄苳)。
4. 布袋鹽湖紅樹林(海茄苳)。
5. 北門鹽湖紅樹林(海茄苳)。
6. 臺南四草墓地與四鯤鯓塭岸紅樹林(欖李、五梨跤)。
7. 永安水道、塭岸與鹽田紅樹林(海茄苳)。
8. 高雄旗津陸生紅樹林(海茄苳、欖李)。
9. 東港水道紅樹林(海茄苳)。

三、建議作爲紅樹林增植或復育之地點包括：(1)溫寮沿海；(2)高美沿海；(3)伸港海埔地；(4)好美寮鹽湖；(5)茄萣鹽田。

四、已編印臺灣紅樹林摺頁兩式及明信片兩套，分發有關機構與人員參考，並利用不同研習會場合加以解說與宣導。唯後續之保育與推廣工作仍需有關單位與全民共同推動。

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森林生態教育宣導示範先驅計畫

黃英塗*・曾珍妮*

一、計畫目的

1.協助遊客對溪頭森林遊樂區內森林及其他自然生態資源之認識、瞭解與欣賞，使其獲得充實而愉快的遊憩體驗，產生愛林、保林的觀念。

2.引導遊客對區內各項資源及設施作合理利用，並機動引導遊客遠離易遭破壞或過度利用之地區，而減輕區內生態環境之衝擊。

3.透過解說服務之雙向連繫作用，增進遊客與管理機構間之相互了解，有助於各項經營、管理及服務設施之改善。

二、執行方法

1.解說設施之維修與更新：包括充實旅遊服務中心之各項解說器材及展示內容；增設解說牌及自導式步道；編印各項解說摺頁與資料。

2.教育宣導及解說服務：平時由專任解說員在遊客中心及區內各遊憩據點採定點或定時方式，現場爲遊客講解森林及其他自然資源與人文景觀之外，並接受各機關、學校、旅遊團體之預約，作生態宣導及解說服務。寒暑假遊客較多時，由甄選自各大專院校相關科系之臨時解說員支援解說，並從事遊客問卷調查工作。

三、執行成果

本(77)年度計畫執行成果如下：

1.解說設施之維修與更新方面：增闢林間自導式「健康步道」60公尺，並設置「森林浴」、「森林是水的故鄉」、「林間步道」、「健康步道」等大型木質解說牌四座；化石實物展示二座及介紹化石之解說牌「滄海桑田的故事」一面；新編「溪頭森林遊樂區簡介」彩色摺頁及「推廣多用途的固有優秀樹種—樟樹」彩色解說資料，並增印「介紹幾種溪頭重要及有趣的植物」、「昆蟲之旅—溪頭」、「溪頭森林遊樂區遊覽路線圖」、「怎樣享受森林知性之旅」等解說資料，於遊樂區入口、遊客中心大廳、各餐廳旅社櫃台、販賣部等處，免費供遊客取閱。此外並擬具溪頭森林遊樂區旅遊服務中心營運計

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畫大綱供爲執行本計畫之參考依據。

2.教育宣導及解說服務方面：經統計本年度內在溪頭森林遊樂區旅遊服務中心及各據點接受解說服務之遊客達14.萬人次，各界反應極爲良好。

四 結 論 與 建 議

1.本計畫實施兩年多來，已初見成效，不但直接提供遊客認識本區自然生態環境的機會教育，並使遊客瞭解本區之經營目標，進而產生對本區環境維護的熱誠，顯著地減少各種破壞行爲。因此往後應繼續辦理此類對遊客及遊樂區經營管理單位均有實質益處的解說服務工作。

2.解說服務應列爲各遊樂區重要服務項目之一，爲使其能長久延續，並發揮解說服務的功能，各遊樂區應有詳實「解說服務計畫」之規劃作爲實施的依據，其內容應包括下列各項：(1)解說服務目標，(2)解說主題之調查與分析，(3)選定各地點解說主題及解說方式，(4)實施解說主題之具體方案，(5)解說服務計畫之評價。而多年來溪頭森林遊樂區雖經常實施各項解說服務工作，但截至目前爲止，除了旅遊服務中心營運大綱之外，尚無具體之「解說服務計畫」可資依循，亟應早日委請專家或自行規劃、設計，並付之實施。

3.溪頭森林遊樂區範圍廣闊，平均每日遊客人數約 3,000 人，假日更達 4 、 5 倍以上，而執行本計畫所約僱之專業解說員僅有 2.人，根本無法應付衆多遊客之解說需求。然因實驗林本身在財政上爲一自給自足單位，近年來經費極爲拮据，除招募有興趣的社會青年或各大專院相關科系學生施以短期講習訓練，作爲義務解說員，於假日來區爲遊客作解說服務外，無法編列增加解說員之預算，擬請行政院農委會能繼續支持本區森林生態教育宣導之解說計畫，逐年編列預算補助，並增加本計畫之解說員名額至 6.人，使更能發揮教育宣導之功能。

全國各大專院校加強推動生態保育活動計畫

陳 榮 隆[1]

壹、執行目的

文明改善了人類的生活，卻也給世界帶來了可怕的環境污染，尤其卅多年來，我國在追求經濟成長過程中朝野普遍忽略了生態環境保護的重要性；資源的濫用，公害的擴散，自然生態出現了失衡的警訊，我們已面臨嚴重的威脅。台灣地區自從開始重視環境保護後，爲了讓地球的生物，維持平衡生態保護大自然一片清潔的淨土，於是關心環保的人士，提出了一句警惕世人的話：「我們只有一個地球！」如果我們把地球毀滅了一那就是說我們不重視生態保育及環境污染的問題，任意製造污染，毀壞了這個環境，人類就會滅絕。

三十多年來，台灣的自然生態、我們所生存的空間已嚴重失去她昔日的光彩。這個被世人所讚歎的福爾摩沙一我們生於斯、長於斯的故鄉，有誰來關心她的老去、死活呢？

生態環境的污染破壞是現代化的副產品。台灣過去一直追求無限制的經濟成長，的確我們的經濟被譽爲奇蹟，我們的國民所得、生活水準也到達一定的水平，但三十幾年來，我們得到我們預期的驕傲，卻也同時失去原本所擁有的一乾淨的空氣、清澈的溪流、健康的土地及青翠的山林。因此在我們所期望的公元二〇〇〇年——邁入已開發國家之列時，我們生活環境是否也會達到理想的標準？爲此我們提出「全國各大專院校加強推動生態保育活動計畫」，對全國各大專院校青年傳播正確的生態保育觀念，使知識青年在國家現代化過程中得以體認政府政策，對生態保育內容生產回饋作用，發揮意見領袖影響功能。

貳、執行情形

自民國七十五年迄今，針對全國各大專院校學生活動中心正副總幹事、社團負責人、社團幹部，透過各種活動方式及服務，宣導生態保育政策、介紹生態保育知識、加強

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生態保育宣導以及擴大宣導生態保育理念。執行情形如下：

一舉辦寒暑假全國大專社團負責人研習活動，調訓全國各大專院校學生活動中心正副總幹事及社團負責人，宣導生態保育政策。每期一三〇人計辦理十六期參加人員二千多人次。

二舉辦週末研習活動，由台北、新竹、台中、台南、高雄五個大專學生社團服務中心，調訓各大專院校社團幹部，介紹生態保育知識。計辦理九十六期，每期一〇〇人參加人員近萬人。

三協助各大專院校辦理社團幹部訓練活動，加強生態保育宣導，計辦理三五〇次。

四協助各大專院校社團辦理生態保育宣導工作，計四〇〇餘次。

五發動各大專院校辦理還我青山、環保週、香魚計劃、綠化環境、登山淨山等校際活動，擴大宣導生態保育理念。

參、結果與建議

經過多年的努力，各大專院校同學對我們生態保育環境維護的意識已覺醒，但我們可見到，單有意識是不夠的，政府、企業界、社會民衆都需要有正確的生態保育觀念，也就是整個生態環境被污染破壞是全面、整體的，包括經濟、政治、文化等因素，並不是單一的作法就能解決。生態保育運動是永無止盡的，是要一點一滴的努力，更是大家的責任。

今日我們這一代已預支了下一代的生態環境資源，我們只顧眼前的生活，卻未爲下一代的子孫著想，這是很不公平的，因爲他還未出生，不能跟你爭。因此我們今天生態保育運動要由認知教育期，邁向運動期。大衆傳播對生態保育運動是很重要的，可以扮演鞭策的角色，使政府努力改善環境。政府更要有前瞻性的作法，要有人本思想，替我們子孫留下乾淨的水、空氣、陽光，並且注重生態環境倫理教育。

社會每一份子都能成爲行動者，爲我們的生態保育環境維護盡一份力，政府、企業、社會各階層亦然——關心我們生存的環境，從自己每日的生活、身旁事物作起，竭自己所能去想、去看。或許我們才能再次擁有乾淨的空氣、清澈的溪流、健康的土地及青翠的山林。

自然文化景觀保育宣揚工作

1. 葉承　2. 徐喜美

前　言

過去我們的教育不重視鄉土或本土環境的內容，以致國民普遍對鄉土知識不足，近年來國內學術單位對本土的地理、生態、社會及人文方面已進行一些研究，而各社教機構或出版社也出版了一些文宣資料或研究成果，但一般人或因生活繁忙，或因資訊管道不足，或因沒有良好的學習環境或習慣，因而對自己週遭的環境仍陌生得很，因此，「知性之旅」義工小組成員們希望結合小組伙伴們不同的專長，相互成長，並分享社會大衆，讓大家能因爲了解鄉土而關懷鄉土，進而對鄉土的自然、文化景觀工作作有形無形的維護，使我們鄉土的自然文化景觀能不被破壞或日漸改善。

執行目的

「知性之旅」工作小組每兩個月舉辦一次認識鄉土的「知性之旅」活動，讓民衆從旅遊活動中對台灣本土的地理、人文、社會景觀或背景作實地的勘查與了解，進而關懷鄉土、愛護鄉土，74年7月至79年6月共舉辦「知性之旅」活動32次。

「知性之旅」工作小組每兩個月出刊一期「保育通訊」，藉以報導保育專文，國內外保育新聞、紙上「知性之旅」，目前國內稀有動植物及環保行動專欄。

執行情形

74 7. 1.～79 6. 30. 知性之旅活動

活動日期	活動名稱	活動地點	活動內容
74 7. 21.	沙丘之旅	上福、草漯、紅毛港	台灣西海岸沙丘地形及海濱植物
74 9. 15.	鼻頭角之旅	鼻頭角	岩岸地形及海濱生態

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國聯矽業化學股份有限公司
台北市民生東路687號9樓

2. 徐喜美
台北市萬興國民小學
台北市秀明路2段114號

74 10. 20.	台北盆地之旅	台北、林口、關渡、圓山、五股	台北盆地的成因、地形、人類的活動及自然災害
74 11. 24.	水資源之旅－看水去	民生污水處理廠、青潭堰、蟾蜍山淨水廠	自來水水源、淨水過程及污水處理
75 1. 26.	三貂嶺之旅	基隆河上、中、下游	河流地形及人類活動對河流的影響
75 3. 23.	蘭陽平原之旅	蘭陽平原	蘭陽平原地形、開發史及沼澤生態
75 5. 25.	桃園冲積扇之旅	桃園台地	桃園台地地形、漢人聚落及漢人對自然的利用
75 7. 27.	台北盆地之旅	象山、華岡、竹子湖、二重疏洪道	台北盆地的地形、人口演變及近人開發導致的危機
75 9. 28.	大漢溪谷之旅	大漢溪沿岸	大漢溪沿岸地形景觀及水庫之興建和水土保持
75 11. 22. ～ 75 11. 23.	東勢大湖之旅	火炎山、東勢、卓蘭、出磺坑	火炎山地形景觀及東勢地區農作型態及現況
76 2. 22.	蘭陽平原之旅	蘭陽平原	蘭陽平原成因、地質地形特性、開發史、河川整治
76 4. 26.	沙丘之旅	觀音、草漯	沙丘成因、定沙植物、防風林及海岸的經營
76 6. 21.	大屯火山蝴蝶花廊之旅	大屯山	火山地形及大屯山蝴蝶花廊之生態
76 8. 23.	北海岸之旅	北部海岸、淡水、富貴角、金山、野柳	北海岸地形、海濱植物及人類觀光遊憩活動對此地區的衝擊

76 10. 25. （77 4.17.）	草嶺古道之旅 （因颱風改期）	草嶺古道	古道農觀及興築的歷史背景
76 12. 25. ～ 76 12. 26.	竹鹿之旅	竹山、鹿谷	當地農業活動及開發史
77 1. 17.	台北都會區捷運系統之旅	台北市政府捷運局	未來台北都會區捷運系統
77 3. 20.	七星夢幻之旅	七星山、夢幻湖	火山地形的今昔及其生態環境
77 5. 14. ～ 77 5. 15.	東北角之旅	東北角海岸風景特定區	海濱地區的生態景觀及其發展
77 7. 15. ～ 77 7. 17.	台灣東部之旅	台東、花蓮	東部地殼運動的痕跡及其人文特性
77 9. 18.	台北盆地之旅㈠	台北盆地	台北盆地的形成、變遷及發展
77 11. 20.	台北盆地之旅㈡	台北盆地	台北盆地的自然發展及災害
77 12. 31. ～ 78 1. 2.	台灣東部之族	台東、花蓮	東部地殼運動的痕跡及其人文特性
78 3. 19.	桶后溪之旅	烏來桶后溪	桶后溪沿岸生態景觀及水源保護
78 5. 21.	鶯歌陶瓷之旅	北投、鶯歌	製陶、陶器之運用
78 7. 14. ～ 78 7. 16.	嘉南平原之旅	嘉義、東石、布袋、左鎮、烏山頭、大崗山、台南	漁村景觀、惡地地形、惡地改良後之土地利用及嘉南平原之開發史與聚落型態

78 9. 17.	濕地之旅	關渡、挖仔尾、洲美	基隆河沿岸之濕地生態
78 11. 19.	客家文化之旅 （第一梯次）	竹東、北埔、湖口	客家文化特色與人文風貌
79 1. 21.	桃園台地之旅	大溪、龍潭、湖口、楊梅	桃園台地的形成、土地利用與變遷
79 2. 18.	客家文化之旅 （第二梯次）	竹東、北埔、湖口	客家文化特色與人文風貌
79 3. 18. 79 3. 25.	金瓜石之旅 （第一梯次） （第二梯次）	九份、金瓜石	產金地之今昔及未來發展
79 5. 19. ～ 79 5. 20.	東勢大湖之旅	東勢、大湖地區	東勢、大湖地區的地貌及土地利用

執行結果與建議

「知性之旅」活動廣受參加者熱烈歡迎與回響，今後將繼續辦理，並力求改進使活動辦得更臻完美；但「保育通訊」之出刊因出刊週期較長，篇幅也有限，而義工們均屬兼職性質，無法增加篇幅和內容，致使該通訊不若「知性之旅」活動廣受肯定，故擬於下次計畫中刪減此刊物之出刊。

臺灣昆蟲特展

王 效 岳[1]

執行目的

昆蟲綱是世界上種類最多的一類動物，已命名種類超過一百萬種，而根據昆蟲學者的推測，臺灣昆蟲的種類約達五萬種之多，因此昆蟲在臺灣生態環境中扮演著很重要的角色，對我們人類的生活亦有很大的影響。

中華昆蟲學會為了使一般社會民眾對臺灣昆蟲有更多的認識，乃邀請國內16個和昆蟲研究有關的公私立機構，在臺灣省立博物館聯合舉辦了這項昆蟲特展，分別介紹臺灣的昆蟲相、臺灣昆蟲學研究概況、昆蟲的保育、臺灣有用昆蟲的利用、臺灣養蜂及養蠶的經營事業、藥用昆蟲、有害昆蟲及防治、害蟲之生物防治、森林害蟲、衛生害蟲、費洛蒙防治害蟲、昆蟲博物館介紹等項目。

執行情形

1987年7月31日到8月31日展出的1個月期間，各種豐富的的昆蟲標本和精美的透明片展示內容，吸引約10萬人次參觀人潮，會場並有電視錄影播放介紹。所有的展示內容皆編印成一本精美的說明手冊，供參觀人士攜回做為永久的參考。在展覽期間並邀請多位昆蟲學家舉辦一系列的專題演講，以擴大宣導的效果。

結果與建議

政府在推行農業政策之同時，欲防制農藥等化學廢棄物污染空氣和水源，並處理協調業者和當地民眾之間的糾紛極感困難，本次展覽可宣導民眾正確防治有害昆蟲的途徑和觀念，進而使環境保護問題獲得改善，人民的生活品質得以提昇。本次展覽亦增進大眾對臺灣昆蟲相的深入認識，激起民眾研究昆蟲的興趣，進而配合政府保育昆蟲的工作，達成保護我們生態環境的目的。

1 服務單位：臺灣省立博物館
地　　址：台北市襄陽路2號

推廣高雄市各級學校
生態保育及愛護鳥類巡迴宣導計劃

魏 銀 南*

壹、研究目的

高雄地區爲一新興工業城市，資源開發迅速，一般市民均忽略自然生態保育觀念，隨著經濟的發展，生態環境迭遭破壞。由於鳥類是人類生活環境的指標，愛護鳥類爲自然生態保育的重要一環，藉此計劃，重點式向各級學校推廣鳥類的保護意識，宣導生態保育觀念，往下紮根，讓下一代了解自然生態資源的寶貴和環境保育的重要性，以期不久的將來，這些學生會起而帶動高雄地區對自然生態保育措施的重視和落實。

貳、研究材料及方法

一製作宣導媒體：

1.海報與書籤。

2.生態保育及愛護鳥類解說單。

3.幻燈片—包括鳥類及自然生態保育實例、文字解說等。

二生態保育及愛護鳥類巡迴宣導：

1.委請高雄市政府教育局中、小學主管科，分別函送各級學校張貼宣導海報。

2.重點選擇十五所學校，放映宣導幻燈片（視宣導對象之不同略作調整），解說並面對面研討，贈送書籤。

三野生鳥類實地觀賞指導：

1.定期接受各級學校預約，舉辦十五梯次野鳥棲息地（如澄清湖觀、觀音山、黃蝶翠谷、墾丁國家公園等）實地觀賞野鳥，指導並解說。

2.在解說賞鳥的同時，誘導學生愛鳥、護鳥，以及生態環境的保育常識。

*高雄鳥會

高雄市建國一路 306 號之 1

參、研究結果

一生態保育及愛護鳥類巡迴宣導：

1.在十五次的宣導活動中，宣導對象有小學生、小學生與家長、小學教師、高職生等，其參加次數分析如下：

- 純小學生：6次，約佔全部次數的40％。
- 小學生與家長：6次，約佔全部次數的40％。
- 小學教師：2次，約佔全部次數的13.5％。
- 高職生：1次，約佔全部次數的6.5％。

2.小學生大多由學校篩選對自然生態有興趣者，因此宣導效果極佳，不但聚精會神，而且頻頻發問，甚至盡已所知，主動搶著回答同學們的發問，而且肯用心記憶。

3.部份小學教師非常認眞，除作筆記外，並詢問詳細資料，作爲指導校內學生課外活動的內容。

4.高職生比較沒有小學生的興緻，倒是旁聽的教師對賞鳥方面頗爲有趣。

5.家長與小學生一起聽講的情形比較熱鬧，學生在講堂中頻頻發問或搶答，家長則在講完後探詢賞鳥的方法。

6.高雄地區的小學經常邀請本會赴校宣導講演，但是却未有任何一所國中或高中學校向本會查詢或邀約，可能與升學壓力有關。

二鳥類棲息地實地賞鳥指導：

1.共十五梯次，均爲小學生，其中十次有家長陪同。

2.在鳥類棲息地實地觀賞鳥類，經過解說後，大多觀賞者包括學生和家長都會異口同聲地表示：「希望這些美麗的鳥不要被捕殺」，以及「希望這些自然環境不要被破壞」等。可見愛鳥、護鳥的意識也能促使觀賞者對環境的認知和維護，這是生態保育一個很好的起步。

三高雄市凱旋國小師生對宣導活動特別有興趣，除重複二次邀約本會赴該校作宣導活動外，並廣加提倡，由該校分別舉辦全市「小學生科學研習營」及「小學教師科學研習營」，以生態保育及賞鳥爲主題，由本會支援，頗獲校際讚嘉，現已成爲該校每學期定期活動之一。

肆、結論及建議

學童的心靈總是充滿著對大自然的憧憬，從小開始讓他們接觸鳥獸、昆蟲、花草樹木，讓他們徜徉青山綠水，與大自然爲伍，從而了解自然生態資源，關心各種生境的變化，使年青的一代都具備了廣義的地球觀，將正確的生態保育意識深植他們的內心，往下紮根，幾年或十幾年之後，我們的社會就擁有衆多的生態保育生力軍，由年青人來實踐理想，前伏後繼，各層面都將有熱心的人關心生態保育，爲生態保育出力。即使生態保育的最高理想不一定能一蹴而成，至少可以降低生態環境遭受破壞的程度。

根據我們一年來熱心對生態保育和愛護鳥類的巡迴宣導經驗，雖然我們已經播下了種子，在高雄市小學之間已引起迴響，但是我們發覺鳥會的人力有限，無法到達各個學校全面推廣，因此我們建議改變一下活動的方式，以達到全面共識：

一定期在賞鳥區舉辦跨校「教師生態研習營」，以生態環境認知與賞鳥、愛鳥爲主題，提供資料及支援解說，培訓教師成爲推展此項活動的催化劑。

二協助各級參加過「教師生態研習營」的老師，在自己的學校定期舉辦學生「生態研習營」，由點擴展爲面，以收事半功倍之效。

東亞國際候鳥繫放先驅計畫
中部大肚溪口繫放報告摘要

賴子文[1]　羅俐娟[1]　梁皆得[1]

歷年的春、秋季水鳥調查暨新年鳥類調查資料顯示出；本區岸鳥的種類和數量，一直是台灣西海岸之首，因此由農委會主辦在本區的繫放，自是有其重要與代表性。

本區繫放計畫即將屆滿三年；第一年度係自民國七十六年八月起至七十七年六月底止，合計繫放二十一次，捕獲三十九種，一、三〇七隻次候鳥；第二年度係自七十七年八月起至七十八年六月止，共計繫放四十七次，捕獲四十六種，四、五五五隻次候鳥；目前正進行第三年度計畫，係自七十八年度至今（七十九年四月底），已繫放二十三次，捕獲超出三、〇〇〇隻次候鳥。

以上短短三年繫放九十次計畫過程中，最重要的是捕獲到由澳洲方面繫放的候鳥五隻，其資料簡述如下：

1. 幃鷸(Calidris ruficollis)
   腳環號碼 032-44968
   原放鳥地 澳洲 Hobart (42° 53' 5S, 147° 19' E)
   放鳥日期 1986年12月 6日
   回收日期 1988年 8月14日
2. 反嘴鷸(Xenus cinereus)
   腳環號碼 051-25308
   原放鳥地 澳洲(32° 52' S, 151° 46' E)
   放鳥日期 1988年 3月27日
   回收日期 1989年 4月 7日
3. 游鷸(Calidiris ferruginea)
   腳環號碼 040-98966
   原放鳥地 澳洲 (42° 58' S, 147° 32' E)
   放鳥日期 1979年11月23日
   回收日期 1989年 4月 7日
   （時間間隔：九年四個月十四天）
4. 寬嘴鷸(Limicola falcinellus)
   腳環號碼 041-46537

1 台中鳥會
台中市南區40207三民路一段14號

原放鳥地 澳洲 Port Hedland (20° 15' S, 118° 55' E)
放鳥日期 1988年 4月 8日
回收日期 1989年 4月22日

5.幃鷸(Calidris ruficollis)
腳環號碼 033-42671
原放鳥地 澳洲 Port Augusta(32° 31' S, 137° 47' E)
放鳥日期 1989年 2月17日
回收日期 1989年 5月 6日

本區繫放候鳥的資料，七十六年度已有年度報告交呈農委會，謹此將七十七年度以後所繫放候鳥的資料概略分析，以及繫放心得報告簡述如下：

一. 七十七年秋冬季水鳥過境高潮期間(七十七年九月三日至十月八日)，共計繫放八次，六七三隻次候鳥，七十八年春季水鳥過境高潮期間(七十八年四月至五月六日)共計繫放八次，一七三九隻次候鳥，而國際繫放回收捕隻鳥中，有四隻是在這期間回收的，(七十八年四月六日、八日、二十一日和五月六日)，據此資料推測候鳥之遷移過境，於春季北返的途逕中，中部大肚溪口是重要的中繼站。

二. 繫放過程中發現，(七十七年度)東方鴴是唯一繁殖的岸鳥。繫放年度第三十六至四十一次(七十八年四月六日至二十九日)之間，所捕獲的東方鴴，羽毛多數有孵卵斑，有些東方鴴的下腹部還可以觸摸感覺到卵。第四十二次(七十八年五月六日)以後所捕獲的東方鴴，便不再發現孵卵斑。其繁殖期間，成鳥完全未換羽；但，第一年鳥皆無發現有孵卵斑，且飛羽均已換新。

三. 紅領瓣足鷸是本區最具代表性的春季過境鳥，全年繫放五四六隻次，於七十八年四月二日至五月六日，共繫放五三八隻次紀錄。

四. 根據二年來之架網經驗，架設於潮間帶之網，已有固定據點，主要以淡水之河溝與潮間帶交接處；網架東西走向，將漲滿潮前先收攏鳥網，待退潮開始時，再將鳥網張開，經驗中退潮時間所捕獲的鳥數均較漲潮時多。

五. 本區的環境變遷頗鉅，是值得憂心之處。主要變數均由人為因素如養殖業之濫墾，使得潮間帶迅速縮小；採砂場所的擴張暨垃圾污染等等，亦使繫放據點經常改變；近年社會環境的變異，先則有不法份子在大肚溪口作野外實彈射擊，獵殺冬季之雁鴨科鳥類，續有兩岸走私、偷渡等情勢的發展，使得繫放工作人員壓力增大。

綜觀年來繫放所得資訊，為生態科學研究及保育工作之推展，逐漸的建立一完整且可信度高的候鳥遷移調查紀錄資料檔案，仍是十分需要且迫切的工作。

「自然生態保育巡迴展覽及演講」活動執行報告

報告人　鄭貫群[1]

壹、執行目的

在人口壓力和工商業快速發展下，臺灣的生態環境和自然資源已遭受嚴重破壞。近數年來，國人體認良好的生活品質，不僅止於物質享受的滿足，因而導致環境保護和自然保育的呼聲日益增高。但由於許多人對保育自然未具正確認識，故教育社會大衆認識自然，應是刻不容緩的事。

本活動執行目標係在自然生態保育主題下，藉由舉辦巡迴展覽及演講活動，教導民衆認識周遭環境和自然生態，進而使自然生態保育問題漸獲解決。

貳、執行情形

一、巡迴展覽部分：七十八年度（ 78.7～79.6 ）假全省各縣、市文化中心，共舉辦自然生態保育巡迴展覽五項，六十四場次。

活動項目	展覽內容
魚及魚類資料巡迴展	魚的分類、歷史與化石、生態習性、基本結構等照片、標本；臺灣的漁業、生態保育海報，以及魚類書籍、食譜等。
臺灣昆蟲生態攝影巡迴展	臺灣昆蟲生態攝影115幅。
臺灣蜥蜴巡迴展	由文化大學生物學系、師範大學生物學系提供臺灣各類蜥蜴圖片42幅，及說明看板29片。
海洋生物攝影巡迴展	包括海綿動物、腔腸動物、環境動物照片134幀，分門別類展出海洋生物的生態環境。
臺灣海藻巡迴展	臺灣海藻種類、生活史、養殖等圖片；褐、綠、紅藻類標本；海藻食品及藻膠利用食物等。

1. 服務單位：臺灣省立博物館
台北市10014襄陽路二號

二、巡迴演講部分：1.以全省師範學院學生爲對象，內容以自然保育觀念之傳播爲主，每校一次，共計八次。2.以農科（農工）學校學生爲對象，內容以從稀有動、植物保育觀念到實際執行情形的宣導爲主，共計廿二校，每校一次。

參、結果與建議

一、結果：各類巡迴展覽展出圖片及實物珍貴而生動，因而頗獲好評。自然生態保育觀念廣爲推廣，逐漸根植於全省民衆心中。各項展覽參觀人數統計如後：

活動項目	參觀人數(人次)	展出場次
魚及魚類資料巡迴展	8,840	2
臺灣昆蟲生態攝影巡迴展	66,240	16
臺灣蜥蜴巡迴展	75,968	16
海洋生物攝影巡迴展	70,048	16
臺灣海藻攝影巡迴展	61,292	14
合計	282,388	64

巡迴演講部分，係對各師範學院、農工類學校全校師生演講，加深各校師生對自然環境的認識，日後更能散播保育觀念於未來工作崗位上。

二、建議：綜合各項展覽參觀之建議事項如后：1.每項展覽可配合安排專題演講，使有興趣者能獲得更深入認識。2.各項展覽可提供相關之專業書籍，展覽單位隨時翻閱，解答參觀者問題。3.昆蟲生態展包含之科類別較少，且應標明昆蟲名稱。4.巡迴演講因主辦單位居於演講者與聽講學校之中間聯絡，協調較不易，日後可提供主講人名冊，各校依其需要自行安排。

中小學自然生態保育教育宣導之調查研究

杜 娟 娟[1]　　吳 功 顯[1]

前　言

自然生態保育之教育工作爲一長期性教育事業，行政院農業發展委員會有鑑於生態保育之教育工作必須由國民基礎教育著手，因此委託國語日報社從事爲期五年（自民國七十五年至七十九年）的自然生態保育教育推廣計畫。教育推廣對象爲台灣地區中小學生，計畫內容包括：㈠舉辦「自然生態保育」徵文、徵畫比賽；㈡編印自然生態保育徵文、徵畫優等作品集；㈢編印自然生態保育兒童叢書。期望透過舉辦活動以及編印叢書分贈全省各中小學圖書館的方式，達到自然生態保育教育宣導的目標。

研 究 目 的

本研究即針對該項教育宣導計畫自民國七十五年至七十七年止之執行情形進行瞭解，並探討初步執行成效。因此，本研究的目的如下：

1. 瞭解中小學學生媒介接觸情形。
2. 瞭解全省各中小學圖書館概況。
3. 分析中小學自然生態保育教育宣導計畫的初步成效。
4. 根據上述分析，對日後中小學生態保育教育工作提出建議，以供日後規劃之參考。

研 究 方 法

由於推廣教育計畫中之徵文、徵畫部分無法取得參賽者詳細資料，且當初國中、國小高年級學生如今已畢業離校，追踪調查不易。故僅就編印自然生態保育叢書部分，進行研究調查。

本研究計以問卷調查訪問隨機抽樣之中小學學生共 2,752 人，郵寄各校圖書館問卷回收 1,572 份，實驗法測試德協國小學生計 341 人，並邀請 9 位中小學老師依十項考評指標對十五本叢書進行評鑑工作。調查所得之資料以交叉表、變異數分析等方法進行分析。

研 究 結 果

1. 國中、國小分別有 3.2％及 19.1 ％的學校尚未成立圖書館或圖書室。除非這些

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學校採取巡迴各班閱覽的方式，否則圖書贈閱的效果將受影響。

2. 中小學擁有各項視聽器材的比例頗高。因此製作自然生態保育教學錄影帶或幻燈片，寄贈各校配合教學使用之方式，可行性很高。

3. 叢書編寫內容優良，製作精美。惟內容僅適合國小中、低年級同學閱讀，對國小高年級與國中生而言，內容稍淺。

4. 目前有八成以上的學校圖書館內無此叢書，普及程度不夠，將嚴重影響教育宣導效果。

5. 閱讀叢書的同學與未閱讀叢書的同學，在叢書內容相關之生態保育測驗上，呈顯著差異，表示閱讀的效果明顯。

結論與建議

1. 中小學自然生態保育教育宣導工作之執行，叢書製作優良精美，書籍在各校圖書館內使用頻率頗高，且閱讀效果顯著，惟因叢書流傳不廣，致教育宣導工作成效未盡理想。整體而言，若能有效掌握書籍流傳過程，並依學生程度編寫深淺不一的內容，編製叢書分贈各校圖書館的方式仍然值得採行。

2. 在經費有限的情況下，應由多種可行方式中選擇較有效率的傳播途徑。建議對幾種可行方案進行深入研究，評估並比較各項媒介的成本與效果，以便對日後生態保育教育宣導工作之推行，提供更具體之參考。

台灣地區商業性昆蟲資源利用之調查

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一、研究目的

為瞭解昆蟲在商業上之利用現況，本研究以製作問卷訪談及資料蒐集整理之方式，調查台灣地區商業上昆蟲之利用之方式，及相關業者對昆蟲之利用情形；是否會危及珍貴稀有種類之族群，並探討業者目前面臨之問題。除一方面建立昆蟲資源保育之基本資料外，亦提供政府及業者參考，冀望兩者在昆蟲利用及保育之間能儘量獲取共識，使此項資源能作合理、永續之利用。

由楊（1988）之資料得知，昆蟲之商業性利用可分成（1）昆蟲標本、活體及加工之利用；（2）人、魚、鳥、獸之食用；（3）家蠶、蜜蜂等有用昆蟲之利用；（4）中藥昆蟲之利用；及（5）生物防治及胡蜂（Vespidae）昆蟲之利用等。

由於家蠶、蜜蜂之利用在政府方面已有「台灣省農林廳蜂蠶試驗場」，在民間則有「中華養蜂協會」之研究推廣；寄生蜂類應用於生物防治亦有一民營單位從事玉米螟卵寄生蜂（Trichogramma ostriniae）之飼養販售，但主要的是由農委會、農林廳及台灣糖業研究所合作之大量繁殖兩種赤眼卵寄生蜂（T. ostriniae 及 T. chilonis），再以成本價販賣給農民。而胡蜂科昆蟲之利用則已有趙（1988）之調查報告。故本研究乃以昆蟲標本、活體及加工品之利用調查為主；同時亦調查民間對中藥昆蟲及食用昆蟲之利用情形。

一、材料及方法

1. 昆蟲標本、活體及加工品之利用：

(1) 調查範圍及對象

本項調查將台灣分成北、中、南、東及離島等

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五區；調查對象分大、中盤商及特產店兩類。前者係自職業及業餘採集者處收購昆蟲或僱人採集昆蟲之業者。後者則為販售特產、紀念品、山產、外銷商品等之業者，其中亦有觀光飯店及機場之特產部。訪談對象包括大、中盤商19家及特產店79家。

(2)調查方法

本研究原係製作問卷郵寄及電話訪問，但發現成效欠佳；乃改以製作問卷直接赴大、中盤商及特產店進行訪談，訪談問卷內容如附表；次將問卷資料進行整理分析。

2．中藥昆蟲利用之調查：

(1)調查範圍及對象

本項調查係以大台北地區為範圍，包括台北市及台北縣之永和、中和、板橋、新莊、樹林、三重、新店、淡水等；對象為各轄區內之中藥店。

(2)調查方法

依民國77版大台北地區之電話簿所列892家中藥店，扣除所在地不詳之74家即818家中藥店（包括批發商5家），逢機取90家（11％）進行問卷訪談；其中台北縣、市所進行訪談之店數如附表。再將訪談之有效標本85家（10.4％）結果進行整理分析。

3．食用昆蟲利用之調查：

(1)調查範圍及對象

有關食用昆蟲之利用分人食及動物食用；前者係以台灣大學在學生為對象，在全校13020人中，分文、理、法、醫、工、農及管理學院等七學院，逢機抽樣發出1953人（15％）之問卷；再將實際有效回收問卷859份（6.6％）之結果進行分析。後者則赴台北市之寵物店、鳥店作動物食用昆蟲種類之定性調查。

4．其他昆蟲之利用：

有關家蠶及蜜蜂之利用調查，係蒐集1982-1988年台灣省農林廳年報之家蠶及蜜蜂產量、產值進行統計；至於胡蜂科昆蟲之利用則依據趙（1988）之

調查報告。

三、結果與討論

1. 昆蟲標本、活體及加工品之利用：

(1) 昆蟲大、中盤商之分佈：

在19家大、中盤商中，北、中、南、東各有 8、7、3 及 1家，以北及中部最多。不過在調查末期即1989年12月底為止，至少有4家大、中盤商因經營不濟歇業。

(2) 昆蟲大、中盤商經營型式：

19家中以專職經營為主者有11家，8家係以兼營為主；專營為主者，有部份兼賣香菇等山產，兼營為主者，則以其他山產及特產為大宗。由此亦可看出昔日Marshall (1982) ；Morton and Collins (1984) ；Owen (1976) ；Severinghaus (1977) 及 Unno (1974) 等報告所述及台灣昆蟲商業性利用之景氣，如今已消失。

(3) 昆蟲大、中盤商經營時間：

平均為19.5年；其中最長者為71年，最短者則只有6年。此結果亦顯示此行業仍以世代經營為主，但近十年來此業赬條，工資又昂貴，僱大量工人經營者已甚罕見。

(4) 兼營昆蟲業者之經營時間：

在87家之兼營者中，平均經營時間為20.7年；其中10年以下者有24家，11-20年者有45家，21年以上者則有18家；可知特產店業者亦以世代經營者為主；但昆蟲類之販售只是業者收入之少部份 。

(5) 昆蟲標本、活體及加工品之貨源：

大部份之貨源來自國內各地者，佔92％；購自國外者只有8％。不過利用之名錄中卻發現，有部份係CITES附錄Ⅱ之種類。國外產者，亦有不少是大型、漂亮之種類。而CITES附錄Ⅱ之種類，其輸入是否取得合法文件進口，猶待查證。至於國內產之種類，幾乎18種已被列入瀕臨絕種及珍貴稀有之種類 (

農委會， 1989），均在交易名錄中，此實值得檢討。

(6)國內昆蟲貨源之來源：

以中部最多佔35.9%，其次為南部24.0%；北部19.8%，東部18.3%又次之；而離島者僅2%。由此尚可發現目前國內貨源仍是以中、南部闊葉林區內之昆蟲為主。除職業採集人外，尚有利用昆蟲盛季參與採集之業餘採集者；其中大多數為原住民及其下一代。

(7)國內昆蟲貨源之類別：

以蝶類所佔最多為48.3%；甲蟲類次之，佔35.3%；蛾類10.0%又次之；蟬類、竹節蟲等其他昆蟲只佔6.4%。在蝶類中，一般常見之種類有108種，其他特殊種類則達30種；甲蟲類則以大型、漂亮之種類為主。蛾類主要為皇蛾。

(8)國外昆蟲資源之類別：

亦以蝶類最多，所佔有貨源之36.6%；其他為甲蟲類31.0%及蛾類22.5%；蟬類、蠶斯類等9.9%。不過在此類中，屬於CITES附錄Ⅱ（CITES，1990）之種類；亞歷山大鳥翼蝶（Ornithoptera alexandrae）、高山天堂蝶（O. chimaera）、紅頸鳥翼蝶（Trogonoptera brookiana）、大青蝶（I. brookiana albescens）及黃裳鳳蝶屬（Troides spp.）均可在市面上見及，此類是否合法進口宜加注意，以免引起爭議。

(9)昆蟲標本、活體及加工品之銷售對象：

顧客中以外國人居多佔59.9%；本國人為40.1%。其中日本人佔34.3%，其他外國人為21.9%。在本國人中以學校、博物館及研究機構之23.6%最多。

(10)業者利用昆蟲之型式：

包括製作好或未製作好之標本，蝶蛹為主之活體標本及加工品。加工品包括 <1>蝴蝶畫：精緻畫及卡通造型畫 <2>裝飾品 <3>日用品：包括桌巾、

茶杯墊及書籤等。

(11)最受顧客歡迎之昆蟲：

以台灣產蝶最受歡迎，佔43.6％；其次為國外產之蝶類25.0％；國外產之甲蟲類及國內產之蛾類25.0％，分別為14.5％及12.8％。

(12)進口昆蟲利用之類別、價格及進口地區：

進口之昆蟲分蝶蛾類，甲蟲類（包括鍬形蟲、獨角仙類、金龜子類、天牛類及吉丁蟲類等。）及其他（包括蠟斯類、竹節蟲類及蟬類等）。價格例如太陽蝶Morpho hecuba obidonus每隻單價在1980年前為台幣7元；大型蛾類每隻約2.5元；甲蟲類則每公斤約500元。進口地區及國家包括泰國、馬來西亞、新加坡、印尼、巴西、哥倫比亞及肯亞等。至於進口量及總值雖查閱有關進出口貿易月報及關務年報等期刊，由於係以總項估算，並未列出商品細目之量和總值，故無法估計進口總量。而其他野生動物及其產品之進口量之估算亦未分細目列出，所以如想做好野生動物及其產品－包括昆蟲類之進出口管制，今後此細目之單價、總量及總值，仍應詳細明列。

(13)國內商用昆蟲之類別及利用方式：

國內蝴蝶之利用，發生量較多之一般種類共有108種被作商業利用，主要用於蝴蝶畫之製作、活體外銷、裝飾品及日用品之製作，至於特殊種、包括特有種，稀有種則有30種被利用，多以標本收藏為主。大型蛾類共有10種被利用；其中以皇蛾（Attacus atlas）最多；均經製成裝框標本販售。甲蟲類及其他昆蟲則以製成標本販賣為主；一部份例如擬穀盜（Tribolium spp.），則作動物之食物。

(14)國內大、中盤商所利用昆蟲之數量及價格：

在1980年以前大發生之黃蝶類，淡黃蝶類，每年曾利用100萬-1500萬隻，每隻僅0.5-1元；斑蝶類，每年利用20萬-50萬隻，每隻0.5-2元；鳳蝶類，每年利用50萬-300萬隻，每隻0.5-30元。稀有蝶類

，如寬尾鳳蝶每隻之收購價均在800元以上。皇蛾類，每年消耗5000-10000隻，每隻15-20元。甲蟲類，例如鍬形蟲類，每隻在20-2000元，因種類及個體大小而異。

但在1981年以後，昆蟲價格普遍上揚；像過去每隻僅3-5元之豹斑蝶，自1989年底已升至20元。屬台灣特有種綠小灰蝶類，每對均在1000元以上。不過，蝶類之價格往往會因年度發生數量及訂單之大小而有升降。收購量則受訂單及市場需求而定。以調查期間而言，大量之訂單少，景氣可謂十分低落。

(15)商用高價格之種類及零售價：

在高價昆蟲中以仁愛綠蛺蝶（Euthalia malapana）每對曾販售26萬元新台幣最高。而8公分以上台灣大鍬形蟲及長角大鍬形蟲每隻2000-30000元次之；寬尾鳳蝶每對5000-10000元又次之。

(16)大、中盤商貨源有無減少趨勢：

據多數業者表示，以1000公尺以下地區包括平地，昆蟲約減產80％；在蝶類中台灣麝香鳳蝶、珠光鳳蝶、寬尾鳳蝶、大紫蛺蝶、仁愛綠蛺蝶、霧社綠小灰蝶及寶島小灰蝶數量已明顯減少。而甲蟲類中之台灣大鍬形蟲、台灣角金龜及虹彩吉丁蟲，亦有減產之現象。

(17)業者經營面臨之危機：

近十年來，尤其是這五年內，昆蟲經營業者幾乎很難維持，在19家大、中盤商中至1989年12月為止，又有4家歇業。造成此現象之原因依序為<1>國外業者競爭，銷路欠佳<2>工資高，成本高，利潤低<3>資金不足<4>棲地遭破壞，昆蟲貨源減少 <5> 熟練工人難覓<6>相關之保育法規的限制<7>顧客之接受之能力。

(18)昆蟲經營業者對未來之期望：

由訪談結果得知，多數業者的意見為： <1>希望成立公會組織<2>呼籲保護原始林，尤其是闊葉林

區應多保護；以提供昆蟲繁衍之棲地 <3>希望政府能多輔導少限制 <4>希望學術界能多配合，推廣昆蟲知性之旅活動 <5>希望政府獎勵昆蟲園及蝴蝶園之設置 <6>希望限制性法規之推展能多和業者進行溝通，以求達成共識。

本研究並依分類方式整理出國內昆蟲經營業者所利用之昆蟲名錄；值得注意的是在利用之名錄之18種國內立法保護之瀕臨絕種及珍貴稀有種類，仍可在市面上交易；而且列名於CITES附錄Ⅱ之種類，有部份亦能在市面上見及。

2. 中藥昆蟲之利用：

(1)經營年代及經營者：

在85家有效樣本中，經營最短者為2.5年，最長者達107年。經營者大多為世代經營，有由學徒出身者，亦有中醫身份者。

(2)中藥材中昆蟲所佔比例：

在85 家中僅有一家認為昆蟲藥材為總中藥藥材總使用量之11-20%，而有79家則認為昆蟲藥材佔中藥藥材之5 %以下，可見目前使用昆蟲藥材除少數種類，像冬蟲夏草之外，大多只為其他中藥材之添加劑。

(3)中藥材中常用之昆蟲藥材：

在所列舉之34類歸分為常用、少用及不用昆蟲藥材中，較常用者僅冬蟲夏草、蟬蛻、五倍子、螵蛸、蠶蛻、白僵蠶、蠶砂、蜂蜜、及非昆蟲類之金蠍、地龍乾（水蛭）、蜈蚣。

(4)昆蟲藥材使用量：

此項調查結果亦因查閱相關進出口文獻及海關資料中未作細分之項目統計，故無法估計；但由於冬蟲夏草之使用頗為普遍，所以據多數業者表示，每家每月所販賣之金額約為五、六千元，如以5500元計，則大台北地區每年冬蟲夏草之消費金額約為

五千九百萬元。

(5) 昆蟲中藥材之來源：

由訪談資料得知，昆蟲中藥材講究所謂之「道地藥材」，故即使有許多種類台灣均有出產，例如露蜂房、白僵蠶、蠶砂、蠶蛻、蟬蛻等均有出產，但目前絕大多數俱由大陸經香港轉口至台灣。

除了上述結果之外，本報告已整理出現在常用昆蟲藥材之名錄、功用及入藥型式，同時也探討業者對昆蟲藥材之見解，及昆蟲藥材未來之發展。

3. 食用昆蟲之利用：

(1) 食用昆蟲之類別：

食用昆蟲分人食及其他動物之食用：前者以台灣大蟋蟀（Brachytrupes portentosus）為代表，目前已商業化；主要是在啤酒屋及山產店、特產店販售；後者在魚食方面主要為供紅龍魚食用之黑蟋蟀（Gryllus bimaculatata）及美洲蜚蠊（Periplaneta americana）。鳥食方面則以俗稱麵包蟲之擬穀盜類（Tribolium spp.）為主。

(2) 食用昆蟲之種類：

本項調查就調查對象所食過之昆蟲種類建立名錄；其他中最常吃之種類為台灣大蟋蟀、蝗蟲類、蜂類（包括蜜蜂及胡蜂之幼蟲及蛹）。

(3) 食蟲之經驗：

由本項調查得知，台灣大學學生有食蟲經驗者平均為26.3%，在18.5% －31.8%之間，各學院學生略有差異；但男女學生間，則有明顯差異。

除此，本項調查並就食蟲方式，受訪者對食用昆蟲之接受程度及食用昆蟲未來之之潛力等進行探討。由於目前所食用之昆蟲無絕種之虞，故未進行消費量之調查。

4．其他昆蟲之利用：

根據台灣省農林廳年報（1982-1988）之資料整理結果得知，由1982-1988年蜂產品－包括蜂蜜及蜂王漿之產量及產值得知，蜂蜜產量在1982年只有742公噸，但1988年達4054公噸；產值在1982年之89040仟元，而1988年則為608100仟元。產量最高者為1983 年之637296仟元。蜂王漿之產量在 1982 年時只有 178103公斤，產值為650076仟元；而最多之年份為 1985年之285074公斤，882019仟元。由此可知，在1982-1988年間，蜂產品總值在691200仟元-1253179 仟元，其中以1985年之1253179仟元最多。

至於蠶繭之產量，在1982-1988年間，為141171公斤-1248759公斤；產值在28607-182331仟元之間。由表可知，產量及產值有逐年降低之趨勢；由此亦可發現養蠶業在這些年間有逐年萎縮之現象。

另外，有關胡蜂科昆蟲之利用，據趙（1988）之調查，台灣民間入神所使用之胡蜂科個體每年約6萬隻，總值達6000萬元。至於在獲取胡蜂巢後，常將幼蟲、蛹及成蟲浸泡於米酒或高粱酒中以「蜂酒」方式販賣，一般以紹興酒瓶裝販售，零售價在300-500元間；在盛產期，即每年之秋天，山產店所推出之「蜂筍」即其幼蟲，零售價每台斤約1000元。

結果及建議

1．昆蟲標本活體及加工之利用，在台灣光復至1981年間雖曾有段黃金時代；但在近十年來，此業卻已成為黃昏工業之一，究其原因固然和國際上同業之競爭，生態保育意識之興起及貨源有密切之關係；但由於國內業者對於產品之設計未精緻化，也未能引起顧客之注意及喜愛，亦為主因。所以如欲使此方面之產品有競爭能力，應揚棄過去以量取勝、粗製濫造、製作便宜之觀念，應結合昆蟲學家、設計師之力量，力求產品精緻化，生產高級品。

2．由調查得知，在所利用之昆蟲中有部份為國內及CITES 附錄Ⅱ之種類，此和目前之野生動物保育法發生抵觸；且對於昆蟲利用之方式，像蝴蝶畫，經常引起國內、外生態保育界之人士和團體之詬病；是故為使昆蟲保育工作能徹底執行，使此工作更臻完善。

3．業者對於「昆蟲園」、「蝴蝶園」及「知性之旅」等前景咸表樂觀，農委會或許可連絡林務單位進行規劃，並輔導或獎勵業者從事此方面之投資。

4．林地之開發及山區土地利用已破壞許多蝶類及昆蟲之棲地，且貨源減產之現象，尤其是闊葉林區，為昆蟲最佳之棲地，在今後開發時應注意是否危及保育類昆蟲之族群。

5．在海關之商品分類細目中雖有昆蟲標本、昆蟲藥材、昆蟲活體等之項目（CD Code），但在關務年報及進出口統計，無法獲得昆蟲產品之實際進出口量，且對於標本及活體之進出口亦未列種類，其中可能含保育類昆蟲，而成為管制上之漏洞；而其他野生動物之進出口亦出現類似之問題。故建議農委會能邀約相關專家、學者及海關、商檢局人員進行研商，以擬妥善辦法，使野生動物保育法之精神在進出口野生動物及其產品方面能更落實。

中文摘要

台灣地區昆蟲之商業性利用可分成：（1）昆蟲標本、活體及加工之利用；（2）人、魚、鳥獸等動物之食用；（3）家蠶及蜜蜂之利用；（4）中藥昆蟲之利用及（5）生物防治和胡蜂科昆蟲之利用。其中和昆蟲保育息息相關者為昆蟲標本、活體及加工之利用。

由19家大、中盤商及79家特產店之訪談問卷調查結果得知，目前大、中盤商集中在台灣北部及中部；由於近十年來此業已不景氣，專職經營為主者僅11家，特產店業者則全為兼職經營。大、中盤商經營此業的時間為6-71年，平均為19.5年；兼營者則平均為20.7年。至於目前所利用之昆蟲，其貨源92％來自國內，8％則來自國外。國內之貨源以中部佔最多，為35.9％其次為南部，佔24.0％；北部、東部又次之，為19.8％，18.3％。國外之貨源主要來自泰國、馬來西亞、新加坡、巴西及肯亞。

在國內之昆蟲貨源中，以蝶類最多，為48.3％；甲蟲類次之，為35.3％。國外之昆蟲貨源中，亦以蝶類最多，為36.6％；其次為甲蟲類之31.0％及蛾類之22.5％。昆蟲標本、活體及加工品之銷售對象，外國人佔59.9％，本國人佔40.1％，其中日本人最多，為總數之34.3％。其次為美、德、英等其他外國人，為21.9％。本國人中則以學校、博物館及研究機構最多，佔23.6％。

業者利用昆蟲之型式以標本、活體及加工品為主；加工品包括（1）蝴蝶畫；（2）裝飾品；（3）日用品：包括桌巾、茶杯墊及書籤等。在所有商品中，以台灣產蝶類最受顧客歡迎，佔43.6％；其次為外國產蝶類，為25.0％。國內被利用之蝶類，數量較多者共有108種，主要用於蝴蝶畫、活體外銷及日用品之製作。特殊種包括特有種共30種。大型蛾類，則以皇蛾為主。進口蝶類28種蝶類中，除兼用於製作蝴蝶畫外，其餘均被用於製成裝框標本。由於昆蟲商品進出口統計資料未明確細分統計，本研究依（1）台灣光復以後至1980年間及（2）1981年以後僅列出已知種類之利用量及價格供作參考。在零售價格方面，以台灣特有種

一仁愛綠蛺蝶（Euthalia malapana）最高，有一對販售二十六萬元之記錄。調查中並列出目前高價昆蟲之種類及價格。另外本文亦探討所利用種類中，屬於國內及CITES所列保育類動物之昆蟲名錄。

由於國外相關業者之競爭，工資高昂、利潤低及棲地遭破壞，昆蟲貨源不繼等因素，近十年來台灣昆蟲標本、活體及加工業已成黃昏工業之一；故本文亦就業者目前面臨之問題及未來發展之方向進行探討。

在大台北地區85家中藥店中，昆蟲藥材之使用量佔5％以下；其中較常用者僅8種，此8種雖部份亦產於國內，但亦仍以大陸轉口為主。本研究並列出常用昆蟲藥材之類別，使用方式及其效用。在顧客消費方面，如以冬蟲夏草為例，大台北地區每年之消費額約5900萬元。

在食用昆蟲方面，本研究以台大學生為對象，完成使用種類之調查，並探討常人之食蟲經驗及食用昆蟲之未來展望。

至於家蠶之飼養，自1982-1988年間，蠶繭之產量在141171-128759公斤，產值在28607-182331仟元，呈現逐年銳減之趨勢。蜂產品方面，在1982-1988年間，產值在691200-1253179仟元之間；其中蜂蜜產量為742-4054公噸，產值為89040-608100仟元；蜂王漿之產量為178103-285074公噸；產值在650076-882019仟元之間。

扇平與南鳳山地區的鳥類調查報告

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摘要

扇平及南鳳山地區的鳥類調查結果（ 1987／3 ～ 1988／2 ），計 9 目，31科，116種。其中94種留鳥（佔本省留鳥的61％），12種候鳥及10種過境鳥。

所紀錄的鳥科中，有三分之二是屬於燕雀目。主要的科爲鶲科（ 15種）、畫眉鳥科（14種）、鶯科（ 9 種）、鶲科（ 7 種）、鴉科（ 6 種）、鳩鴿科（ 6種）、鵐鶲科（ 5種）、鷲鷹科（ 5 種）、鶺鴒科（ 5 種）。此 9 科約佔本區全部鳥種的61％。

全部紀錄種中有10種屬本省特有種（佔全省特有種之71％），52種爲特有亞種（佔全省特有亞種之75％）。最常見的留鳥有五色鳥、繡眼畫眉、紅嘴黑鵯、小啄木、黑枕藍鶲、白環鸚嘴鵯、小卷尾、樹鵲、烏鶇、白腰文鳥、紅山椒、頭烏線。這些鳥種並維持著相當數量的族群。此常見鳥類的主要食用植物爲桑科、樟科、大戟科及其他昆蟲。

鳥種的岐異度因季節而異。在扇平地區，以12月出現率最高（ 共81種），5 月最低（共39種）。本省較稀見的鳥類如麻鷺、林鵰、寬嘴鸚、赫氏角鷹、喜鵲、赤腹鶇、朱鸝在扇平地區亦不難發現其蹤影。

鳥類出現的主要環境，以天然濶葉林居高（佔61種）；人工針葉林（佔38種）與灌叢及竹林（各有28種）次之。其餘散見草地、苗圃、房舍、林道、電線、溪流、空中、空地等環境。

本報告就 9 科鳥類，分別描述觀察所得，並依科名，列表分別說明各鳥種的月及年出現率（ 豐度），棲息環境及分類（ 留鳥、候鳥）。

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泰雅族狩獵組織之研究－兼及其運作與野生動物間保育關係

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前言

本研究為「臺灣狩獵文化」研究之一部分，後者為一長期性整體研究計畫，由筆者於1988年擬訂，並首度創用及演繹「狩獵」、「狩獵文化」之名詞及定義，並概略引舉「臺灣狩獵文化」之內含及研究項目。以項目言，暫分15大項及62子項，每一大項即一專業範圍，範圍內之重點各子項，是項分類僅粗具代表性，以重點言可再層分，以深度言各子項均具一或數目不等之碩、博士論文。

背景

臺灣野生動物豐富度極高，陸地野生動物主要棲息地之森林，復佔全島面積之52%。山胞居於此一環境中，其與野生動物間往昔、目前及未來之關係，以森林經營、野生動物經營、生態學、自然保護學、相關法律學科及人類學等社會學科為出發點而加以研究，此即臺灣狩獵文化研究之對象及基本原則。

中國五千年歷史向未注意野生動物，記載少及可信度低，自無狩獵文化研究，即該名詞亦付諸闕如，然以Compton's Encyclopedia亦缺此字，足証臺灣狩獵文化研究為獨創研究方向。

山胞社會變化自1945年始甚速，與野生動物間之關係亦迥異從前，山胞年八十以上者尚能追憶四十年前日據時代各種情形。以人獸關係言，該時期屬另一紀元。研究此紀元之狩獵文化，為中國惟一且最後之機會，而此機會能否善用，端視高齡山胞存活及健康狀況而定。

研究目的

狩獵文化為人類必經之文化，長達兩百年之久，視各民族進展情形，狩獵文化之比重、內含均有變化。研究狩獵文化，目的即顯示此種變化，亦及鑑定文化之變化因子間消長互動關係及其影響。台灣狩獵文化發展過程中，有失調偏失現象，如何藉研究以制定有助國人適應較高層次狩獵文化之理論與方法，則為研究台灣狩獵文化特殊目的。泰雅族狩獵組織及其運作與野生動物間保育關係之研究，為台灣狩獵文化整體研究中之兩小項，分屬大項中之狩獵方法及狩獵倫理，其全程計畫含括全台九族，本計化僅其開始，其目的為：泰雅族狩獵組織之制度，功用及操作方式之研究；其運作時與野生動物間關係。後者之研究，要以野生動物學等上述學科為出發點。

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研究材料及方法

一般性材料取自人類學者等社會學者科學化研究山胞之結果，此類文獻上溯至十九世紀初，相關專業研究報告較少。直接有關者為77年「台灣狩獵文化與技術之調查研究」，該項工作為狩獵文化整體研究作觀念、工作程序，及目標上之介紹，並蒐集調查往後所需基本資料。

本研究顧及高齡山胞及追尋原始社會文化結構等因素，故採取深度訪問法，使用非結構型問卷，有關狩獵組織之問卷，於79年基本資料調查曾加試用，保育部分則為78年製作。訪問時，翻譯居間溝通，問畢一問卷，另換他卷，以免受訪人因思路變換，失卻回答意願或可信度，所有對答均予錄音，訪問人利用白日空暇，核對輔助性記憶，將錄音資料作成初步筆錄，供室內後續整理之用。

研究結果

77年度計畫已有研究報告。工作收獲照逾期待，差甚堪慰。本研究則因研究助理嚴重失誤。經大幅補充調查，目前正整理統計中。初步所知，泰雅族狩獵組織之形式、功用、人員及運作等均非固定不變，此與通常已知者相異，惟此項發現尚待最後鑑定。

保育調查工作似較複雜。對山胞言過於抽象，擬應出以實例並劃分個人及狩獵組織兩層面以加研討，否則就問題表面答案，易生誤導。

結論與建議

台灣狩獵文化整體研究歷史部分之調查，因時間因素不利，應調整模目前工作方式。泰雅族山胞與野生動物間關係錯綜複雜頗堪玩味，難藉一或數項計畫能予詮釋。專業人才欠缺窒礙工作進展。據此建議實行建教合作，擴大工作面，全省同步並全力蒐集資料，以搶救文化之失落。

台灣山產動物疾病調查研究初報

曾秋菊[1]、張志成[1]、翁仲男[1]、朱瑞民[1]

摘　要

著者等於1989年6月至1990年2月間，利用病理學檢查及微生物分離的方法，共檢查75個由山產店及屠宰山產動物的地點取得之野生動物，其結果摘錄如下：

在受檢之75個山產動物中，哺乳類(mammals)有51例，鳥類(birds)17例，爬蟲類(reptiles)5例，魚類2例。病因分析中，感染性者佔42例(48.2%)，其中以寄生蟲感染21例(24.1%)為最高，其餘依次為細菌性感染者10例(11.5%)，原蟲性疾病8例(9.2%)，黴菌佔3例(3.4%)。非感染性者佔14例(16.0%)，依次為創傷佔12例(13.8%)，休克及腫瘤各1例(1.1%)。死後變化佔9例(10.3%)。22個樣品(25.3%)則未具有意義之病理變化。在寄生蟲及原蟲感染例中，以條蟲(tape worm)感染6例(20.7%)為最多，其餘依次為內孢子蟲(sarcocystis)5例(17.2%)，蛔蟲(ascarida)5例(17.2%)，肺蟲(lung worm)4例(13.8%)，蟯蟲(oxyurid)4例(13.8%)，球蟲(coccidae)3例(10.3%)，毛細線蟲(capillaria spp.) 2例(6.9%)。

在受寄生蟲所感染的山產動物中，以哺乳類中的齧齒目(rotentia)及食肉目(Carnivora)為最多，於12隻受檢的老鼠中，發現5隻有條蟲感染。肺蟲主要見於食肉類動物的棕簑貓(carb-eating mongoose)及臭鼬(skunk)。肉孢子蟲，蟯蟲及毛細線蟲主要發現於齧齒目的老鼠及松鼠(tree squirrel)。蛔蟲則在鳥類發現2例，另外在齧齒動物發現3例。在這些動物的寄生蟲感染中，與家畜及人類較有關連的有肺蟲，條蟲，蛔蟲及毛細線蟲。

細菌性感染以病原性大腸桿菌(pathogenic E. coli)及鏈球菌(streptococcus sp.)最常被分離到。

獵人使用捕獸器捕捉野生動物，為造成山產動物發生意外創傷的主因。

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泥岩惡地地景保留區之研究

王　　鑫*

一、研究目的

根據文化資產保存法及文建會「台灣地區具有被指定爲自然文化景觀之調查研究報告」所建議保留區名錄辦理。本研究以台南縣、高雄縣、花蓮縣、台東縣爲範圍，進行大面積泥岩惡地地形景觀調查研究。並儘速選定仍具保留價值的特殊地形景觀，建議考慮劃設保留區。

二、研究方法

由於研究區調查的面積廣大，且是以區域性地形景觀品質調查爲主，因此採用航空照片判讀的方法爲基礎，進行大面積的調查。惡地地形區由於缺乏植被保護、侵蝕劇烈，所以常造成大規模的裸露地，在航照上呈現出極淡色調、不規則塊狀、坡面並具有細密線條的型態。利用立體鏡進行立體像對的判讀很容易將各裸露地標繪出來，並轉繪至五萬分之一等高線圖上，作爲室內作業的底圖，經過此步驟後，再根據適當的指標，便可選定具有較高景觀品質潛力的區域。最後則依照所選定的區域，進行野外實地勘察，以確定其景觀品質。

採用的航空照片是以農林航測所於76年拍攝的黑白航空照片爲主。

三、研究結果

㈠南部地區的惡地：

經由航照判釋的結果，得知南部地區的惡地地形分布範圍廣大，北自台南縣龜重溪南至高雄縣燕巢；東沿楠仔仙溪北上至旗山、內門一帶，轉沿大埔溪至烏山頭水庫集水區之東緣；西界則由六甲、官田一帶向南沿伸至龍船、崇德。其中發育較良好的地區則集中在菜寮溪、二仁溪兩流域，尤其以外岡子林、內岡子林沿線右側地區及上茅草山、古亭坑、田寮等地的裸露地分布最爲密集。

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將惡地分布圖與地質圖（耿文溥，1981）相比對，可以發現惡地的分布深受地層、構造線分佈的影響。裸露地集中區域的西緣與關廟層、南化泥岩兩者間的層界頗相吻合。南界則與旗山斷層相吻合。此外，在有現代冲積層覆蓋的地區，諸如左鎮、內門與崇德等地，惡地僅零星、小規模散佈。在大林尾、烏山頭、龍船窩一線，則受左鎮斷層的影響，也少見惡地之發育（圖1）。

㈡東部地區的惡地：

花東地區的泥岩惡地受利吉層分布的控制，沿海岸山脈西緣，自台東大橋附近緊臨卑南大溪向北延展發育，呈狹長的帶狀分布，其中以台東縣延平鄉鸞山村附近地區及卑南鄉富源村附近地區分布的面積最廣（圖2），但仍不能跟本省南部地區的情形相比擬，地表裸露的程度也不及台南、高雄南部地區。因此，透過航照的判讀後，將花東所有惡地分布的地區視爲一區，不再加以細分副區。

四、結論與建議

民國七十一年，政府頒佈了文化資產保存法。該法總則第一條明訂：本法以保存文化資產，充實國民精神生活，發揚中華文化爲宗旨。同法總則第三條，明白闡示其所稱之文化資產，包括具有歷史、文化、藝術價值的數種資產，而自然文化景觀是其中重要的一項。自然文化景觀由農委會會同經濟部、內政部、教育部與交通部審查指定之，並依其特性區分爲生態保育區，自然保留區及珍貴稀有動植物三種。這三種自然文化景觀在該法條文中，都有明確的定義。其所稱之自然保留區，指具有代表性生態體系，或具有獨特地形、地質意義，或具有基因保存永久觀察、教育研究價值之區域。這些條款明白的宣告了地形及地質景觀在自然保育工作中的重要性與價值。

惡地是一種特殊的地形景觀，泥質岩層、旺盛的侵蝕作用，造成尖銳陡峭的外表，它們是高美質的地形，展現了大自然的鬼斧神工，令人讚賞不已，是一種珍貴的自然景觀資源。就科學教育而言，這些奇特的地形景觀，分別孕含了地形作用及地殼變遷的訊息，甚或動態地展現了地形作用的運作情形，這些資料是地球科學教育研究上的重要資訊，科學家得以藉此推理出地殼的過去、現況及其未來的演變。因此，這些奇特的地形景觀也具有高度的教育研究價值，建議劃爲自然保留區（1、2、3、4、5、6、7）。

表 1 ：建議之南部泥岩惡地地景保留區

範　　圍	由於 SB 100 區內的惡地地形發育良好，且分布廣泛，因此建議將區內的惡地地形區劃規爲惡地地景保留區。本區惡地的範圍集中於岡子林西側約 1 公里至 3.5 公里的區域內，北起坑日，南達草山村，大林尾附近尤以紅毛寮一帶最爲密集（圖 1 ）。
劃爲保留區的可行性	由於面積廣大，在土地管理上可能會遭遇困難。

表 2 ：建議之南部泥岩惡地地景保留區

範　　圍	由於 SB 200 區內的惡地地形發育良好且分布密集，因此建議將區內的惡地地形劃爲地景保留區。範圍由岡山子、下寮沿二仁溪向西南延伸，經應茱龍達月世界、崇德止，面積廣大（圖 1 ）
劃爲保留區的可行性	本區惡地地形發育良好，面積廣大，且裸露區內甚少人爲土地利用，十分適合劃爲保留區。但在崇德附近的「月世界」由於觀光活動開發較早，不當的人爲設施已將原地景破壞甚多，所以在劃設保留區時應將此部分排除。

表 3 ：建議之南部泥岩地地景保留區

範　　圍	本單元位於 SB 300 區內，沿二仁溪支流兩側發育，自南勢、古亭一帶向東南橫陳，經鹿埔到坑內、打鹿埔一帶止（圖 1 ）。
劃爲保留區的可行性	本單元位於河流兩側，受河水營力、雨水作用下，隨時都在變化中，對科學研究而言相當有價值。

表 4 ：建議之南部泥岩惡地地景保留區

範　　圍	本單元位於 SB 300 區內，南安村一帶由堅旗呈向南延伸經外安、內安達茱寮止（圖 1 ）。
劃爲保留區的可行性	區內尚無大規模人爲活動，地景保存尚稱良好，建議劃爲保留區。

表 5 ：建議之南部泥岩惡地地景保留區

範　　圍	本單元在區 SB 300 區內，位於內寮附近，呈帶狀由北而南分佈（圖 1 ）。
劃爲保留區的可行性	由於裸露地分布較零散，日後的經營管理較爲困難。

表 6 ：建議之南部泥岩惡地地景保留區

範　　圍	本單元位於 SB 300 區內，金山南方之千秋寮到車瓜林之帶狀區域（圖 1 ）。
劃爲保留區的可行性	區內農業土地利用較多，將來在土地管理上可能遭遇困難。

表 7 ：建議之東部泥岩惡地地景保留區

範　　圍	台東縣卑南鄉富源村內，卑南大溪接近台東大橋附近的左側（圖 2 ）。
劃爲保留區的可行性	本單元之惡地地形景觀經實地勘察，確定爲具有高美質的地形景觀，且尚未受人爲嚴重破壞，值得劃設爲保留區。

澎湖柱狀玄武岩地景保留區調查

王　　鑫*

一、研究目的

本研究主要的目的是在進行澎湖群島柱狀玄武岩景觀之調查，從而選定具有嚴格保留價值的柱狀玄武岩景觀區，並建議依據文化資產保存法劃設爲自然保留區。

二、研究方法

澎湖群島共有六十四個面積大小不等的島嶼，散佈在相當大的區域內。因此若要在各個島嶼一一進行野外實地調查，在時間、經費及效率上都有困難，所以初步的調查方法是採航空照片判讀，將柱狀玄武岩最可能露出的海崖地區一一標示出來，並轉繪至五千分之一的像片基本圖上。然後以此像片基本圖爲基礎，實地進行野外調查，找出柱狀玄武岩確實的分佈位置與範圍，並依適當的指標，將具有保留價值的柱狀玄武岩建議劃爲自然保留區。

三、研究成果

經野外實地調查後，得知澎湖群島有高品質柱狀玄武岩分布的島嶼從北到南分別爲白沙嶼、鳥嶼、小門嶼、漁翁島、員貝嶼、雞善嶼、錠鉤嶼、桶盤嶼、西嶼坪嶼、西吉嶼、七美嶼、貓嶼等。

各島嶼的柱狀玄武岩出露區，根據出露規模、景觀品質（出露高度、柱狀節理、表面光滑度）、人爲活動…等因子之考量，再挑選出條件最適宜的柱狀玄武岩出露區，分別位於小白沙嶼、鳥嶼、錠鉤嶼、雞善嶼、員貝嶼、西吉嶼、貓嶼等七個島嶼，建議劃爲柱狀玄武岩保留區。

有些島嶼，如將軍澳嶼、望安島…等，在文獻資料記載中有柱狀玄武岩出露，但在野外實地調查中發現其柱狀節理發育極差或規模太小，其調查結果則不列入本報告中。此外，虎井嶼雖有大規模的柱狀玄武岩出露，但因其仍爲軍事管制區，無法實地調查

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，故其柱狀玄武岩之詳細出露情況仍有待進一步研究。

四、結論與建議

本研究建議的澎湖自然保留區包括下列地點：

1.鳥嶼東岸

2.小白砂嶼

3.雞善嶼

4.錠鉤嶼

5.員貝嶼北岸

6.西吉嶼

7.貓嶼

台灣地區校園美化之研究

吳功顯　葉慶龍　陳慶雄　鍾玉龍　陳朝圳[1]

一、研究目的

人類之生存空間，受工業化、都市化的影響，綠地逐漸減少，生活環境品質日趨惡化，在此情況下「自然生態保育」，「綠化、美化環境」等運動乃應運而生，農委會爲確使自然生態保育觀念落實生根，除對整個自然資源環境作有系統的研究外，且基於綠化、美化環境可以維持自然生態之平衡；校園綠化、美化具有提高生活品質的意義與「境教」之效果，故委託本校對全台灣地區校園環境之綠化情況加以調查，藉由現況之分析、研究，提供實際可用之方案，增進校園環境綠化、美化之效果。本研究之主要目的包括：

㈠、建立校園環境綠化、美化評估調查表。

㈡、對全省國民中小學校園之綠化、美化現況藉由評估調查，瞭解其現況，並提供綠化、美化技術。

㈢、建立校園綠化、美化資訊系統，以提供綠化、美化技術、植物解說及樹種保育資訊。

㈣、利用調查研究結果編印「校園環境綠化、美化工作手冊」及「校園常見植物解說手冊」並舉辦綠化、美化研習會，提供綠化、美化技術及宣導自然保育觀念。

二、研究材料及方法

㈠、校園環境綠化、美化評估表之建立。

1. 以文獻分析法確立調查據點及植栽計畫目標，並根據植栽理論及植栽計畫目標研擬各調查據點之評估標準。
2. 以無母數統計之 **Friedman** 檢定法，測定評估者對同一學校評估時之差異性，以驗證評估之客觀性及統一性。

㈡、校園綠化、美化現況調查。

1. 樣本選取：

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1. 國立屏東農業專科學校　屏東縣內埔鄉學府路 1 號

以全省之國民中、小學爲範圍，依學校所在地之地理狀況區分爲都市、鄉村、山區、海邊四種，學校級別區分爲國中、國小及縣別，以分層取樣法進行樣本選取，共得有效樣本520所，取樣率約 19 %。

2. 調查法：

調查者先行調查行前講習，再透過預評過程後陸續前往被抽取之樣本學校依調查準則，進行調查。

3. 資料分析：

以SPSS統計軟體爲工具，進行各不同據點之頻度分析，並以無母數統計之 Mann - Whitney 檢定，測驗綠化、美化影響因子對各據點所產生效果之差異性。

㈢、校園綠化、美化資訊系統建立。

以 Dbase 語言設計校園綠化、美化資訊系統。

三、結 果

㈠、校園環境綠化、美化評估表之建立

校園各分區所應强調的效果及依據美學與植栽理論所設立之調查項目及評估標準之評估表，經由六位評估者，同時調查十所學校，其調查結果經量化後依 Friedman 檢定，其結果六位評估者對十所學校之各調查項目得分差異不顯著，顯示評估表具有客觀性與統一性。

㈡、校園環境綠化、美化之現況調查分析

1. 綠化效果評估

所謂綠化效果係指防風、防塵、隔音、隔離及蔽蔭等綜合效果。全省在 520 所被評估之學校中約有 50 %以上學校未盡理想，其中以海邊及都市型學校最爲嚴重，其主要原因爲：

(1)綠化時未考慮環境因子而造成樹種選擇不當。

(2)植栽設計時未考慮綠化效果。

(3)特殊環境之綠化樹種其苗木來源尋求不易。

2. 美化效果評估

植物於校園美化上扮演著重要角色，其應慮之重點包括：

(1)色彩之搭配。

(2)植物與人工設施之配合。

(3)植物於校園空間上之佈置。

本研究即以校園植物對各不同調查據點所應表達之視覺感觀進行評估，其結果約有40 %之學校未盡理想，由研究者實地觀察，大部份學校校園缺乏利用植物之開花特性來進行色彩之搭配以求空間、時間之活潑性，而在植物配置方面，部份學校未能與人工設施取得調和，且太過於強調統一而缺乏漸變之韻律美。

3. 校園綠化率與學生每人所得綠地面積

依據日本中小學綠化基準之規定，校園綠化率需在 20 %以上，而每位學生所得之綠地面積以 20 m^2 最爲適當，本省國民中小學校園 90 %以上其綠化率皆高於 20 %以上，但由於學校面積與學生人數未能依比例增加，而造成約有 70 %以上之學校其學生每人所得綠地面積低於 20 m^2 。

4. 校園植物提供教學材料之效果

由調查結果顯示約有 90 %以上之學校在植物解說牌之設立或植物教材園之利用情形未盡理想，其最主要原因爲學校對植物瞭解不深無法編訂植物解說內容。

㈢、校園綠化、美化技術之研擬與推廣

依據校園綠化、美化現況之調查分析，瞭解校園綠化、美化之問題所在，編印各種技術指導手冊包括：

1. 校園綠化、美化工作手冊。

2. 校園常見植物解說手冊。

舉辦四次研討會推廣校園綠化、美化工作技術。

㈣、校園綠化、美化技術資訊系統之建立

爲便於各校對本研究各項技術之利用，本研究以 Dbase 語言設計校園綠化、美化技術資訊系統，其內容包括：

1. 校園常見植物解說系統。

2. 古齡珍稀樹種資訊系統。

3. 校園美化、綠化技術資訊系統。

四、結論與建議

本研究經討論分析所得之結論與建議歸納如下：

㈠、由文獻分析法所建立之校園綠化、美化評估表，將來進行校園綠化、美化評估時能具標準性及統一性，且可藉由評估結果可提供往後之綠化、美化工作方針。

㈡、由校園綠化、美化之現況分析，吾人瞭解校園綠化、美化之問題所在，為解決問題，本研究篇印了「校園綠化、美化工作手冊」及「校園常見植物解說手冊」，可供校園綠化、美化及植物解說之參考。

㈢、由校園植物調查得知全省國民中小學校園之植物種類約有110科506種，而其中有78所學校其校園內具有40餘種之古齡珍稀樹種，而這些樹種深具景觀及教育價值，應考慮依法指定為文化資產而加以維護。

㈣、校園綠化、美化技術，植物解說內容及古齡珍稀樹種等各項已建立完成資訊系統可迅速、方便查詢各項資料。

英 文 部 份

English Summary

Content

I. A list of the nature conservation projects supported by the Council of Agriculture

Council of Agriculture[1]

	The Subject of the Projects in FY1990	Sponsoring agencies
A.1	The protection of land-locked salmon (Oncorhynchus masou) habitats	Wu-ling Farm VACRS
A.2	The population and ecological studies on land-locked salmon	National Taiwan University
A.3	The preliminary planning of an Education-center of land-lacked salmon and freshwater fish at Wuling farm	National Taiwan University
A.4	The monitoring pesticide residues in the stream water of Chi-Jia-Van river	Taiwan Agricultural Chemicals and Toxic Subtances Research Institute
B.1	The natural resources conservation in lien-hua chih area	Lien-Hua-Chih Branch Taiwan Forestry Institute
B.2	Study on diseases of bird in Taiwan	Taiwan Feng-huang-ku Bird Garden
B.3	Habitat selection and its vegetation analysis of Formosan Munjac(Muntjacus reevesi microcus)in the geo-kin-yang area,Ilan	Fujen Catholic University
B.4	A study on the reproduction and growth of seven residential mammalian species of Taiwan	Taipei City Zoo
B.5	Health monitoring to disease survillance in exotic animals of the zoos	Pig Breeding Science Research Institute
B.6	Wildlife data bank of Taiwan(1) Amphibians(2)	National Taiwan Normal University
B.7	The ecological study of Formosan Serow (Capricornis crispus swinhoei)	National Taiwan Normal University
B.8	The population ecology of Taiwan Macuque	National Taiwan University

1. 37 Nanhai Road, Taipei, Taiwan 10728, R.O.C.

	The Subject of the Projects in FY1990	Sponsoring agencies
B.9	The study of pro visioning to Taiwan macaque (Macaca cyclopis) (2)	National Taiwan University Luo-dong Forest Distriction, TFB
B.10	A behavioral and ecological study on Formosan Reeve's muntjac (Muntiacus reevesi) (4)	National Taiwan Normal University
B.11	Study and management of Formosan black bear (Selenarctos thibetanus formosanus)	Society of Wildlife and Nature R.O.C.
B.12	An investigations on the egret resources and its impacts on aquiculture(2)	Society of Wildlife and Nature R.O.C.
B.13	The bird protection project in Ta-Tu river estuary	Chang-hua County Government
B.14	Studies on the conservation of chinese pangolin Manis pentadactyla pentadactyla (2)	Taiwan Forestry Research Institute
B.15	Study on the restoration of Bretschneider sinensis	Taiwan Forestry Research Institute
B.16	Assessment on effects of conservation to rare and threatened plant species in Taiwan	Tong-hai Catholic University
B.17	Ecosystem of beech forest in Taiwan	Taiwan Forestry Research Institute
B.18	Preservation and utilization of Taiwan wild tea germ plasm	Taiwan Tea Industry Improve Research Institute
B.19	The conservation of freshwater fish in the forest stream	Taiwan Forestry Bureau
B.20	Investigations on sedimentological landscapes in Heng-chun peninsula	National Cheng-kung University
B.21	Investigation on fossil geological landscapes and fundnamental geology in Hsin-hua hill, Tainan Hsaen (2)	National Cheng-kung University
B.22	The protection of Keelung abrasion coast	Construction Bureau, Keelung Municipal Government
B.23	The management of pond and hardwood nature reserve in Nanao area	Luo-dong Forest Distriction, TFB
B.24	Pilot project for banding of international migration bird in eastern asia	Wild Bird Society of R.O.C.

	The Subject of the Projects in FY1990	Sponsoring agencies
C.1	Project of management and preservation in Kuan-tu nature reserve	Construction Bureau, Taipei Municipal Government
C.2	Protection and maintenance of Yuan-yung lake natural reserve area	Department of Forest Development, VACRS
C.3	Planning and management of Ha-pen nature reserve	Taiwan Forestry Research Institute
C.4	The management and pretection of Hoyenshen nature reserve in Mioli	Shin-chu Forest District Office, TFB
C.5	The management and pretection of Tamsui mangrove nature reserve	Luo-dong Forest Distriction, TFB
C.6	The management and protection of Pin-lin Keteleria davidiana nature reserve	Luo-dong Forest Distriction, TFB
C.7	Management and protection of Amentotaxus nature reserve in Taiwu	Tai-tong Forest District Office, TFB
C.8	Management and pretection of nature reserve in Tai-tung	Tai-tong Forest District Office, TFB
C.9	The management and protection of Ta-wu mt. nature reserve buffer area	Taiwan Forestry Bureau
C.10	The studies and management of Heng-chun natural protected area	Heng-chun Branch, Taiwan Forestry Research Institute
C.11	Preliminary investigation on natural resources of Tavu mountain area(4)	Society of Wildlife and Nature R.O.C.
C.12	Developing an ecological system for nature preserves	National Taiwan University
C.13	Studies on vegation of declared nature reserve	Taiwan Forestry Research Institute
C.14	The biological atudy and conservation of lanyu scopes owl	Academia Sinica
D.1	Technical improvement on natural protection program, FY1990	Technique Division, PDAF
D.2	Establishing natural conservation library (4)	Society of Wildlife and Nature R.O.C.
D.3	Circulating exhibition and lectures on nature conservation and environment protection	Taiwan Museum

	The Subject of the Projects in FY1990	Sponsoring agencies
D.4	Project of research activities on natural ecology in Chitou area	Experimental Forest of National Taiwan University
D.5	F.Y.1990 Yuen-yang lake nature reserve workshop	Ilan Branch, China Youth Corps
D.6	Ecological conservation activities of college students	China Youth Corps
D.7	Nature conservation and environment protection workshop	China Youth Corps
D.8	The publicizing program of natural and cultural heritage	Society of Wildlife and Nature R.O.C.
D.9	In producing of the beautiful land broadcasting program for promoting natural culture and scenery conservation	The China Broadcasting Station
D.10	Study on the technique for conservation of campus-landscape	Ping-tong Agriculture College
E.1	The survey to diseases of captured wild animals	Pig Breeding Science Research Institute
E.2	Recovery plan of trofes magellanus and survey of butterfly resources	The Taipei Municipal Cheng-kung Senior High School
E.3	An investigation on the conservation of the wildlife resource by the aborigines in Taiwan(2)	National Taiwan Normal University
E.4	Transplanting experiment of endangered aquatic plants around Taoyuan area	Taiwan Forestry Research Institute
E.5	Survey on the resource and ecology of aquatic insects in Tung hou river(1)	National Taiwan University
E.6	The ecological studies of the fish resources at Tunhon streem	National Taiwan University
E.7	The protection of fish in chin-shia-go streem	Nantou County Shui-feng Middle School
E.8	Landscape study of the coastal range, eastern Taiwan	National Taiwan University
E.9	The protection of shin-fun morgrove	Shin-chu County Government
E.10	Egret investigation and protection in Tai-chung	Taichung County Government

The Subject of the Projects in FY1990	Sponsoring agencies
E.11 The investigation and protection of large trees in Tai-chung	Taichung County Government
E.12 Transplanting test and field survey of endemic species of agamid lizards in Taiwan area	Chinese Culture University
F.1 The second symposium on disease control of exotic animal	Pig Breeding Science Research Institute
F.2 Study on officer on endergerous animals import and export	Taipei City Zoo
G Support to the activities of nature conservation task force	Forestry Department, Council of Agriculture

II. Major nature conservation events in FY1990

Council of Agriculture [1]

1989

Jul. 27 Approvement of FY 1990 Nature / Culture , Landscapes Conservation Project. Under this program seven main subjects and sixty-seven detailed projects in total have been covered.

Aug. 4 More than 600 wild animals be publicized as conserved species according to the Wildlife Conservation Law by this Council following the promugation of Wildlife Conservation Law.

Aug. 31 The Nature Conservation Committee of this Council held the 30th joint meeting.

Sep. 7 Workshop on the improvement & management of wild animal conservation in Taiwan, The delegates from this Council and every county(municipal) governments, public or private agencies concerned,police office, scholars and specialists were all involved.

Sep. 8 Dispatching Dr. Lucia Liu Severinghaus was dispatched for representation of our country to attend The IAFWA 1989 annual conference held in South Dokota, on Sep. 8-13.

Sep. 13 Drs. Chang, Kun-hsiung, Yao-sung Lin , and Mr. Ming-shan Chang visit to Japan, from Sep. 13 through 22 , 1989. Observation trip to Japan for planning of education center of salmon,

Oct. 5 The folding paper of Guild for the protection of Wildlife be printed and delivered to the port,airport,post station, and other agencies concerned,inside and outside of country , for publicating wildlife conservation concepts.

Oct. 7 Drs. Ying-wang, Ling-ling Lee,and San-Wei Lee, attend the CITES 7th membership conference organization held from 7th of Oct. through 25th of Oct. 1989 in Swiss.

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1. 37 Nan-hai road, Taipei, Taiwan 10728, R.O.C.

Oct. 18 For setting up the fund of wildlife conservation, 16 agencies included Ministry of the Interior,be requested to arrange proposely NT$ 5,000,000 dollars in 1991 annual budget.

Oct. 21 By-laws of Wildlife Conservation Law be approved by the Committee of this Council after eight times discussion with the agents, scholars and specialists concerned, and transfered it to Executive Yuan to examined.

Oct. 30 The 31th joint meeting of the Nature Conservation Committee and the Technical Committee this Council held on Oct. 31, 1989.

Nov. 4 The second workshop with a topic of The Disease Control and Management of Wildlife be held on 4th-5th of Nov. 1989 at Taipei City Zoo. The workshop were sponsored by the Council and Pig Breeding Science Research Institute.

Nov. 7 The 1st workshop on execution of nature conservation work in Taiwan be held on 7th-8th of Nov. 1989 at Taiwan Forestry Research Institute (TFRI). The workshop were sponsored by Taiwan Provincial Department of Agriculture (PDAF) and COA.

Nov. 9 The Chinese-Japan binational workshop on studies of the land-locked salmon be held on 9th~11th of Nov. 1989 at Wuling Farm. The workshop were sponsored by COA and Academia Sinica and Department of Biology, National Taiwan University.

Nov. 15 The 2nd Workshop of Nature Conservation work sponsored by COA and PDAF, be held on 15th-16th of Nov. 1989 at TFRI.

Nov. 15 The bred captivity program of giant panda were sponsored by the agents concerned,scientists and the members of COA involved.

Nov. 28 The 32th joint meeting of the Nature Conservation Committee & Technical Committee of COA had been held.

Dec. 5 The discuss meeting of the protection and breeding techniques of rare plant / animal species be held. The members of PDAF and this Council, scholars and specialists and other agents concerned involved.

Dec. 6 Discussing the program of young man vocational activities. The members of China Youth Corps, COA and other agencies concerned involved.

Dec. 13 The workshop of the training the agents of custom and other persons controlled the importation and exportation for the endangered species be held by this Council and Taipei City Zoo at this Zoo.

Dec. 15 A trip to Yeh-liu and Tamshi to review the installations for breeding rear tigers & bears and estimate the amount of edible bamboo available for giant panda proposed to be breeded respectively,The members of this Council and the scholars and specialists concerned participated the trip.

Dec. 19 Discussing the management of the rhino horn and its products in Taiwan. The members of COA, Chinese doctor and its union and agencies concerned were involved.

Dec. 19 Discussing meeting for the protection of rare aged trees, roadside tree,and a field trip on the scene,the members of PDAF and this Council and the scholars, specialists, agencies concerned involved.

Dec. 20 Discussing the system of management on the importation and exportation of wildlife in Taiwan, the members of the Ministry of Economices and this Council and agencies concerned involved, and decided that the Bureau of Foreign Trade(BOFT) should establish a special group to set the system according to the regulation in here and CITES.

Dec. 21 Discussing meeting for function and frame of the wildlife Zoology Research Institute to be established were convened by COA. The major function including investigation , inspection & quarantine, disease control and management were briefly concluded. The delegation from COA, concerned agencies, scholars and specialists were invited to the meeting.

Dec. 22 Discussing meeting for establishment of wildlife conservation fund, convened by COA, and the draft of rule of governing receipt & expendicture of fund were throughly discussed.

1990

Jan. 5 The illustrated book of conservated birds in Taiwan becompleted by COA, and disseminated to the schools, railway office, highway office for publicity.

Jan. 8 Six times of circulating speeches and exhibitions be held by COA corperatively with Taiwan Museum in Jen-ai and Tai-chung agriculture high school, from 8th ~ 9th of Jan. 1990.

Jan. 9 A public field trip visiting Tao-yuan be held by COA and the Society of Wildlife and Nature(SWAN), R.O.C..

Jan. 11 Mr. Paul Mooney, a special commissioner of Asia weekly newpaper, visits here for understanding of legislations and policies concerning wildlife conservation in TAiwan.

Jan. 13 The second team of 9 America parliment assistants, visit to Taiwan for understanding of fishery , forest and wildlife conservation program in TAiwan.

Jan. 19 A special visit of Taipei City Broadcasting Station made to COA for brief & publiciting the policies & management of nature conservation in Taiwan, thus to increase the citizens to understand the present situation of the conservation.

Jan. 21 A public field trip visiting Tao-yuan"be held by COA and the SWAN, R.O.C..

Jan. 22 A special lecture on the nature / ecoloy and wildlife conservation was given to the member participated in the workshop of ecology and environment conservation held in Kinting, which was corperatively sponsored by China Youth Corps and this Council.

Jan. 22 FY1989 workshop for excellent students on science selected in Chia-Hua County be jointly held by COA and Experimental Forest of National Taiwan University, Jan. 22-24.

Jan. 25 The draft of by-laws of Wildlife Conservation Law have been reviewed and passed by the legislative Committee, Executive Yuan.

Feb. 2 The meeting of the designation of the explantation equipment of Kuan-to nature park held by Bureau of Construction, Taipei municipal government.

Feb. 2 Twice "FY 1990 nature conservation activities at winter vocation in Yuen-yang lake",be jointly held by COA and the China Youth Corps Feb. 2-10.

Feb. 16 Participating the discussion meeting of Guild of import and export of rare species plant and endangerous animals and its products" convened by MOEA,and the members of this Council attendent.

Feb. 16 Discussing meeting for adjustment the list of the conserved wild animals and the guide for management of the nature reserves was convened by COA.

Feb. 18 " Trip for visiting the culture of Hokkas of S. China" had been completed.

Feb. 22 The Nature Conservation Committee of this Council held the 33th joint meeting.

Mar. 3 A face to face talking between COA & citizens on the topic of wildlife conservation work be held on 3th~4th of March.

Mar. 5 The first reviewing to the Program of Bred and Breeding of Giant Panda be held by COA.

Mar. 14 A face to face talking to international trade of wildlife between COA & represent of importer and exporter be held by COA.

Mar. 15 The by-laws of Wildlife Conservation Law have been approved by the Executive Yuan on 2173th Yuan's meeting.

Mar. 16 COA releasing a confiscated Marine turtle (Carette carette gigas), to the ocean in Mioli.

Mar. 18 "The first trip on King-kua-shi" be held by this Council and the Society of Wildlife and Nature, R.O.C..

Mar. 20 COA participated to the 1st seminar of wildlife conservation sponsored by Tai-chung County Government.

Mar. 21 A one-week seminar for educating forestry resources investigator to recognize the endemic wildlife be held by this Council.

Mar. 23 COA participated to the 2nd seminar of wildlife conservation which was sponsored by Tai-chung County Government.

Mar. 25 "The second trip on King-kua-shi" be held by this Council and the Society of Wildlife and Nature, R.O.C..

Mar. 30 Prof. George H. Stankey, the Forest resources special commissioner of Oregon State University, U.S.A. visited Taiwan for one week, for consulting to the work of conservation and forest recreation in Taiwan, and gave a speech in National Taiwan University.

Mar. 31 By-laws of Wildlife Conservation Law was publicized by this Council.

Apr. 6 "The second workshop of Nature Conservation " sponsored by this Council & corperated with Natural Science Museum held on 6th-7th of Apr.More than 200 volunteers were invited to participated the workshop.

Apr. 14 Mr. P. J. Le Roux, the Chief Directorate of Nature and Environment Conservation in Cape Town, S.A. visited to Taiwan.

Apr. 17 The 34th joint meeting of the Nature Conservation Committee & technical committee of this Council held.

Apr. 24 Dr. Tom Milliken, TRAFFIC-JAPAN representative came to Taiwan to understand the improvement of nature conservation work in here.

May 19 The HRH Prince Bernhard of the Netherland visited Taiwan.

May 22 The ivory and its products which was smuggled and be confiscated in last August by custum were burned at Nan-jung Cemetery, keelung city. The delgates of this Council, the custom, water-police team, communication, and national nongovernment conservation organizations,aswellas Minister Feng-shu, Chang and the HRH Prince Bernhard of the Netherland participated.

May 30 Assessment of proposed natural reserved area in Peng-hu Hsian were conducted by the members of Nature Conservation Committee & technical committee from May 30 ~ Jun. 1.

Jun. 2 The workshop of Management of Zoo be held by this Council and Taipei City Zoo corperatively in the Zoo.

Jun. 7 Reviewing the results of Research , Investigation and management of natural conservation program in FY 1990 was held by this Council at National Taiwan University,Taipei.

Jun. 22 The annual workshop for reviewing the execution of Wildlife Conservation Law be held by this Council on June 22, 1990 in this Council, Taipei.

The Management and Preservation of Tan－Sui Mangrove Nature Reserve

Jong－Her Hwang

1.Purpose

The distribution of Tan－Sui Mangrove is along the riverside of Tan－Sui Riverfrom Tan－Sui to Chu－Wei, and the mainly plant communication is the pure forest of the Kandelia (*Kandelf eandela Druce*) of Kandelia of Rhizophoranceae.

The greatest value of this reserve is the function of knowledge. As the Kandelia is one of vivipary plant which is rare, the mangrove and the creature which live in constituting a special ecosystem, and is the best outdoor laboratory of Ecology, too.

In order to Let people know the profound of nature, cultivate kind protection of nature creatures and country, and reach the superla－tive target to try to educate by amusememt, the purpose of this reserve is to protect the mangrove as the subject of education and science research.

2.Excution

(1)Cleanning

As the Tan－Sui Mangrove is situated in the riverbed, in front of it, the garbage which rejected by people nearby and living upstream, thus dirty and foul surroundings seriously bothers visitors and research workers. Owing to the limitation of budget, we can only arrange enviroment partly by engaging laborers to provide a higher quality of surroundings.

(2)Inspection

In order to maintain the original situation of mangrove is reserve, we have assigned staff to see over and protect this area periodically.

(3)Explaination service

Visiting activities being organized or being requested by common people, schools and organizations to visit in usually. Data for ecological phonomenon of

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Luo－Dong Forest Distinction
118 Jong－Jeng North Rd. Luodong, Yilan

mangrove is collected for explaination service. From the service it will teach people about the concept of taking kind care of nature resources and ecosystem conservation. As to facilities, two big explaination boards, four warming boards have been set up, and 198 meters fence along river side for visitors security have been coustructed.

(4)Drawing up the management plan

For the purpose of managing efficiently Tan－Sui Mangrove Reserve and reaching the multiple target of conservation, science research and nature education, principle and strategy for management have been drawn up. A distinction plan, resources conservation plan, public facilities, explaination service plan have been set up, too. A 48,000,000 dollars for five years is to be set.

3.Result and suggestion

(1)The urgent problem for this area is the waste barred in lower part of mangrove form upstream of Tan－Sui River when typhoon or storm rain is over. Though engaged laborers are arranged to clean the reserve periodically, but it still can't be clear. Only when the treatment of Tan－Sui River is done, and a fence is set outside the reserve to intercept the waste and pick up the garbage squeezed in, then the reserve will be maintained clean completely.

(2)As Tan－Sui Mangrove Reserve is near the Taipei city, many people is attracted to there by its reputation. Explainatiom service is always requested by schools and groups. So it is necessary to establish a complete system of explaination to serve visitors for a satisfactory data of natural enviroment and ecosystem, then an outdoor ecological classroom will be provided.

(3)The most important and basic work for reserve management and preservation is inspection pericdically to finding out and prohibting the beheaviours that demaging the ecological enviroment of mangrove. As it is easy for people to enter the reserve. The inspection must be strengthened to avoid the agitation from neighbours and visitors.

The Management and Preservation of Pin-Lin Taiwan Keteleeria Nature Reserve

Jong-Her Hwang[1]

1.Purpose

Taiwan keteleeria is the native species of Taiwan. It shows an unsuccessive distribution both at the northern and southern part of Taiwan. Since Taiwan was connected with mainland long time ago, when the Taiwan Strait had sunk, Taiwan keteleeria becomes an independent species, Some of the scholars though the special phenomen may be a result of geographic isolation. Moreover, Taiwan keteleeria is worth researching in ecological geography and systematics as the fossil has been found in Northamerica, Europ and Japan.

There are only few populations of Taiwan Keteleera at Pin-Lin because (1) the most seeds in cone can't sprout, (2)the site is occupide by shrub and weed so it is hard for the deceudance of Keteleeria to compete against, (3)the development of agriculture cause the area of forest decrease. The purpose for establishing this reserve is to protect Taiwan Keteleeria from being disturbed by people, so it will survive and be used as the subject for educatign and scientific research.

2.Excution

(1)Inspection

Inspection is the basic work for management and preservation of the reserve. The reserve is disturbed by people easily because the most part of reserve has been rented and is near the tea plantation. A staff has been assigned to see over periodically.

(2)Renew of the indicative board

The indicative boards set last year have been demaged. It is necessary to renew these boards. Announcement › warming and explaination can be clearly provided.

(3)Repairing the trail

The trail is injured by the steep slop and frequent rain, laborers have been engaged to repaire it. So that it is convenient for visitor and researchers.

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[1] Luo-Dong Forest Distinction
118 Jong-Jeng North Rd. Luodong, Yilan.

(4)Volume survey for the planted tree

Since the 94.2% of the area of the reserve has been rented for planting, the volune Survey for the planted tree is carried out as the basis data for buying up in the future.

(5)Drawing up the management plan

For the purpose of management Pin－Lin Taiwan Keteleeria natural preservation, the principle and strategy for management have been drawn up. A distinction plan, resources conservation plan, public facilities plan, explainatory service plan have ben set, too A 8,700,000 dollars for five years is to be set.

3.Result and suggestion

(1)The most important and urgent problem of the reserve is to with－draw the land that has ben rented. The reserve is difficult to maintain the original state since the rent area for cultivation can't be prohibited. So a survey for the volume of the planted tree has been carried out this year. A budget for withdrawing the rented land is expected as soon as possible.

(2)Taiwan Keteleeria is on the verge of extinctions because there is only a small quantity left and its decendance is difficult to survive. So it is necessary to evaluate wheather some restorative work on the buffer strip in order to con－tinue the population of Taiwan Keteleeria, or let it be in natural tendency.

(3)As this reserve is near the tea plantations, the activity of people near there is frequently. So the inspection must be strengthened to avoid the agitation.

Report on the Project of the management of the Yuan-yang Lake Nature Reserve

YANG I TONG[1]

CHU BAO HUA

FOREWORD

The Yuan-yang Lake is located at the 89,90 and 91 compartments of Ta-hsi working circle of the Forest Development Administration. Geographically, it is at the Ta-han Stream's upper reaches which resides at the Chien-shih Village, Hsin-chu county. It is between 1650 and 2432 meters above sea level, With a total area of about 374 hectares, in which the lake occupies 3.6 hectares and the swamp 2.2 hectares, This area is abundant in valuable Cypress forest and still maintains a perfect natural ecological system.

In 1969, under the financial support of the National Science Council and to cooperate with the Taiwan Forestry Research Institute, the administration had carried out a series of investigation in this area, and then in 1973, it was established as a "Nature Protection Area", the first one in Taiwan.

On June 27,1986, this Government announced it as a "Nature Reserve" according to the "Cultural Property Protection Law" and appointed the Administration as the formal administrator. Under the support of a special fund offered by the Council of Agriculture, the Administration protects lake, swamp, and more than one hundred species of Hydrophytes, Mesephytes, and trees, especially Chamaecyparis formosensis Matsum and Chamaecyparis obstusa. Fourteen species of rare fowls including Mandarin duck, wild duck and animals like deer, squirrel and monkey are also protected.

PURPOSES

(A) Due to the advancement of technology and rapid growth of populations, the exploration of natural resources speed up in recent years. The natural enviroment has been seriously damaged before human beings fully realize it's importance. Thus to reserve Yuan-yang lake with such a full scale ecological system becomes a necessity.

(B) To provide a perfect environment for acadamic research on biological science and nature resources reservation.
Such as:
1. Evolution of geology, soil and climate
2. Structure and evolution of vegetation
3. Watershed management and water pollution study
4. Mountain topography and topographical lake formation
5. Hydration
6. Ecology of migratory birds
7. Exploration on new recorded plants

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1 FOREST DEVELOPMENT ADMINISTRATION VACRS.
#100 LIN SEN RD. I-LAN city

RESULTS OF EXECUTION

(A) Establishment of the control station: the control station is located at the entrance of this area, 17 kilometers from the starting point of the 100th forest road. Visitors without permission given by the Administration will be kept out.

(B) Erection of the interpretation boards: Two boards are set at the entrance of this area, which show the name of the reserve, objects to be protected, total area, location, administrator ... etc.

(C) Erection of the bullentin boards: one board is set at the check station near the entrance of the 100th forest road, and the other at the entrance of the reserve. Restricted and prohibited items are listed on the boards.

(D) One who wants to enter the reserve must submit his application to the administration at first. If approved, he will be given an entrance permission, which must be presented at the check station.

(E) Two rangers are responsible for patrol and rutine maintenance work. Report must be submitted weekly to the administration for futher consideration.

(F) Due to strict control, visitors have been greatly decreased in recent years. All the measures undertaken in the reserve are proofed to be successful.

RECOMMENDATIONS

(A) To strengthen the work of demonstration and education, and to cooperate with the police in preventing illegal breakers: Since the establishment of the reserve, there are still some tourists who wish to enter without permission, which usually leads a conflict between the rangers and the tourists.

(B) Orientation of the position of the rangers: Without judicial power, it is very difficult for the rangers to execute their missions.

(C) To enhance the function of enviromental education: Opening of this reserve to the public to a certain degree is recommendated.

The Executing Plan of Management About Huoyenshan Protected Area, San-Yi, Miaoli Hsien

By A.S.Lin [1]

I.INTRODUCTION

Owing to the rapid economic development and population growth in Taiwan, the nature ecological system had been seriously destroyed.

For the better living quility of environment of our generation, Nature ecological conseravation is the only way to keep on the continue development of human culture and society.

II. PURPOSE

The landscape of Huoyenshan, San-Yi, is combined of many smaller sharp peaks. The major part of Huoyenshan is consist of gravel and sand. It's five steep cliffs and it's brittle, crumbly composition have contributed towards the spectacular erosion that has been caused by heavy rains. In the evening light, in particular the summit of the mountain ,take on the colour of a burning red flame. No doubt this explains why the mountain bears the name "Huoyen".

Despite all these disadvantages of growing environment, the Masson pine shown sufficient toughness to overcome every hurdle. Today it not only survives on the side of steep gravel slopes and sheer cliffs by acutually flourishes in a thick natural forest.

In June, twenty-seventh, 1986, the Mt. Huoyen area was designated as a special nature conservation zone by the Executive Yuan's Agriculture Commission .It also provide a opportunity for natural science education and study.

III. EXECUTION :

CONTENTS :

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[1] Hsin Chu Forest Administration Department, Taiwan Forestry Bureau
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I.PERIOD : Before June, 1989

1. Accomplishing the measurement of conservation area 219 ha. 04, and bury 14 cement stake at outstanding place.
2. Accomplishing the Investigation of trees whose diameter above eight cm including Pine, Liquidambar formosana, Cinnamomum camphora, Acacia confusa, Sapium sebiferum, Dodonaea viscosa, Rhus semialata ...etc. The total stand volume for 35,869 trees are 4,354 m^3 87.
3. Building safty fence 200 meters around seriously collapsing or dangerous zone to keep off people away from.
4. Set up two interpreting plate. One at Tai-An rest station of Highway, and the other inside the zone.
5. Dispatching three people make tour of inspection over twenty time monthly to avoid illegal events happened.

II. PERIOD : July, 1989 - June, 1990

The investigation of plants, interpreting report, plate established, trail for inspection and safety have accomplished till now are :

1. set up one interpreting plate beside the No. 6, Hsin-Mio Road to educate people.
2. Set up Warning plate at each five gravel river to warn people not come in. And also set up plate at the mountain entrance which signed like " The terrain is sharp, poorly consisted and easily collapsed. Only people work here enter " to let people notice danger.
3. Break 1,280 meters trail by smoothly mountain slope for inspection or academic research.
4. Entrusting academic research administration investigated the growth of plants, and the report will be finished nearly.
5. Set up Tree-name plate beside the trees on mountain trail for making a distinction of trees.
6. Set up nylon rope whose diameter 2 cm around overhanging cliff 300 meters to keep people away from danger.
7. For prohibitting illegal events, people work here patrol 20 times monthly.
8. For arousing people sympathy about natural conservation, we made lantern slide to be a tool for interpreting education and being a natural conservation propaganda data.

IV. RESULTS AND SUGGESTION

By "Culture Assets Protection Law ", Mt. Huoyensan had been declared as natural conservation area and prohibite trying to change its natural environment. It also preserve and provide the precious opportunity to study the ecological system of the largest Masson pine area in Taiwan.

SUGGESTION :

There is a narrow riverbed between the area and No.6, Hsin-Mio Road, But a quarry located at the east direction of riverbed and a tample near Yuan-Li town both pick stones from the riverbed now. It will seriously affect the landscape of Huoyenshan. Although the public opinion had reflect and the Miaoli Hsien Government handled it. But it seems inefficiency. The people live nearby also empty garbage on the riverbed to make pollution. We suggest under strict government supervision, the nature conservation work will be promted more effectivly.

A MAINTENANCE PLAN FOR THE MANAGEMENT AND PRESERVATION OF CYCAS NATURE RESERVE IN TAITUNG

SHOOU FA CHEN [1]

1. Preface

The cycas Taiwaniana is a gymnospermae and an evergreen woody coir palm tree with pinnate on aper apices with a length of about 1-2 meters and the frameside without reversing rolling to become a reserved umbrellate unisexual dioecious flower. The flower of the male cone is elliptical with a length of about 50-60 cm. Each cone can produce 100-200 seeds. The diameter if the conical seed is about 2-3 cm and 4-5 cm in length. Therefore, Cycas Taiwaniana has become a favored garden plant because if its beauty.

Usually, Cycas Taiwaniana is called Taiwan cycas and is a pri-mitive plant. It developed 140 million years ago and is one of a few old plants to have existed before the earth encountered several big changes. It can be sad that it is a living fossil. Current-ly, there exist a few natural stands of Taiwan cycas. It is especially rare to find it growing in large dimensions.This reserve area, covering 290 hectares of land, is special treasure.

2. The purpose:

The plant was discovered when Taiwan was still under the Japanese rule. This office sent staff members to make a field survey on the biological situation in 1975 and 1978. In order to preserve the natural growth of the Taiwan cycas and the ecological environment and to prevent the plant from being cut, this administration has strengthened patrols to prevent illegal cutting of the Taiwan cycas to preserve natural plant resources.

The main purpose of founding this administration is to protect this priceless and rare living fossil, the Taiwan cycas, so that it can forever and be used for scientific and educational research.

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1 Taitong Forest Distinction,
No. 297, Kuang-tong Road, Taitung, Taiwan, R.O.C.

3. Analysis of the environment and the current situation:

1) Position and its range:

Taiwan cycas are scattered in compartments Nos. 19, 23 and 40 of the Yenping working circle along the two banks of Luyeh Stream. Covering 290.46 hectares stretching from the east to the west for 7 kilometers with most scattered in northern bank at 300-900 meters above sea level. Stands of Taiwan cycas are mostly scattered on the slopes along the twobanks. They also grow at the cliff and the collapsed land. Although they are scattered over a vast area, the majority are concentrated in compartment No. 19 and nearby No. 23. The geology of this reserve area is shale and platestone with sandstone in between. The structure of soil is very weak and is easily collapsed and the soil is sandy, containing a large quantity of stones which will be good for water drainage and dry quickly and thus providing an ideal place for Taiwan cycas to grow.

2) Humanities and communications:

The bus ride form Taitung city through Hungyeh Village of Yenping Hsiang to the Reservoir administration station of the entry of Pinanshan river covers about 30 kilometers and takes about one hour. Then one must walk along the right bank of the Luyeh Stream about 6 kilometers to reach the entry mouth of this reserve area. At present, a control house is erected there and if one continues to walk about 10 kilometers, one will reach compartment No. 19 and near No. 23, where the majority of Taiwan cycas are growing. If one continues walking south and crossing the river, one reaches compartment No. 40. However, during the rainy season, the water current is rapid and the river can not be crossed. If one continues walking to compartment No.23, one must pass the river several times. The trip requires about 3-4 hours to reach on foot. However, during the rainy season, one can not pass the river, which is dangerous to cross even during the dry season.

3) Weather:

The rainy season is from May to October and the dry season is from November to the next April. The rainy and dry season

shared each half year. There are an average of 130 days with rain, with 2,300 cc. The annual temperature averages 23 degrees Celsius. The hottest month is July, averaging 28 degrees Celsius, and the coolest month is January at 17 degrees Celsius. As for wind direction, there is a southeastern wind from April to August , whereas from September to February the next year a northeastern wind prevails.

4. The implementation situation and results:

The reserve area was formally established on June 27, 1986 in accordance with the formal promulgation of the Council of Agriculture if the Executive Yuan naming it the Taiwan Cycas Reserve Area in the Tai-Wu Working Circle. On September 7,1988, the council formally proclaimed that Taiwan cycas are a "priceless and rare plants" and should be protected in accordance with the Cultural Asset Preservation Law.

In order to understand the current condition of Taiwan cycas in this reserve area, the administration sent staff members to conduct a field survey and surveyed every tree in December 1987. The survey showed that there are 800 trees of Taiwan cycas in the area. They also hung an acrylic card in the tree. The card is filled with information about the height, chest and diameter for further study. Statistics about tree height show that trees with a height of less than 1 meter are 12 (15.12%), those between 1-2 meters are 349 (43.63%) and those over 5 meters are 2 (0.25%). The highest one is 5.2 meters.

Taiwan cycas are scattered in groups and a single tree is rare. It is a plant which likes sunshine and dislike cold and humidity or the shade. Therefore, most Taiwan cycas grow in open slopeland between 300 to 900 meters above sea level. They are mostly scattered on slopes facing southeast or south. Rarely are they found in a place where the sun is blocked by tree leaves or in a place that is very humid.

After the area has been projected to be a protected ecological environment for the Taiwan cycas, we decided to include the nearby primitive broad-leaved trees in this reserve area, which covers 290.46 hectares. We have already erected a large post each

at the entry of both the Taoyuan and Hungyeh village working stations. A guard office is being built at the entry to the reserve area.

The Tai-Wu working station will dispatch a patrol team to strengthen the patrol mission in this area, and patrol boxes are also installed in the area. Members of a patrol squad should sign the patrol card and fill in a daily working report after the patrol for further verification. This administrative will send its personnel to supervise or observe the patrol mission conducted by staff members of the Tai-Wu working station. As of today, we have not yet founded illegal tree cutting. However, this administration will continue to send personnel to strengthen patrols and observation missions so as to reserve this priceless natural resources for scientific and educational study purposes.

5. Review and recommendations:

1) The Taiwan cycas Natural Reserve Area is for scientific and educational study use only, and it will not be open to the public for sightseeing and trips. This is to avoid a mass inflow of travelers which would damage the ecological environment and affect the growing of the Taiwan cycas.

2) The Twain Cycas Naturl Reserve Area is a Class A Mountainous Control Area, suggesting that police and security forces should strengthen efforts against illegal entry and that lawbreakers should be severely punished.

3) Propaganda and education should be strengthened so that the public have a better understanding of the importance of natural preservation and hence treasure and protect rare and priceless plants.

A REPORT ON THE MANAGEMENT AND PRESERVATION OF AMENTOTAXUS NATURAL RESERVE IN TAI- wu

SHOOU FA CHEN[1]

1. Preface

The Formosan Amentotaxus is a gymnospermae with an evergreen arbor. The leaf is a wide linear with a length of 5-9 cm and a width of 0.5-o.8. The leaf pair is reverse rolled and the leaf back has an obvious white stoma, which is one of its identifying characteristics. Dioecious female flowers and most male flowers are reversed hanging as spikes assembled in catkins. The length of each spike is 5 cm and the female flower will blossom in March and April every year. The cone will mature in June and July every year. The seed has a long and elliptical shaft with a diameter about 1 cm and 2 cm in length. During the maturing period, the outside cone will be covered by a red and sweet aril which is a favorite food of birds and squirrels.

The Formosan Amentotaxus grows in Tahanshan and Kutselunshan in southern Taiwan. It is peculiar to Taiwan. At present, the number of the Formosan Amentotaxus is gradually reducing because the primitive forest has been destroyed. Therefore, it is very important to establish the Formosan Amentotaxus Reserve Area in Tai-Wu.

2. The Purpose:

The administration office found this rare seedling of Formosan Amentotaxus in compartment No. 39 of the Tai-Wu Working Circle when the office was conducting a survey on forest conversion in 1973. Therefore, we exclude this compartment from the area for treatment in order to preserve it. In order to avoid destroying the ecological environment, we have preserved the neighboring 100 hectares of land. This kind of preservation will be great contribution in the history of preserving the ecological environment.

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Besides outlawing cutting, we have sent staff members to strengthen patrol mission to prevent illegal cutting of the tree so as to preserve the resource of this rare natural plant.

The purpose of establishing this reserve area is to protect this priceless and rare plant--the Formosan Amentotaxus--so that it may grow forever for scientific and educational study use.

3. Analysis of the environment and the current situation.

1) Location and its range:

The Formosan Amentotaxus Natural Reserve Area is located in the southeastern slopeland of Tahanshan in the southern section of the Central Mountain Range near the frontier of pingtung county and at compartment No. 19 of the Chaochow working circle. It covers 86.4 hectares and is located at 1,000-1,500 meters above sea level. The forest is a broadleaved forest and remains in virgin condition.

2) Humanities and communications:

The area is located deep in the mountains, or 90 km southwest of Taitung city. Therefore, communications are inconvenient and the human presence is rare so the problem of people interfering is minor.

More than 10 years ago, we could reach the compartment No. 39 of the Tai-Wu working circle by forest route when we were conducting a forest conversion survey at the Tai-Wu working circle. Now, the aforestation work has been completed for almost 10 years. Now, because so many years have passed, cars can not drive the original forest route. At present, it can be reached by Pingtung county's Shuiliaoti (about 130 km) and by the Tahan forest route. We have erected a large post at the 23 km mark of the Than forest route in 1987 to let the people to walk on foot along the route for 4 km before reaching this reserve area. In all the distance is 157 kilometers (153 km by car and four km on foot).

3) Weather:

The weather of this area is moderate and rainy with an average temperature of 16 degrees Celsius. The average temperature in January is 10 degrees Celsius and that in July is 20 degrees

Celsius. The rainy season is between May and September every year and dry season is between October and the next April with an average rainfall of between 2,500 -3,000cm.

The area is always covered by fog when the temperature is high, especially in the afternoon. The visibility and vision are very low and in spring and summer, the prevailing wind are southeastern direction and in autumn and winter they are northeastern.

4. Implementation and results:

The Council of Agriculture of the Executive Yuan formally established the Formosan Amentotaxus Natural Reserve Area on june 27, 1986 and proclaimed the Formosan Amentotaxus "rare and priceless plant". This Proclamation gave it protection of the Cultural Assets Preservation Law of September 7, 1988.

In order to better understand the current situation of the Formosan Amentotaxus in this reserve area, we sent a group of staff members to conduct a survey and note each tree. They found that there are a total of 421 Formosan Amentotaxuses in this area. Each Formosan Amentotaxus has an acrylic card hung on it with details about the height, width and diameter for further study. Statistics show that baby and little caliber trees have the lion's share. Those of a height 2-8 cm total 329 (78.15%), those 10 -18 cm total 68 (16.15%) and those 20-36 cm total 24 (5.7%). So far none have been found bigger than 36 cm.

The Formosan Amentotaxus is scattered throughout this area in groups and a single tree has not yet been found. It is scattered in the natural broad-leaved forest and always appears in a pressured situation where it constitutes a second-layer tree. It likes shadowy places and its power of budding is very strong. Two suckers exist in the root.However, it has so far not yet been found to be scattered in a pure forest or in a superior forest.

In order to protect the ecological environment of the Formosan Amentotaxus, the area has been expanded to cover the nearby broad-leaved forest and now includes 86.4 hectares.The administra-tion has erected a large post at the entry of the reserve area and at 23km along the Tahan forest route respectively. To strengthen inspection and observation of the area, the Tai-Wu working

station will send a patrol team to the area every month. Patrol boxes will be installed in the area and the members of the patrol team should sign the patrol card at the box and afterward they should fill in a daily report for further verification and approval of this administration. This administration has always sent staff members to recheck and supervise but until now no tree has been found to have been cut illegally. We will continue strengthening patrol missions and observation work so as to preserve these rare and priceless natural resources for scientific and educational study purposes.

5. Review and recommendations:

1) The Formosan Amentotaxus reserve area is for scientific and educational study purposes only. It will nor be open to the public for sightseeing purposes.Too many tourists flooding into the area will affect the ecology of its environment.

2) The Formosan Amentotaxus reserve area is classified as Class A Mountain Control Area. Therefore we suggest that the police strengthen their patrols and that breakers be severely punished.

3) Strengthening propaganda and educational work should be accomplished so as to teach students and the public to understand the importance of natural preservation and to cultivate a love of rare and priceless plants.

A REPORT ON THE MANAGEMENT AND PRESERVATION OF THE TAI-WU NATURAL RESERVE BUFFER AREA

SHOOU FA CHEN [1]

1. Preface

The Tai-Wu Natural reserve Buffer area, occupying 47,000 hectares, covers the five watershed zones of Lichia, chihpen,Taimali, Chinlun and Tahsi. with a special geographic landscape and flourishing woods, the are, except for a small part of aforestation, is unexplored forests of natural hardwoods. In this area, there is no land which can be cultivated without limitation nor leased land. It is the largest and the most complete area of natural forest in Taiwan.

There are rocky mountains, a few people and a lot of rivers and dangers in the area. Since the forest cover is still maintained in a natural style it is an ideal place for wildlife to live and breed here. Therefore, there is a lot of wildlife here, especially many priceless and rare animals threatened with extinction.

The Council of Agriculture of the Executive Yuan believes that a great majority of the original low and medium natural wooded areas near sea level in Taiwan have been destroyed, thus shrinking the area for wildlife to live. In addition, serious hunting pressure has put wildlife in even more danger. If no adequate protection measures are adopted, the balance of nature can not be maintained in the long run and national priceless biological resources will vanish. Therefore, the council has tried to protect this wildlife by designating this area the "Tai-Wu Natural Reserve Area".

2. The purpose:

The council formally promulgated the"Tai-Wu Natural Reserve Area" on January 13, 1988 in accordance with the "Cultural Assets Reserve Law".

The main object to be protected in this area will be wild animals and their resting places, virgin forest, high mountains and lakes covering a range of 47,000 hectares. The area located in compartments Nos. 2-10, 12-20, and 24-30 of the Tai-Wu Working Circle.

The founding purpose of this area is to protect all the wildlife in the area and to build the area into a paradise for the wildlife, helping those rare animals to continue proliferating and existing forever so as to keep

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priceless biological resources for our younger generation and for a scientific and educational research.

3. Wildlife resources:

The council invited scholars and experts to make field studies the surveys of the wildlife in the area in 1987 and 1989. The resutls of survey show that the animals in the area are many. There are at least 25 mammals, 37 birds, 21 reptiles, 10 amphibians and 6 fishes. The animals be protected under Article 4 of the wildlife Animal protection and Education Law include the following: Macaca cyclopis,viverricula indica pallida, selenarctos thibetanus, Manispentadactyla pentadactyl. Martes flavigula, pagumalarvata Tai, Felis bengalensis chinensis, Cerus unicolor swinhoei,muntiacus reevesi, Capricornis crispus swinhoei pertinent to the manalias, Lophura swinhoii, Symaticus mikado, Aixgalericulata, Spilornis cheela hoya, Garrrulas poecilorhynchus, Garrulax canorus, Gurrulax morrisenicanus, Heterophasia auricularis, Yuhina brunneicips, Pycnonotus taivanus, and Myiophoneus insularis of the birds; Agkistrodon acutus, Elaphe taeniura, Bungarus multicinctus, Naja naja atra, Trimeresurus mucrosquamatus, Takydromus sauteri, and ophisaurus harti of reptilias; and Rhacophorus robustus,Rhacophorus moltrechti of the amphibians and Troides aeacus Kaguya of butterfly.

The scholars and experts who were assigned to conduct the research and survey could not undergo an overall surevey because of the vast dimensions of the area and because of topographic, communication, weather, time and manpower limitations. Therefore,the Tai-Wu Natural Reserve Area may contain even more abundant animal resources.

4. Implementation situation and results:

The plan will be implemented simultaneously by three menthod: patrols to dismantle hunting instruments, the educational promotion of natural preserevation with education about and management of the natural reserve area.

1) Dismanting of hunting instruments

A. The implementation situation:

a) The reserve area has organized a "Mt. Tai-wu wildlife patrol Team "composed of aborigines hired from the Tai-Wu Working Circle and chihpen circle. The patrol team, under the leadership of staff members of the area, will be divided into six routes for irrequlars patrol missions taken 1-2 timesper month. Each patrol mission will last 3-4 days and patrol boxes will be set up on the patrol route. The area administration station will send its staff menbers to make sampling inspections. In addition,it will cooperate with local police to check for those

illegally hunting every season.

b) The mission of the patrol team is mainly to protect the forest, to preserve the dorest, to prohibit hunting and thepoisoning of fishes,to dismantle hunting instruments, traps and hunter s shelters, and to prevent the illegal picking of plants so as to reduce the hunting pressure and to protect the wildlife in the area.

B. Implementation results:

a) The patrol tram has discovered many hunting instruments such as hunter's shelters instruments used to electrocute fish, fishing nets, hanging ropes, pincers, cages, bird pads, ammunition for hunting guns, and nets for capturing butterflies. Some of the captures instruments are displayed at the Tai-Wu and Chihpen Stations. The remaining are locked away.

b) Hunting and poisoning of fish activities were verey common before the area was formally founded. However, these kind of activiities have almost been checked at the present.

c) The number of hunting instruments and shelters captured by the patrol team have dramatically decreased, indicating thatfewer hunters are coming.

2) Promotion and education:

A. The implementation situation:

a) Large posts were erected at the main entries of this area to warn against hunting and other illegal activites.

b) Staff members will be sent to attend village meetings to explain the forest preservation law and to propagate new knowledge of forest preservation as well as to call on the public not to illegally hunt and to work together to pretect natural resources.

c) Offering news materials to local mass media for publication.

d) Asking local police and officials of mountain entry check points to strictly prohibit illegal hunting activities.

B. Implementation results:

a) Currently, seven large posts have been erected at the main entriesand 60 small warning posts have been erected in areas where illegal hunting has been serious.

b) Tai-Wu and Chihpen have sent their staff members to attent the monthly villages' meeting to explain the forest preservation law. They were well received by local villagers.

c) The populace has gradually known about the development of the

natural reserve area through news pubications and the local mass media.

3) Management and operation of the natural reserve area:

A. Implementation situation:

a) The current stage of the operation used for scientific and educational study purposes. It will not be open to the public for sightseeing and mountain climbing activities so as to prevent damage to the ecology.

B. Implementation results:

a) In line with the founding of this reserve area, the area has canceled tree cutting in compartments no. 38 and 39 covering 565 hectares originally projected for fiscal 1990 and has canceled the cutting of yellow rattan in fiscal 1988 in compartment Nos.9, 10, 13, 20, and 24 at the Tai-Wu wood circle originally constructed to sell. The areahas actively adopted measure to protect the integration of the natural reserve area which has won praises from all walks of life.

b) In November 1987, staff members worked togther with local police to dismantle tents, shelters and related equipment illegally set in the pilu spring area to reduce the interference of people.

c) Rejecting all use application including those for mining water rights to protect the integration of wood cover so as to help protect the wildlife.

5. Review and recommendations:

1) We suggest that a law be enacted to prohibit the populace from entering populace from entering the reserve area without permit because the free entering of the populace will destory the living environment and interfere with the wildilife.

2) We suggest strengthening checks against the illegal sale of preserved wildife at shops specializing in selling mountain products. Currently, many shops sell mountainous products and business is booming. We suggest that police be strengthened to check the illegal, killing, trade, display and of exchange of preserved wildlife.

Plant Resource Information System for Nature Preserves

Chang Fu Hsieh*

The PRIS is an integrated software system designed to facilitate plant resource inventories, vegetation studies, and impact assessments. The concept behind this system was to develop a tool that could provide information about plant species and vegetation to researchers, resource managers, and land use planners. Sources of information included in PRIS can be: (1) museum or herbarium collections; (2) extensive searches through scientific and popular publications pertaining to the taxonomy, geography, ecology, biology, and uses of plants; and (3) data from field survey.

PRIS takes the advantage of the affordable and widespread personal computer. It requires an IBM-XT, PC-AT, or compatible system with (1) a 40 MB hard disk; (2) at least 1024 KB of memory; (3) a VGA or EGA compatible display adapter and display monitor; (4) a FBX24/AT imaging card with a resolution of 1024 x 1024 x 24-bit; and (5) a TEXNAI TX-200 color image scanner.

The software is organized into two subsystems. The first subsystem is used for vegetation analysis. Capabilities include: raw data manipulation, plant list preparation, composition and dominance analyses, diversity measurement, ordination, clustering, analyses of population structure and spatial pattern, etc.

The second subsystem is designed to synthesize information on the status of a species or other taxon. It integrates information regarding taxonomic classification, biological characteristics, habitat and environment, economic value, legal status, and degree of threat or protection for the various populations. The software is also expanded to include geographic grid-reference, graphic, and image systems, and make it more versatile and powerful.

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Conservation and extension of mangroves in Taiwan

Ming-Yih Chen* Shin-Hwei Lin Chao-Yuan Lin
King-Cherng Lu Chien-Chin Shun Tin-Sin Hong

In Taiwan, mangrove forests live at the muddy and wet soil in the west coast from Tanshui to Tungkang. The rate of disappearance of mangroves in Taiwan has been alarming. Existing mangrove species include common *Avicennia marina* and *Kandelia candel*, and endangered *Rhizophora mucronata* and *Lumnitzera racemosa*.

Almost all the mangroves at Kaohsiung have disappeared due to port, industrial and urban developments during the past sixty years. Two native species at Kaohsiung, *Ceriops tagal* and *Bruguiera gymnorrhiza*, were already extinct. Mangrove at Yungan, Tungkang and Tainan are being unnecessarily destroyed by the diking of fish pond and canal. Some mangroves in the west coast are being converted to fish ponds.

The rapid disappearance of mangroves in Taiwan are deeply concerned. Mangroves at Tanshui estuary, Tungshih coast, Putai lagoon and Peimen lagoon have been proposed as natural reserves. Residual mangroves at Hsinfeng, Tainan, Yungan, Chichin and Tungkang also have to be protected. Actually, aquaculture and mangrove can coexist if properly planned and mangroves can play a beneficial role in bank stabilization as well as in windbreaking. Suitable habitats such as abandoned salt evaporation ponds at Chiating and lagoon at Homeiliau can be naturally recolonized by some species of mangrove. New mangrove systems can also be established at tidal lands at Wenliau, Kaomei and Shenkiang by artificial planting.

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Pilot Project of Interpretative Services in Forest Ecosystem

Huang, Ying-Tu* & Tzeng, Jen-Ni*

Abstract

Chitou Forest Recreation Area, favored destinations for urban man, is famous for her soaring landforms and expanse verdent forest. Data reveal that over one million people visited this recreation area per year. In hence, the destruction from visitors in this area can not be immune.

To keep away from vandalism and provide visitors both educational and recreational benifits, the interpretative services in natural resource and environmental education of this recreation area is needed obviously.

The achievements of this project executed in Chitou area are described as following:

1. We provide colorful, ecological, scenic folders and maps for visitors in visitor center, hostel, souvenior shops,....etc. and take free charge. Over 10 kinds of folders and maps are printed and supplied.
2. Retend or renew the interpretative signs of this forest. There are five signs renewed this year.
3. We employ and train environmental interpreters, who graduated from department of forestry in college, to help visitors better understanding the importance of natural resource. The audience could learn how to treasure the only earth we live.

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ECOLOGICAL CONSERVATION ACTIVITIES OF COLLEGE STUDENTS

Chen Rung–Lung [1]

I. Purposes

Civilization has bettered up man's life, but it has also brought to the world sinister environmental pollutions. In the past three decades, in the process of pursuing rapid national economic growth, both the government and the civilians alike have neglected the significance of the protection of ecological environment. We are confronted with a critical menance, as the warning signs of ecological imbalance are reflected in the ill use of natural resources and the diffusion of public harms. Ever since the first day when the Taiwan area began to look seriously at the problem of environmental protection, some people, higly concerned about environmental protection, striving to keep an ecological balance of all the living creatures on earth so as to protect the nature from being further contaminated, put forth the following catchword, "We have only one earth!" which means that if we ruin the only earth we dwell upon- –that is, if we disregard the problem of environmental pollution and continue to indiscriminately produce varied pollutions and therefore maim our living environments, we would soon face the fate of self–destruction.

For thirty years, the natural ecology of Taiwan, i.e., the environments we live in, has lost much of its original lustre. Who will care about the aging and dying of our native island which was once lauded by the world with the name of the beautiful island, Formosa?

The pollution and damage of the ecological environment has been a by-product of modernization. Taiwan has been in constant pursuit of unlimited economic growth. Indeed, our economic achievement has been commended as a miracle and our per capita income and living standard have been enormously elevated. For thrity years, we have managed to reach a praiseworthy goal in ecomomic development, but this goal is achieved at the expense of losing what we originally had––clear air, limpid creeks, a wholesome earth, and green and lush mountains and forests. As we are looking forward to the year of 2,000 when we can be ranked as one of the developed countries in the world, can our living environments proportionately meet the ideal standard of a developed country? For this very concern, we try to advocate this "Ecological Conservation Actitities of College Students," with a view to inculcating the correct knowledge of ecological conservation into our college students, and arousing our youth' general recognition of the government's policy in the process of modernization. Hopefully, they will

[1] C.Y.C. Taipei Collegoate Activity & Lub Center
Sec. 2. Hsin Sheng S. RD. NO. 38 Taipei 10618

make some feedback to the advocacy of ecological conservation and furthermore function as the opinion leaders of the society.

II. Practical Activities

From 1986 up to the present, we have paid a better part of attention to those students taking charge of students' activities center affairs and those student leaders of varied extra-curricular activities clubs and organizations. By providing various forms of activities and services, we attempt to advocate policies, knowledge and ideals of ecological conservation.

The following is how we have put the ideals of ecological conservation into practice:

1. One of the activites, held during the winter and summer vacations, is aimed at informing those students staffed in the student activites centers and extra-curricular activities clubs and organizations of the policies of ecological conservation. For Each session there are 130 participants and sixteen sessions held amount to over 2,000 students joining in this type of activity.

2. An over-the-weekend seminar is held by the five club service centers of college and university students in Taipei, Hsinchu, Taichung, Tainan, and Kaohsiung areas. This kind of seminar activity is aimed at increasing the ecological conservation knowledge. Ninety-six such seminars have been held and with each seminar of 100 participants, the total number of students involved in this knid of activity run up to nearly 10,000.

3. Assistance has been given to support the training programs of ecological conservation of the extra-curricular activities club leaders. About 350 times of such assistance have been made over the years.

4. Approximately 400 times of assistance have been extended to help varied extra-curricular activities clubs to promote the education of ecological conservaton.

5. Intercollegiate activities under such attractive titles as "Give Green Hills Back to Us", "Environmental Protection Week," "Fresh Fish Project," "Greening Our Environments," and "Mountain Climbing and Mountain Cleaning" have been held to extensively promote the perception of ecological conservation.

III. Results and Suggestions

After years' efforts in advocating the ecological conservation, our college students have become increasingly aware of the importance of the protection of ecological environments. As we can clearly see, however, awareness alone is not adequate; we need reinforcement from the government, the enterprising circle, and the public in general. For the damage and pollution men make on the ecological environment have an overall effect that calls for a combined consideration of economic, political and cultural factors. Ecological conservation is a long-term mission that demands gradual and accumulative effort and everyone's cooperation.

The present generation has gone a step further to withdraw a portion of the savings from

the bank of ecological environment resourses of the next generation. It is unfair to see ourselves selfishly concerned with only the present rather than also with our descendants who are yet to be born to voice their complaints. Therefore, our ecological conservation should be pushed a step forward from the "know" to the "do" stage of movement. The mass communication media do play a stimulating role in urging the government to ameliorate our ever worsening ecological environment. It is strongly hoped that our government must be far-sighted, cheirsh a humanitarian heart, do its best to preserve the clean and fresh water, air, and sunlight for the generation to come, and emphasize the ethical education of the ecological conservation.

Every member of the society must be a contributor to ecological conservation, so must the government, the enterprises, and people of all walks of life——all must be concerned about our living environments, starting to observe and think from the everyday living and the things near and familiar. Only by so doing can we restore the clean air, clear water, healthy earth, and green mountains and woods.

Promotion of Environmental Protection and Cultural Preservation

Yeh-Chen 1 **Hsu Shi-Mei 2**

In the past, there was a general lack of knowledge in the natural environment and cultural development of our homeland. Recently, research in the geography, ecology, society and humanities of our homeland has been conducted by academic institutions. Documentation on the research results and publications are made available to the public. However, the information has not been adequately presented to the general public. As a consequence, the public is still unfamiliar with his homeland, and alien to the environment around.

The "Tour of Intellect" is composed of volunteers who are concerned about our environment and homeland. Its members are of various professional backgrounds. The group was formed with an intent to promoting public concern, and thereby enhancing the protection of our natural environment and preservation of traces of cultural development.

Through the tour activities conducted by the "Tour of Intellect", the participants may acquire hands-on experiences by personally visiting various parts of the island and investigate the geographical, cultural and societal background of our homeland. As listed in the attached tables, thirty two tour activities were conducted, or planned, between July of 1985 and June 1990. These activities were widely accepted and favored by the participants. More activities of similar nature will be conducted in the coming years.

In addition, a bi-monthly periodical was issued by the working team of the "Tour of Intellect". Papers and news on environmental protection and preservation, and columns on endangered species and environmental protection activities were included in the periodical. Tremendous manpower is required for editing a periodical with satisfactory level of contents. As most members of the working team are volunteers with other primary dedications, it is difficult to fulfill the manpower requirement for such an elaborate undertaking. It is suggested that the periodical be discontinued.

1. United Silica Industrial Ltd.
9/F, No. 687 Minsheng east Road, Taipei, Taiwan
2. Wan Hsing Primary School
No. 114 Sec. 2 Show-Ming Road, Taipei, Taiwan

Date	Activity	Location	Theme
74.7.21	Tour of sand dune	Shangfu, Tsaolo, Hungmao Port	Sand dune and coast plant along the West Taiwan coastline.
74.9.15	Tour of Pitouchiao	Pitouchiao	Rock coast and its ecology
74.10.20	Tour of Taipei Basin	Taipei, Linkou, Kuantu, Yuanshan and Wuku	Formation of Taipei Basin and topography; human activities and natural hazards
74.11.24	Tour of water resources	Minsheng Waste Water treatment Plant,Chingtan Dam and Chanchu Shan Water Purification Plant	Origin of water supply, purification process and waste water treatement
75.1.26	Tour of Santiao Ling	Along Keelung River	River topography and effects of human activities on the river
75.3.23	Tour of Lanyang Plain	Lanyang Plain	Topography, history and swamp ecology of Lanyang Plain
75.5.25	Tour of Taoyuan alluvial fan	Taoyuan Plateau	Topography of "Han" village and lifestyle.
75.7.27	Tour of Taipei Basin	Hsiangshan, Huakang Chutzu Lake and Erhchung Flood Channel	Evolution of topography and population distribution
75.9.28	Tour of Tahan Creek	Along Tahan Creek	Tahan Creek landscape, reservoir and water/soil conservation
75.11.22/ 23	Tour of Tungshih Tahu	Tungshih, Huoyen Mountain, Cholan, Chuhuang Keng	Huoyen Mountain landscape and the agricultural development of Tungshih area
76.2.23	Tour of Lanyang Plain	Lanyang Plain	Land formation of Lanyang Plain, history of development, village pattern and river management
76.4.26	Tour of sand dune	Kuanyin, Tsaolo	Sand dune formation, vegetation for preventing erosion, wind breaks and coast management
76.6.21	Tour of Tatun Volcano	Tatun Mountain	Volcano topography and butterfly corridor ecology in Tatun Mountain
76.8.23	Tour of North Coast	Tamshui, Chinshan Yehliu, Fukuei Chiao	Northeast coast topography, coast plants and environmental impacts of recreation activities

Date	Activity	Location	Theme
76.10.25	Tour of Tsaoling	Tsaoling Ancient Path	Landscape along the ancient path and its history
77.4.17	(Rescheduled due to typhoon)		
76.12.25	Tour of Chushan and Luku	Chushan, Luku	Agricultural activities and development history
77.1.17	Tour of Mass Rapid Transit System of Taipei Metropolitan Area	Department of Rapid Transit Systems	Future MRT Systems in Taipei
77.3.20	Tour of Chihsing Mountain & Menghuan Lake	Chihsing Mountain and Menghuan Lake	Past and present volcano topography and ecology
77.5.14/ 15	Tour of Northeast coast	The Northeast coast National Scenic Area	Ecology, landscape and development of a coastal region
77.7.15/ 17	Tour of East Taiwan	Taitung, Hualien	Traces of earth crust movements and cultural characteristics
77.9.18	Tour of Taipei Basin	Taipei Basin	Formation, changes and development of Taipei Basin
77.11.20	Tour of Taipei Basin (2)	Taipei Basin	Natural environment and hazards in Taipei Basin
77.12.31 1.2	Tour of Eastern Taiwan	Taitung, Hualien	Traces of the earth crust movements and cultural characteristics
78.3.19	Tour of Tunghou Creek	Wulai	Ecology, landscape and protection of water resources along Tunghou Creek
78.5.21	Tour of Yingke	Peitou, Yingke	Pottery making and its usage
78.7.14/ 16	Tour of Chianan Plain	Chianan, Tungshih Putai, Tsochen, Wushantou, Takang-Shan and Tainan	Landscape and land use of fishing villages, badlands; history and the village pattern of Chianan Plain
78.9.17	Tour of Wetland	Kuantu, Watzuwei, Choumei	Wetland ecology along Keelung River
78.11.19	Tour of Hakka culture	Chutung, Peipu, Hukou	The Hakka culture and societal characteristics

Date	Activity	Location	Theme
79.1.21	Tour of Taoyuan Plateau	Tahsi, Lungtan, Hukou, Yangmei	The formation, land use and change of Taoyuan plateau
79.2.18	Tour of Hakka culture (2)	Chutung, Peipu, Hukou	The Hakka culture and societal characteristics
79.3.18	Tour of Chinkuashih	Chiufen, Chinkua-shih	Past, present and future of the gold producing area
79.5.19/	Tour of Tungshih, Tahu	Tungshih, Tahu	Topography and land use of Tungshih - Tahu area

Special Exhibit of Taiwan Insects

Hsiau Yue Wang [1]

Purpose

Most of animal species on earth belong to Class Insecta, over one million insect species have been named by now, according to entomologist estimated, there are about 50,000 insect species distribute in Taiwan, so insects playing a very important role in our ecological environment, and have a major influence on huban's life.

To make the people having further more understanding about Taiwan insects, "Entomological Society of the Republic of China" invited 16 governmental and private institutes to hold this insect exhibit at Taiwan Museum, items include: insect fauna of Taiwan, introductions of entomology research in Taiwan, conservation of insects, management of beneficial insects, rearing honey-bee and silkworm as a business, medical insects, pest insects and their control, control pest by biological methds, control pest by pheromone, home pest and forest pest, introduction of insect museum ··· ect.

Execution

During one month from July 31 to Auguest 31, 1987, display of various insect specimens and beautiful slides attracted about 100,000 people to visit the exhibit, and entire illustrations were edited into a brochure to be an available reference of visitors, many entomologists also been invited to hold a series of lectures to expand the effect of education.

[1] Address: TAIWAN MUSEUM
2, Siang Yang Road
Taipie, Taiwan, R.O.C.

Consequence

As the agriculture policy of government was being executed, it's very difficult to prevent poisonous chemicals from polluting air and rivers, as well as government try to mediate the problems between owners and local residents.

this exhibit educate people the correct way to control pest insects, also educate people to protect our environment, and to improve our quality of life. it also introduce the insects Knowledge to the people, encourage people to understand the knowledge of ecology and concern about nature conservation.

PROPAGATION PROJECT OF ENVIRONMENTAL CONSERVATION AND WILD BIRD PROTECTION TO SCHOOLS IN KAOHSIUNG CITY

BY Y. N. WEI (*)

A. PURPOSE OF STUDY

Kaohsiung is a new industrial city where the development of nature resource was too fast and the citizens neglected the concept of nature conservation, therefore, accompanying with the rapid economic development, many nature environment have been destroyed.

Since the wild bird is the symbolic guidance of human living environment, to love birds is becoming a very important link of nature conservation. By means of the subject Project, we intend to spread the consciousness of wild bird protection and propagate the concept of nature conservation to the students in Kaohsiung city, convince the new generation to realize the preciousness of nature resource and the importance of environmental conservation. We expect in the near future, this may affect these students leading the entire city to pay much more attention to and practice the policy of nature conservation.

B. STUDY MATERIAL AND METHODS

1. Producing the propagating media:

   a) Poster and label.
   b) Explaining paper.
   c) Slides - including illustration of wild bird and nature conservation, wording explanation.

2. Circulating propagation of nature conservation and wild bird protection:

   a) Requesting Kaohsiung City Authorities to distribute propagating posters to all schools in Kaohsiung city and to post in public for students and teachers' notice.

   b) Visiting fifteen (15) schools where reservation being made to demonstrate slides, explain and discuss face to face by presenting labels.

3. Wild Bird Watching:

   a) Selecting fifteen (15) wild bird habitats such as Cheng Ching Lake, Kuan Yin Shan, Yellow Batterfly Valley, Kenting National Park, etc., for bird watching in field, teaching the students bird watching methods and explaining characters of wild birds.

(*) Kaohsiung Bird Society:
No. 306-1, Chien Kao 1st Road, (80249) Kaohsiung, Taiwan

b) At the meantime, convincing students to love wild birds, to protect them and to realize the relationship between wild bird and nature environment as well as the human being and our environment.

C. RESULTS OF STUDY

1. Circulating propagation of nature conservation and wild bird protection:

a) In total fifteen (15) propagating courses, there were primary school students, primary school teachers, vocational school students, primary school students together with parents. The percentage of number of times is summarized as follows:

- Primary school students only: 6 times, about 40% of total number of times.
- Students with their parents: 6 times, about 40% of total number of times.
- Primary school teachers: 2 times, about 13.5% of total number of time.
- Vocational school students: 1 time, about 6.5% of total number of times.

b) Most of the primary school students expressed their love in nature, they not only asked questions but also answered what they knew, besides, they have a very strong memory.

c) Some school teachers were very serious to join this course, they took notes and asked plenty of data, reportedly which would be part of sources for their own students in extra-curriculum.

d) Vocational school students had not much interest to this course, however, the teachers who joined together were found enthusiastic about bird watching.

e) Students accompanied by their parents were evidently much cheerful, students asked and answered questions in the course, while the parents made inquiries of bird watching methods after the course.

f) Many primary schools or Children Activity Center approached us to reserve this Project for their students, however, no any Middle and High Schools contacted us, possibly the Middle and High School students suffer the pressure of advance examination to a higher school.

2. Bird Watching in Fields:

a) In all fifteen (15) times of bird watching in the field, we found that all the participators were primary school students and part were their parents.

b) After high peak of delighted bird watching, most students and the parents would express their reactions as "Wish those

beautiful wildbirds will not be killed" or "Wish the nature environment will not be destroyed". Apparently, the consciousness of loving birds may urge the bird watcher to realize the importance of environment preservation. This is a good beginning step of nature conservation.

3. Kaohsiung Municipal Kai Shuan Primary School requested twice of this propagation course which delighted both their students and teachers, in turn, they held each one(1) "Science Study Camp" for students and teachers respectively which were supported by us and became a regular extra-curriculum of their school.

D. CONCULSION AND SUGGESTION

The primary school students are always full of dreams of nature, if they are encouraged to contact birds, animals, insects, flowers and trees, etc., and to wander in the wild fields, mountains and water during the period of their young age, they will realize the nature resources and their changes be concerned, in turn, they will equip the wider sense of EARTH and deeply erect their concept of nature conservation. After few years or decades, the entire country will possess a great number of fresh poineers of nature conservation, and the young generation will practice the idea of nature conservation consecutively in all respects. Eventually, although the highest idea of nature conservation can not be surely reached, it will reduce the degrees of nature damaged.

In accordance with one year's experience of circulating propagation project of environmental conservation and wild bird protection to schools in Kaohsiung City, though we have planted the seed which taking the root in primary schools in Kaohsiung City, but we still found that our Bird Society, as an amateur member society, is unable to reach all respects of every school, therefore, in order to improve this, we sincerely propose our suggestions as follows:

1) To have regular "Nature Conservation Studying Camps" in bird's habitat area, encourage teachers in various schools to participate in the nature conservation courses and the lively bird watching in field.

2) To assist those teachers who participate the teacher's "Nature Conservation Camps" to hold their own school's "Nature Conservation Studying Camps" for their students. Expect the concept of nature conservation and bird protection will spread from point to surface in the entire country through the school teachers and students.

BENDING OF BIRDS MIGRATION IN TA-DU ESTUARY, TAIWAN (1987-1989)

TZU-WEN LAI[1] LE-CHUEN LO[1] J-DER LIANG[1]

ABSTRACT

The bending program of our region is nearly reach three years. During the first year period, from August 1987 to the end of June 1988, bending have down 21 times. Among 1307 birds of captured migratory birds, 39 kinds are contained.
During the second year period, from August 1988 to June 1989, bending have down 47 times. Among 4555 birds of captured migratory birds, 46 kinds are presented. At the present time the third year period program is holding on hand. From July 1989 till now, (up to the end of April 1990) bending already done 23 times, and 3000 migratory birds captured. Among the whole captured birds, there are containing 5 migratory birds which bent from Australia. Detail information are described as following:

1. Red-necked stint (Calidris ruficollis)
   BEND NUMBER: A 032-44968
   B 033-42671
   BENDING PLACE: AUSTRALIA A:HOBART (42°53'S, 147°19'E)
   B:PORT AUGUSTA (32°31'S, 137°47'E)
   BENDED DATE: A: DEC. 6, 1986
   B: FEB. 17, 1989
   REPLY PLACE: DA-TU ESTUARY, CHANG-HWA COUNTY (24°12'N, 120°28'E)

   REPLY DATE: A: AUG. 14, 1988
   B: MAY 6, 1989

2. Curlew Sandpiper (Calidris ferruginea)
   BEND NUMBER: 040-98966

   BENDING PLACE: AUSTRALIA (42°58'S, 147°32'E)

   BENDED DATE: NOV. 23, 1979

   REPLY PLACE: DA-TU ESTUARY, CHANG-HWA COUNTY (24°12'N, 120°28'E)

   REPLY DATE: APL. 7, 1989

   TIME INTERVAL: 9 YEARS 4 MONTHS 14 DAYS

   DISTANCE: 7938 KM.

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1 Taichung Bird Society
30, Lane 38, Ho-Ping st. Taichung, Taiwan.

3. Terek Sandpiper (Xenus cinereus)
BEND NUMBER: 051-25308

BENDING PLACE: AUSTRALIA (32°52'S, 151°46'E)

BENDED DATE: MAR. 27, 1988

REPLY PLACE: DA-TU ESTUARY, CHANG-HWA COUNTY (24°12'N, 120°28'E)

REPLY DATE: APR. 7, 1989

TIME INTERVAL: 1 YEAR 11 DAYS

DISTANCE: 7136 KM.

4. Board-billed Sandpiper (Limicola falcinellus)
BEND NUMBER: 041-46537

BENDING PLACE: AUSTRALIA PORT HEDLAND (20°15'S, 118°55'E)

BENDED DATE: APR. 8, 1988

REPLY PLACE: DA-TU ESTUARY, CHANG-HWA COUNTY (24°12'N, 120°28'E)

REPLY DATE: APR. 22, 1989

TIME INTERVAL: 1 YEAR 14 DAYS

DISTANCE: 4920 KM.

As conclusion, the information that recorded from the program of birds bending is much useful for the study of ecology science. And could be established a complete and reliable information file of the movement of migratory birds, therefore, it is a most reguisite action.

A Program Report of Traveling Exhibitions and Lectures on Natural Environment Protection

By Cheng Kuan-chun[1]

PART 1: PROGRAM GOALS

Owing to the growing population pressure and rapid industrial development, Taiwan's natural environment has deteriorated day after day. In the past few years, more and more people have realized that good quality of life should mean more than mere satisfaction of material things. Therefore the appeal for environment protection and nature conservation is getting stronger and stronger. Unfortunately many people still do not have a correct conception about conservation. It is proper and imperative that such an education program should be performed for the public.

This program is to serve that purpose and to be focused on nature conservation. By giving traveling exhibitions and lectures, we hope to let people know about the importance of the natural environment and the biological world. It will help solve our problems on nature conservation gradually.

PART 2: WHAT HAS BEEN DONE IN THE PROGRAM

(1) Traveling Exhibitions:

During the 78th national fiscal year (July 1989 -June 1990), there have been 64 exhibitions on 5 different subjects held at cultural centers of cities or counties throughout Taiwan.

1. Taiwan Museum
Hsiang-Yang Road, Taipei 10014.

Subject	Exhibits
Fishes	Fish species, history and fossils, habitat, basic structure, etc. presented in photographs and specimens; Taiwan's fishing industry; nature conservation posters; books about fishes and fish recipes.
Insects	115 large photographs about insects and their habitat in Taiwan.
Lizards	42 pictures and 29 explanation boards about all sorts of lizards in Taiwan, provided by the Departments of Biology of both Chinese Cultural University and National Normal University.
Marine Life	134 photographs about the habitat of many sorts of marine life.
Marine Algae	Its species; life history; cultivation; specimens of brown, green and red algae; foods made of seaweed.

(2) Traveling Lectures:

(a): For students of teacher's colleges throughout the Province, lectures are focused on the conception of nature conservation. There are 8 lectures in total, one for each college.

(b): For students of provincial agricultural schools, lectures are focused on the protection of endangered animals and plants as well as the conception and what the government has been doing for this. There are 22 lectures in total, one for each school.

PART 3: RESULTS

Our exhibitions have been widely appreciated because the photographs, pictures and specimens are so precious and lifelike. The conceptions of nature conservation have been wide-spread and have begun to root in people's minds.

The statistics of the exhibitions are as follows:

Subject	Number of Visitors	Number of Exhibitions
FISHES	8,840	2
INSECTS	66,240	16
LIZARDS	75,968	16
MARINE LIFE	70,048	16
MARINE ALGAE	61,292	14
TOTAL	282,388	64

The traveling lectures are for students and teachers of provincial normal colleges and agricultural schools. They will be more influential in spreading the conceptions of nature conservation.

PART 4: SUGGESTIONS

The summary of suggestions from all sources to the program is as follows:

1. Lectures should be held for each exibition subject exhibited so that interested visitors may know more about the subject.
2. Books or leaflets for references should be provided so as to help the exhibition staff to answer questions from visitors.

3. Insect exhibitions have fewer species, and have no name labels to insects.
4. It would be better to provide schools with a list of lecturers on such topics so that each school can arrange lectures according to its own needs.

A Study on the Extension Project of Education on Natural Environmental Conservation for Elementary and Junior High School Students

Chuan Chuan Du[1] and Carson Wu[1]

ABSTRACTS

The Council of Agriculture, in an attempt to improve the Knowledge of natural environmental conservation for elementary and junior high school students, has funded a five-year education project since 1986. The major working purposes of the project include the publish of available books and free provision of books to expected students of elementary as well as junior high schools. This evaluation research is set for taking look of the effectiveness of project implementation in terms of the criteria of that the right things are delivered to the right persons with appropriate methods.

The evidence of data were collected with four samples, which are: (1) students in ten districts selected with random sampling methods, (2) librarians from elementary and junior high schools, (3) students selected with purposive sampling as control-experimental groups, and (4) teachers selected to evaluate the content of the books.

The results of this study are:

1. Books published by this project are rated as "excellent", but they're only suitable for students of middle-low classes of elementary schools. It reveals that the target populations of this project are overinclusive.
2. Since only less than 20% schools have received these books, the project is not effective in reaching its target students.
3. There are two equivalent groups -- one has read the books and the other has not, the former group has significant higher score of conservational knowledge than the latter

1 NATIONAL PINGTUNG INSTITUTE OF AGRICULTURE 1,Hsueh Fu Road, Nei Pu Hsiang 91207 Pingtung, Taiwan Republic of China

one in the test of this study. This indicates that the effectiveness of reading these books is significant.

4. According to our research, most schools own the audio-visual equipments. It may be an alternative way to use video-tape or slides instead of books to achieve the educational goal. But this suggestion needs more deliberate evaluation based on cost-effectiveness analysis with comparison between reading and audio-visual education.

Survey on the commercial utilization of insect resource in Taiwan

Ping-shu Yang [1]

Summary

Insects for commercial utilization can be divided into following items: 1)for making specimens, book markers, coasters, table mats, plastic toilet seats, and decorations. 2) for animal food. 3)utilization of honey-bees and silkworms. 4)for Chinese medicine. 5)for biological control agents and others such as for worship ceremony with paper wasp (Vespidae). Among them, the utilization of 1st. purpose has a close relationship with insect conservation.

According to the results of interviewing with the dealers, the insect industry has declined from 1981 to now. There are only 11 or so factories which processed insects for commercial utilization. Some of these factories and 79 souvenir shops conduct insect trading with a small scale.

About 92% of insect resource for commercial utilization are collected from Taiwan, only that of 8% is imported from overseas, particularly Thailand, Malay, Singapore, Indonesia, Brazil, Columbia and Kenya. In Taiwan, 35.9% insects for commercial utilization are collected from the Central Area of Taiwan, 24.0%, 19.8%, 18.3% is from that of the Southern, Northern, Eastern Area, respectively.

The results indicate 48.3% to total amount of insects for commercial utilization in Taiwan is butterflies, and 35.3% is beetles. Insects imported from overseas, 36.6% to total amount is butterflies too, 31.0%, 22.5% is beetles and moths, respectively. From the analysis of

1 Department of Plant Pathology & Entomology, National Taiwan University, Taipei,10764, Taiwan,R.O.C.

customers, 59.9% are foreign people, especially Japanese. And butterfly products are the most appreciate articles for customers. In Taiwan, 108 common species, 30 endemic and rare species of butterflies are utilized for commercial utilization now. At least 28 species of foreign butterflies are utilized. In these species contain 5 rare and endangered species, such as Agehana maraho, Troides spp etc., and some foreign butterflies such as Ornithoptera alexandrae, Trogonoptera spp. etc., which has been listed on CITES App. II.

The price, name list of utilized insects for commercial utilization has been accomplished in this paper. And the results indicated the competition of foreign dealers, expensive wage, experienced workers, declined insect populations and protected laws for insects and other organisms have limited the development of insect industry recently. So some problems and the future view of insect industry in Taiwan are discussed.

On the other hand, the utilization of honey-bees, silkworms and insects for animal food, for Chinese medicine were mentioned and discussed in this paper too.

BIRDS OBSERVED IN THE SAN-PING AND NAN-FENG-SHAN REGIONS OF SOUTHERN TAIWAN

HEN-BIAU KING[1], HUA-JEN HO[1] AND NAI-HANG CHANG[1]

Summary

Observations (from March 1987 to Feburary 1988) on the birds of the San-ping and Nan-feng-Shan regions of Southern Taiwan have recorded 9 orders, 31 families and 116 species. Of these, 94 species are permanent residents or 61% of total permanent residents of Taiwan, 12 species are migrants and 10 species are transients.

Over two-thirds of the 31 families fall into the Order Passeriformes. The major families are Turdidae (total 15 species), Timaliidae (total 14 species), Sylviidae (total 9 species), Muscicapidae (total 7 species), Corvidae (total 6 species), Columbidae (total 5 species), Strigidae (total 5 species), Accipitridae (total 5 species) and Motacillidae (total 5 species). The birds of these 9 families account for 61% of total birds observed in the studied regions.

Of 116 species observed, 10 are known as endemic species or 71% of total endemic species island-wide, 52 are known as endemic subspecies or 3/4 of total endemic subspecies found in Taiwan. The common or abundant species are Muller's barbet (*Megalaima oorti nuchalis* Gould), gray-eyed nun babbler (*Alcippe morrisonia morrisonia* Swinhoe), black bulbul (*Hypsipetes madagascariensis nigerrimus* Gould), pigmy woodpecker (*Dendrocopos canicapillus kaleensis* Swinhoe), black-naped blue flycatcher (*Hypothymis azurea oberholseri* Streseman), Styan's bulbul (*Pycnonotus taiwanus taiwanus* Styan), bronzed drongo (*Dicrurus aeneus braunianus* Swinhoe), gray tree pie (*Crypsirina formosae formosae* Swinhoe), large-billed crow (*Corvus macrohynehos colonorum* Swinhoe), sharp-tailed munia (*Lonchura striata phaethontoptila* Oberholser), gray-throated minivet (*Pericrocotus solaris griseigularis* Gould) and Gould's nun babbler (*Alcippe brunnea brunnea* Gould). The population is still high. These bird species feed on the fruits of tree species classified under mulberry (Moraceae) and laurel (Lauraceae) families.

The species diversity varies with the season. The most diverse month is October with total 81 species recorded. The least diverse month is May with total 39 species recorded.

Some rare species, such as Japan night heron (*Gorsachius goisagi* Termminck), black eagle (*Ictinaetus malayensis* Temminck), brown flycatcher (*Muscicapa latirostris latirostris* Raffles), magpie (*Pica pica sericae* Gould) and brown thrush (*Turdus chrysolaus chrysolaus* Temminck) have been observed during some time of the year.

The most important habitat types for the species studied are natural mixed hardwoods which account for 61 species observed. Coniferous plantations rank as the second improtant habitat type which accounts for 38 species observed. Hardwood shrublands and bamboo groves account for 28 species each.

This report also describes in some detail selected birds of 9 families, and in taxonomic sequence, tabulates the relative abundance, habitat types and status of all 116 bird species known for the San-ping and Nan-feng-Shan regions.

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A Study on the Hunting Organization of Taiya Tribe
its operations and relations with the Conservation of Wildlife

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Foreward

This research is part of the study on Taiwan's hunting culture,a longterm integrated research project undertaken by myself in 1988, where terms such as 'hunting'and 'hunting culture' and their derivatives were firstly introduced and defined. A general introduction of content is followed by 15 major research items and 62 subdivisions. Each major item makes one specialized topic to be broken down int of urther subdivisions. All this, however, is only a general categorization. A greater breakdown could be made for specific individual emphasis, and each subdivision could be further worked into a MA or PhD thesis.

Background

Taiwan abounds in wildlife. Forest, the habitat of wildlife on-land , occupies 52% of the total area of Taiwan . The aboriginal people sharing the same habitat have been inclose contact with wildlife . Such relations as existing in the past , present or future , in term of forest management,wildlife management , ecology ,nature conservation , and socialstudies like law and anthropology are the main issues and guiding principles of this research project.

Wildlife has never claimed a place in Chinese history; hence the scarce documentation and low credibility . As noresearch in this concern has ever beencrried out,specialized terms are nonexistent, one instance being the absence of the term ' hunting culture ' in Compton's Encyclopedia. The study of Taian's hunting culture is like blazing the trail.

The year 1945 was a threshold marking the beginning of a series of changes in the aboriginal communities. The interwoven human-wild -life relations also undervent great changes. Today's aboriginal octogenarians can still recalllife four decades ago (then under the Japanese rule) , and forty years makes an era in terms of humanwildlife relations . Given that a lot depends on the health and life expectency of these octogenarians, the present is high time that research on Taiwan's hunting culture was carried out.

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Purpose

Hunting culture , which usually lasts two hundred years and is an integral part of every culture , its significance and content being determined by the way each culture advances, or shifting with changes in the bigger context. The purpose of this project is to study the corelations between all the factors of change and their effect. As maladjustment and imbalance has been evidenced in the evolution of Taiwan'shunting culture, it is important that research be carriedout and a theoretical and methodological basis be established as principles redressing or guiding the present trend in the development, and consequently, upgrading our hunting culture.

The study on the hunting organization , its operations and their relations with conservation is dealt with under two subdivisions of the comprehensive study of Taiwan'shunting culture, belonging respectively to the two major items,'hunting methods' and 'hunting ethics'. This project heading the whole research which covers 9 tribe sin Taiwan , deals exclusively with Taiya tribe , firstly ,their hunting organization and system , its functions , and secondly, the effect its operations have on the human-wildlife relations . The study of the latter will be based on nature conservation and other studies as mentioned above.

Material and Method

General source materials for this project come from the scientific study of sociologists or for that matter , anthropologists on the tribesmen. Such documentation about tribes in Taiwan dates back to the 19th century. However, there is a dearth of specialized studies and research, oneof the few relevant ones being the 1988' Survey on Taiwanese Hunting Culture', which provides not only a generalintro duction of hunting culture in terms of concepts, working procedures and goals, but a databank for future research.

In view of the interviewes' age, and the attempts to track the social and cultural structure of the primitive society, depth interviews have been carried out, using unstructured questionnaire. Questionnaire regarding hunting culture was tired out early 1988 forprimary information survey. The part concerning conservation was designed in 1989. The interviews took place with the help of an interpreter. One questionnaire succeeded the other so that the answers would not be affected by a change of mood,or jeopardized by a change of mind, and consistency and reliability could be maintained. Every answer was taperecorded, to be transcribed and supplemented with notes for future processing.

Result

The 1988 project has been satisfactorily substantiated with reports. However, mistakes made by the assistance delayed the progress of this project in question. Largescale make up work, and dataprocessing is being carriedout. Preliminary information reveals that the pattern, function, team members and operations of Taiya's hunting organization by no means remain invariable as has been assumed. However, such finding needs tobe substantiated.

The survey regarding conservation seems more complicated, as the concept is too abstract for the tribepeople. It will be dealt with in terms of more concrete examples and a clear distinction between individual and group hunting organizations . Information based on questions and answers attempted at surface value would be misleading.

Conclusion and Suggestion

The research method regarding to the historical part of the hunting culture in Taiwan should be improved,because the time factor go against the work. The complex relationship between Taiya tribe can not be explained by one or some single studies.

Due to the lock of experienced professionals which hindered the progress of the research work. therefore, it is strongly suggested that the cooperation should be expended (in term of personal and material support) and proceeded throughtout the whole island simultaneously in order to collect more basic data and keep the hunting culture from vanishing.

A preliminary diseases survey of captive wild animals in Taiwan

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Summary

A retrospective study from June, 1989 to February, 1990 was conducted to evaluate disease patterns in 75 captive wild animals which were diagenosed through pathological and microbiological examination. The submitted cases included 51 in mammalian, 17 in avian, 5 in reptilia and 2 in fished. Infectious disease explained 48.2 % of the death of referring cases which were 21 (24.1 %) of parasitic infection, 10 (11.5 %) of bactical infection, 8 (9.2 %) of protozoal infection, and 3 (3.4 %) in fungus infection. Non-infectious disease explained 14 (16 %) of those cases included 12 cases (13.8 %) in trauma, and 1 case (1.1 %)in shock and neoplasma respectively. In addition, 9 cases (10.3 %) were postmortem change and there were no significative lesions finding in 22 (25.3 %) cases. In parasitic and protozoal infection, the infective rate of those were 6 (20.7 %) in Tape worm, 5 (17.2 %) in Sarcocystis and Ascarida respectively, 4 (13.8 %) in Lung worm and Oxyurid respectively, 3 (10.3%) in Coccidae and 2 (6.9 %) in Capillaria spp.

In those of parasite infected captured wild animals the rotentic and carnivora animals have high infection rate. Lung worm were mainly found in carb-eating mongoose and skunk of carnivora animal, sarcocystis, Oxyurid and Capillaria spp found in mouse and tree squirrel of rotentia animal. Ascarida were found in 2 avian and 3 rotentia. In the parasitic infection, Lung worm, Tape worm, Ascaria and Capillaria spp. have correlative infection between human and domestic animal.

Pathogenic E. Coli and Streptococcus sp. were the mainly organise in the bacterial infection cases.

Trauma in captured wild animal were thought due to capture machines using by humter.

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BADLANDS IN TAIWAN

SHIN WANG [1]

Scenic badlands developed in massive mudstone areas can be seen in Taiwan. The most well known areas are the "Moon World" in Tainan-Kaoshiung county and the Lichi village in Taitung county. They are bad only in terms of vegetation cover and agricultral land uses. These badlands are barren regions with eroded surface marked by steep hillslopes with deep rills and gullys, which separate knife-edged crests. Earth fingers, subsurface drainage pipes, caves and small-scaled natural bridges in the gully bottom are very common. Other interesting features include mudflows, salt crust and mud volcanoes.

The badland in Tainan-Kaoshiung area is quite extensive. If well developed, they are locally names "Moon World". As scenic spots, they do attract visitors to come during the weekends and the holidays. Moon lands are incredibly crowded in the Chinese Moon Festival.

In Taiwan, badlands occur mainly in the massive mudstone areas. These massive mudstones are mainly composed of silt-sized particles. If poorly cemented, they are particularly favorable for surface run-off erosion, which produced hills with closely spaced rills and gulleys. These rocks are very weak in nature and water sensitive. Surface mudflow is very easily induced by rain. But, when dry, these mudstones turn to be very hard.

Type localities of badland landscape, which is not only a scenic resource but also a valuable natural heritage with significant scientific value, must be carefully studied and preserved for the coming generations.

This study is areal in nature. By studying the aerial photos and the maps, the authors are able to identify areas with high quality badland landscape, which are proposed for further atudy.

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Columnar Basalt of Penghu Islands

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Basaltic rocks with well developed columnar joints were found in the Penghu islands, which are situated in the Taiwan strait between Taiwan proper and China mainland.

Geologists studied the rocks and proposed an age of 12 - 13 m.y. for the eruption of the basaltic lava. Tectonically, the eruption was related to the opening of the South China Sea during middle and late Miocene. These basaltic rocks, not only represent a tectonic event with great importance, but also create a high quality landscape which deserves strict protection.

It is known, that when basaltic lava erupted onto the surface, cooling and solidification follows with the development of shrinkage cracks. Because of the relatively homogeneous nature of the basaltic lava, shrinkage take place around many equally spaced centers, which results in a polygonal pattern of cracks, ideally hexagonal. The most familiar analogy is the pattern of mud cracks formed on the floor of a drying-up pond.

Columnar joints may curve in response to variation of the temperature gradient. The changing orientation and curvature of some of the columns reflect the uneven cooling rates of the lava flow. Vertical,inclined, curved, radial and bottle-necked columns are all displayed.

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RESEARCH ON CAMPUS BEAUTIFICATION IN TAIWAN AREA

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1.Purposes of study

Under the influence of industrialization and urbanization, mankind's living space is gradually reduced and quality of living environment gets worse and worse. With this, movements including "Natural Reservation" and "Plantation & Beautification Movement" rise accordingly. To ensure establishment of idea of natural reservation, Council of Agriculture has made systematic research on natural resources environment. In addition, because environmental plantation and beautification can maintain balance of natural species and campus plantation, beautification has meaning of promoting living quality and effect "environmental education", it authorizes our school to investigate plantation condition of campus environment in Taiwan area and by means of analysis and research of status quo to provide available plan to promote the effect of plantation and beautification on campus envirnment.

Intention of such research is set out as follows:

(1)To establish assessment list of plantation and beautification for campus environment.

(2)By means of assessment investigation to understand status quo of campus plantation and beautification for Middle School and Primary School in Taiwan and provide with technologies of plantation and beautification.

(3)To set up information system of campus plantation and beautification to offer technologies of plantation and beautification, plant explanation and plant reservation information.

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(4)To edit "Working Handbook for Plantation and Beautification of Campus Environment" and "Handbook for Interpretation of Campus Plants" based on results of investigation and research sponsor seminar of plantation and beautification and promote idea of natural reservation.

2. Materials and Method

(1)Establishment of assessment list for plantation and beautification of campus environment

1.With the method of record analysis to establish base for investigation and aim of plantation project and draw up assessment standard of each investigation base in accordance with theory of plantation and aim of plantation plan.

2.To make use of Friedman statistics to measure difference of the same school assessed by the assessors to prove object and unification of assessment.

(2)Status quo investigation of campus plantation and beautification

1.Sampling:

To limit the range in Middle School and Primary School in Taiwan and divide geography condition which school is located at into urban, village, mountain area, seaside and school grade into Junior High School, Primary School and County Category and proceed with sampling with the method of stratified sampling. Effective samples obtained are 520 schools in totoal and sampling rate is about 19%.

2.Method of investigation:

The investigators first investigates advance seminar and then continuously goest to sampled schools to proceed with investigation through re-assessed process according to Rule of Investigation.

3.Data analysis:

To take SPSS statistics software as the medium to proceed with frequency analysis of different base and test difference of influence factor's effect on each base with

Mam-Whitney statistics.

(3)Establishment of information system for campus plantation and beautification

To set up information system of plantation and beautification with Dbase language.

3.Results

(1)Establishment of assessment list for campus environment's plantation and beautification

In view of effect emphasized by campus division and investigated items established according to esthetics and plantation theory and assessment list used for assessing standard, six assessors simultaneously investigate ten schools. After results of investigation is measured and then certificated by Friedman, it reveals that difference of scores which six assessors make each investigation on ten schools are no significant cliffereuces. That represents assessment list has object and unification.

(2)Analysis of status quo investigation for plantation and beautification of campus environment

1.Assessment on effect of plantation

So-called plantation effect means collective effects such windproof, dustproof, soundproof, separation and shade. Among 520 assessed schools, more than 50% of those have not reached the standard yet.

Especially, seaside and urban schools are most serious. The major reasons are that:

(1)environmental factor which is not taken into consideration as plantation is done results in improper selection of plant kind.

(2)as plantation plan is made, its effect is not considered

(3)for plantation of special environment, it is uneasy to look for resources of seedling.

2.Assessment on effect of beautification

Plants have played a major role in beautification of school ground.

The following points should be noticed:

(1)Matching of color

(2)Matching between plants and artificial installations

(3)Arrangement of plants in campus space

Such research proceeds with assessment on visual sense which campus plants should express to different investihation base. The result of investigation is that about 40% of schools have not met the standard. Through on-the-spot observation of the researchers, we can know that majority of the schools are not good at applying blossoming character of plants to matching of color to liven space and time. In addition, some of the schools are unable to coordinate arrangement of plants with artificial installations and overemphasize unification lack of rhythm beauty of gradual change.

3.Plantation rate of school ground and space area allocated to each student

In accordance with the regulations of Plantation Standard for Middle School and Primary School of Japan, rate of planted space in the campus is required to be over 20% and area allocated to each student is 20㎡. Plantation rate for more than 90% of the campus of our Middle School and Primary School is higher than 20%. But school area is not proportion to student numbers as the latter increases. Therefore, space area allocated to each student for more than 70% of the schools is lower than 20㎡.

4.Effect of campus plants provided as teaching materials

Result of investigation reveals that over 90% of the schools have not done well in establishing explanation plants of plants or using teaching garden of plants since they fail to compil detailed instruction about plants without thorough understanding.

(3)Research and promotion of technologies for campus plantation and beautification

According to investigation and analysis for status quo of campus plantation and beautification, to understand what problems of plantation and beautification is and then edit various technical guidance handbooks which include:

1.Working handbook of campus plantation and beautification

2.Handbook for interpretation of campus plants

To hold four times of seminar to promote technologies of campus plantation and beautification.

(4)Establishment of information system for technologies of campus plantation and beautification

To help each school in making use of technologies of such research, such research designs a set of information system for technologies of campus campus plantation and beautification with Dbase language. It contains:

1.Interpretation system of campus

2.Information system of ancient plants and rare plants

3.Information system of technologies for campus plantation and beautification

4.Conclusion and Suggestion

Under discussion and analysis, we sum up the following conclusion and suggestion:

(1)Assestment list of campus plantation and beautification established with the method of record analysis has character of standsrd and unification as assessment of campus plantation and beautification is made in the future and result of assessment can provide policy for future plantation and beautification.

(2)From analysis on status quo of campus plantation and beautification, we understand where problems of campus plantation and beautification lie in. For the purpose of solving these problems, we hereby edit "Interpretation Handbook of Campus plants" to serve as the reference of campus plantation and beautification and plants'instruction.

(3)We have learned from investigation of campus plants that there are about 110 families and 560 kinds of plants in Middle School and primary School of Taiwan. And 78 schools have forty kinds and more of ancient and rare plants which have scenic and educational values and should be appointed as cultural assets for maintenance according to law.

(4)As w e have set up information system concerning campus plantation and beautification technologies, plants' instruction and ancient and rare plants, it is quick and convenient to make inquiry about individual information.