华南生物多样性保育杂志 A magazine for biodiversity conservation in South China

森林脉搏
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KFBG
Kadoorie Farm & Botanic Garden
嘉道理農場暨植物園

甚么是环境教育？
What is environmental education?

地图
map

◆本期提及的主要地点均已标示
Major sites mentioned in this issue are indicated

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嘉道理农场暨植物园简介

Introduction to Kadoorie Farm & Botanic Garden

嘉道理农场暨植物园是香港的一所慈善机构，早在1951年，嘉道理家族的两兄弟，罗兰士与贺理士，创办本园以推行农业辅助计划，帮助从大陆移民来的贫困农户自力更生。该计划帮助了超过三十万名香港农民改善生活。两兄弟于九十年代先后辞世，但其家族的慈善活动仍延续下来。嘉道理慈善基金会为中国境内及东南亚地区服务贫困社群的计划提供资助，而嘉道理农场暨植物园则因应香港社会的转型，现已建成为一所自然教育与保育中心，并根据1995年通过的香港法例成为一家公益事业公司。我们的任务是「提高大众对人与环境关系的的认识，透过保育与教育，积极改善世界」。本园现推行的计划有野生动植物保育、可持续农业和环境教育等等。

Kadoorie Farm & Botanic Garden (KFBG) is a charity based in Hong Kong, with a tradition of agricultural aid dating back to 1951, when the two brothers Lawrence and Horace Kadoorie began a self-help scheme for poor immigrant farmers from China. This scheme was to help over 300,000 Hong Kong farmers to achieve a good standard of living. Both brothers died in 1990s, but the family's philanthropic activities continue. The Kadoorie Charities fund projects throughout China and the South East Asia region. KFBG, in response to changing priorities in Hong Kong, has become a centre for environmental education and conservation, enshrined by a Government Ordinance in 1995 as a public corporation. The Mission Statement of the KFBG is " TO INCREASE THE AWARENESS OF OUR RELATIONSHIP WITH THE ENVIRONMENT AND BRING ABOUT POSITIVE CHANGE IN THE WORLD THROUGH CONSERVATION AND EDUCATION". KFBG now has thriving programmes in wild plant and animal conservation, sustainable agriculture, environmental education and other areas.

封面照由杜嘉恩摄© 嘉道理农场暨植物园
背景照由李国诚摄© 嘉道理农场暨植物园
Front cover photo by Maggie To ©KFBG
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本期内容
In this issue

我们当中很多人都会以不同方式参与环境教育——这门有时被视作专业的工作。当你深究它时，或会使你摸不著头脑。若然教育是要导人学习，它务必要走出自我的世界，而对其他事物或周遭环境事事关心，那么事实上教育都与「环境」有关。环境教育的出现，反映了人类与其赖以生存的世界重要元素之间的疏离。所以我们需要环境教育来填补人工化城市生活及其对生物共同演化并造成的后果之间的空隙。

今期我们有幸邀请了数位环境教育界人士与读者们分享他们的经验与识见。首先有艾嘉里先生讲述嘉道理农场暨植物园有关利用野生动物而作出的教育工作，继有侯智恒罗列中国自然保护区开展环境教育应有的元素；Rich Reading分析了知识与价值观抗衡的若干制约；Glenn Sutter介绍了环境道德教育的先驱——加拿大博物馆的教育成果；John Huckle也就如何把可持续教育融入中国的学校与我们分享了自己的心得。 此外，当然少不了本期推介的文章节录，与读者们一同探讨：与小朋友分享大自然和把森林纳入课程内容的议题。我们期望日后可以涵盖更多环境教育的题材，更乐于接纳读者的意见与投稿。

本期还会刊载广西东北部植物资源调查的成果，及介绍一些鲜为人知的华南动植物特别物种系列之第一篇。

Many of us are engaged, one way or another, in environmental education, which is sometimes seen as a specialisation. When you think about it, this perception is strange. All education is 'environmental' – if to educate is to guide someone in their learning, education must always take their attention outside themselves and into the world, or environment. The very need for something called environmental education reflects our separation from vital elements of the world we evolved in, and depend upon. It has arisen to fill the gaps between unnatural, urban living and its consequences for living beings.

In this issue we have invited a number of people engaged in environmental education to share their vision and experience. We begin with Gary Ades' story of how the educational work developed at Kadoorie Farm & Botanic Garden, with emphasis on rekindling awareness of living wild animals. Billy Hau asks what needs to be done to take environmental education forward in China's protected areas. Rich Reading explores the limits of knowledge in challenging attitudes. Glenn Sutter describes a pioneering museum-based effort from Canada to explore environmental ethics, while John Huckle reports on efforts to embed such 'education for sustainability' in China's schools. We also include classic excerpts on how to share nature with children, and on integrating forests into the curriculum. We expect to have more frequent coverage of environmental education in future issues, and welcome your contributions and feedback.

Elsewhere in this issue, we see results from botanic surveys in some little-known areas of northeast Guangxi. We also present the first in a new series, introducing some of the lesser-known animals and plants that help make South China special.

海南鹦哥岭首轮考察的发现

2005年5月及6月，海南省林业局辖下的海南野生动植物自然保护中心与本园中国项目在海南中部的鹦哥岭省级自然保护区进行了一次生物多样性调查(更多该区的讯息请参阅《森林脉搏》第七期17-21页)。目的是将这个生物多样性热点升格为国家级自然保护区，是次考察为整个共三期的综合调查之第一阶段。

鹦哥岭保护区幅员辽阔(逾500平方公里)、地势崎岖，在这为期25天的野外调查仅能覆盖保护区约5%的面积。但由各类专家及当地保护区技术人员组成的调查组，发现了很多令人雀跃的动植物记录，包括科学新种(如秋海棠属*Begonia* sp.)、海南新记录(如小鹛*Pnoepyga Pusilla*)和中国新记录(如云叶兰属*Nephelaphyllum* sp.)，以及于海南数十年未有记载的珍稀物种(如紫林鸽*Columba punicea*)。欲知更多有关鹦哥岭考察的发现，请浏览http://hnrb.hinews.cn/php/20050514/56341.php。

组员未有因这次考察的宝贵发现而自满，反而，他们亲眼目睹非法采集珍贵木材和野生动植物的证据，及高至海拔1,000米的天然林被开垦净尽的情况令他们更感受到自身任务之重。刻下组员正忙于调查林区更多不同的地点及编写各类学术文章，以凸显保育鹦哥岭的重要性。

Hainan's forest frontier: findings from Yinggeling

During May/June 2005, the Hainan Wildlife Conservation Centre of the Hainan Provincial Forestry Department and the China Programme of KFBG conducted a joint biodiversity survey at Yinggeling Provincial Nature Reserve, central Hainan (also see *Living Forests* no. 7, pp.17-21). The survey was the first in a series of three to be conducted in a bid to upgrade this biodiversity hotspot to a national-level nature reserve.

Due to its rough topography and vastness, only around 5% of the >500km^2 reserve was covered in the 25-day expedition, but the team, comprising specialists and local reserve staff, discovered many exciting fauna and flora, including species new to science (e.g. a herb *Begonia* sp.), and new records for Hainan (e.g. the frog Pysmy *Wren Babbler Pnoepyga Pusilla*) and China (e. g. an orchid of the genus *Nephelaphyllum*), as well as species that have not been found for decades in Hainan (e.g. Pale-capped Pigeon *Columba punicea*). Readers can click on the following website to learn more about the discoveries (*http://hnrb.hinews.cn/php/20050514/56341.php*).

There is no room for complacence, however, as the team also witnessed first-hand the damage caused by illegal harvesting of valuable timber and wildlife, as well as forest clearance up to 1,000 m asl in some areas. The team is now busy surveying more forest sites and preparing scientific papers to make sure the world knows the importance of preserving Yinggeling.

全球生态系统质量下降

「千年生态系统评估 (Millennium Ecosystem Assessment)」报告出台，促请传媒正视生态环境恶化及其为人类带来的后果。这个由95个国家超过1,300位专家进行的综合报告指出，在被评估的全球24种生态效益当中，有15种已失去可持续性。报告结果主要分四方面：(1)过去五十年人类为了满足对粮食、水、木材、纤维和燃料的日增需求，而改变生态系统的速度和范围是史无前例的。(2)过去五十年间，为促进几种生态效益如作物、畜牧、水产养殖及增加碳汇，已令越来越多其他的生态效益丧失。(3)生态效益恶化的后果可能会在未来五十年加剧，这样非但不能完成在2015年前使全球半数饥民得到温饱等千年发展目标，更会助长新疾病的滋生。(4)适当的政策及宪法修改或可以扭转生态恶化的危机，但这需要巨大的变革，再者仍未有落实执行。报告总结出因生态系统恶化而受害最大的，将会是最贫穷的人口。

报告列举的四种情景都会导致生物多样性消失，却没有一个能够在2050年前成功保障有足够食物供应。其中只有主张不断多方面适应的「Adapting mosaic」显示了整体改善各种生态效益(供应、调控及文化)的素质，它采用极为积极的手法管理生态系统，并针对改善流域地貌规模及减慢最初的经济增长。

来源：http://www.millenniumassessment.org/en/index.aspx

Global ecosystems in decline

Reports have been released from the Millennium Ecosystem Assessment (MA), prompting wide media coverage of environmental damage and the consequences for people. The MA Synthesis Report, conducted by over 1, 300 experts from 95 countries, notes a lack of sustainability in 15 ecosystem services (of 24 examined). The report has four main findings: (1) The unprecedented speed and extent of ecosystem change in the last 50 years, to meet the escalating demand for food, water, timber, fibre and fuel. (2) That the few ecosystem services that have been enhanced in the last 50 years – crop, livestock and aquaculture production and increased carbon sequestration – have been achieved at growing costs in the loss of other ecosystem services. (3) That degradation of ecosystem services could grow significantly worse during the first half of this century, blocking achievement of the Millennium Development Goals such as halving hunger by 2015, and increasing the risk of new diseases. (4) That appropriate policy and institutional changes could potentially reverse ecosystem degradation, but these changes are large and not currently under way. The report also confirms that it is the world's poorest people who suffer most from ecosystem changes.

Of four scenarios examined none suggest successfully achieving food security by 2050, and all suggest biodiversity loss. Only one scenario, the 'Adapting Mosaic', indicates overall improvement in all types (provisioning, regulating and cultural) of ecosystem services; this involves a strongly proactive approach to ecosystem management, focusing on the watershed scale, and slow initial economic growth.

***Source**: http://www.millenniumassessment.org/en/index.aspx*

造林应对生物多样性、气候及当地社区予以慎重考虑

国家林业局于5月11日宣布，将会按照气候、社区及生物多样性联盟(CCBA)的标准来指导未来的造林项目，CCBA是一个集学术界、商界及环保界的国际单位，该套准则经两年的发展及野外测试，终于在5月10日面世。CCBA标准包括下列各项：

- 描述拟定地点于造林前的基本状况。包括地理特徵、植被、碳含量、社区、土地利用及生物多样性，包括世界自然保护联盟红色名录所列的物种。
- 从预计的土地利用趋势，分析如没有项目执行它们会怎样影响碳含量、当地社区、生物多样性及水土资源。
- 提出一个可供第三者进行评估的项目介绍，内容包括目标、活动、地图、时间表、风险减缓措施及界定利益相关者的定义。
- 证明实施造林的管理小组是有能力胜任的。
- 证明拟定造林的土地并没有权属的纠纷，如有的话也可透过造林项目来解决。
- 确保项目得到健全的法律架构支持。
- 证明项目得到具适应性的管理，如具可信性的回馈、管理计划、灵活的项目设计及作出提供持续长期利益的承诺。
- 确保在项目范围内造林对温室气体的含量只会带来正面影响。
- 评估对外的负面气候影响，编制针对性缓减计划。
- 制定初步监测计划以量化及记录碳汇的变化。
- 尽早让当地社区参与项目设计，以改善当地社区福利及经济为依归。
- 减低对外的社会福利及经济之负面影响。
- 制定监管社会福利及经济改变的初始计划。
- 确保造林只有利于当地的生物多样性，不会危害濒危物种，及碳含量不会因基因生物介入而增加。
- 量化及缓减对外界生物多样性的负面影响。
- 监测生物多样性变化的初步计划。

此外，还有一些有助提升项目质量的非强制性细则。

国家林业局会主要采用本土树种造林，积极鼓励当地人民经营及使用人工林。造林项目将会由云南及四川林业局主力执行，并得到CCBA、美国大自然保护协会(TNC)、保护国际(CI)、中国科学院及其他单位的支援。

来源：Climate, Community and Biodiversity Alliance, 2005. Climate, Community and Biodiversity Project Design Standards (First Edition). *CCBA,美国华盛顿www.climate-standards.org/; SciDev.net, 24.05.2005*

Afforestation to take biodiversity, climate and local communities more seriously

The State Forestry Administration (SFA) announced on 11 May that future tree planting projects will be guided by standards created by the international Climate, Community and Biodiversity Alliance (CCBA), a group of academic institutions, companies and environmental organisations. The CCBA standards were launched on 10 May, following two years of development and field testing. For CCBA Standards validation the following are required:

- A description of the original conditions at the project site before the project starts. This will include information on physical parameters, vegetation, carbon stocks, communities, land use and biodiversity, including IUCN Red List threatened species.
- An analysis of projected land-use trends and how they would affect carbon stocks, local communities, biodiversity, water and soil resources without the project.
- A project description adequate for third-party evaluation, including goals, activities, maps, timeframe, risks and risk-mitigation measures and stakeholder definition.
- Evidence for the competence of the implementing management team.
- Evidence that no significant land tenure disputes apply to the area, or that they will be resolved through the project.
- Evidence of a solid legal framework behind the project.
- Evidence of adaptive management including reliable feedback, a management plan, flexible project design, and commitment to long-term sustainability of benefits.
- Net 'positive impacts' on the atmospheric concentrations of greenhouse gases within the project boundaries.
- Estimated negative offsite climate impacts, with a mitigation plan.
- Initial monitoring plan to quantify and document changes in carbon pools.
- Net positive impacts on the social and economic wellbeing of local communities, and their early engagement in project design.
- Mitigation of negative offsite impacts on social and economic wellbeing.
- Initial plan to monitor changes in social and economic wellbeing.
- Net positive impacts on onsite biodiversity, with no negative effects on threatened species, and no genetically modified organisms to generate carbon credits.
- Quantification and mitigation of negative offsite biodiversity impacts.
- Initial plan to monitor biodiversity changes.

A series of other points, though not required for validation, can help the project attain higher status.

SFA will use primarily native species and ensure local participation in plantation creation and use. The Forestry Departments of Yunnan and Sichuan will be the main implementing agencies, working with CCBA, The Nature Conservancy, Conservation International, the Chinese Academy of Sciences and others.

Sources: *Climate, Community and Biodiversity Alliance, 2005. Climate, Community and Biodiversity Project Design Standards (First Edition). CCBA Washington DC, USA; www.climate-standards.org/; SciDev.net, 24.05.2005.*

从入境货物中连续截获红火蚁

广东及江苏再有多次入侵种红火蚁*Solenopsis invicta*进口的报告。广东检验检疫局从3月到6月期间先后多次从来自澳大利亚、美国及英国进口的废纸、台湾的木片和德国的木材中截获红火蚁活体。4月16日江苏检验检疫局又从来自喀麦隆的原木中截获红火蚁。国家质量监督检验检疫总局已部署红火蚁疫情监测和防控工作，对广东省花卉、苗木、盆景、蔬菜等生产基地进行疫情调查，并加强对来自红火蚁出现国家或地区的种子、草皮、苗木、花卉、栽培介质、废物及集装箱等的检验。

来源：新华网 http://news.xinhuanet.com/newscenter/2005-05/04/content_2914080.htm, 04.05.2005

http://www.newsgd.com/news/Guangdong1/200506200062.htm, 20.06.2005 及

http://news.sohu.com/20050628/n226103679s.html, 28.06.2005

科学家吁全力整治气候转变

世界顶尖的科学家发出史无前例的联合声明，呼吁G8成员国政府采取紧急措施，遏制由气候变化引发的全球灾难。由巴西、加拿大、中国、法国、德国、印度、义大利、日本、俄罗斯、英国及美国的科学院领袖签署的联合声明，指出人类活动释出的二氧化碳水平是42万年以来最高的，呼吁G8成员国广泛引进不同的科技来稳定温室气体的含量。科学家们亦警告各国作好准备，迎接气候持续变化带来的种种恶果，如热浪、暴雨的发生频率及劲度加强、大冰原溶解、水位上涨和洪涝灾害。要改善这种状况，各国专不同方面的才必须通力合作。

*来源：*Joint Science Academies' Statement: Global Response to Climate Change. *05.2005. http://www.royalsoc.ac.uk*

气候变化威胁粮食产量

英国皇家学会在6月份发表的政策文件中，披露了气候变化对农业生产力影响的新发现。分析指大气中二氧化碳浓度升高产生的「施肥」效益比之前预期的为少。大气污染物排放量不断上升令近地面的臭氧增加，相信到了2050年全球某些作物的产量将会因而减少高达30%。不过，相关研究并未曾在热带地区开展，因此该区仍未能准确预测可能的影响。此外，文件亦提到应研究气候变化对地区性天气格局、水源供应以至粮食的影响。预计气候变化会使气温超出某些作物临界温度的频率加剧。

来源： Food Crops in a Changing Climate: Report of a Royal Society Discussion Meeting Held in April 2005. *Policy Document 10/05, 06.2005, http://www.royalsoc.ac.uk*

中国扩充世界保护区系统——事在必行

几位专家联合编写了一学术文章去制定一个框架，策略性地扩充及加强针对哺乳类、两栖类、龟鳖及全球受危鸟类的全球保护区网络。该项研究以2003年世界保护区数据库(世界自然保护联盟世界保护区委员会、联合国环境规划署世界养护监测中心)为基础，综合各地所受的威胁及其独特性，列出须增补到保护区网路的地方。分析显示亚洲国家亟待增强保护区的建设；东亚的优先保育地区尤以中国东部及南部及日本的琉球群岛为重点。

来源：Rodrigues ASL et al., *2004. Global gap analysis: priority regions for expanding the global protected-area network.* BioScience *54 (12): 1092-1100.*

人工林对森林回复的限制

近日一项有关天然木本植物在不同类型的人工密林下再生成功率的研究发现本土植物在红胶木*Lophostemon confertus*人工林下的生长能力特别差。前人亦曾研究红胶木人工林的蚂蚁群落，发现物种多样性极低。若红胶木人工林与本土植物的种子源隔离，红胶木林下便只有数种鸟类散播的优势本土灌木。这时候可能需要补种一些散播力弱、耐阴的植物来促进森林恢复。

来源：Lee，EWS，侯智恒及高力行，2005。Natural regeneration in exotic tree plantations in Hong Kong, China. Forest Ecology and Management *212: 358-366。费乐思，1996.* Community Composition of Hong Kong Ants: Spatial and Seasonal Patterns。*博士论文，香港大学*

绿色和平发布金光集团APP海南调查报告

中国绿色和平于5月发布的调查报告公开谴责砍伐海南天然林的亚洲浆纸业有限公司(Asia Pulp & Paper, APP)。报告指成立不久的海南金海浆纸厂面临原料短缺的问题，披露APP较早前已开始在海南全省收购天然林木材，以应付这所新纸浆厂的需求。绿色和平要求APP承诺保护中国的天然林，彻底遵守中国政府的法律程序及授权要求，并制定时间表实施上述承诺。附属于印尼金光集团(Sinar Mas Group)的金光集团全资拥有或以大股东经营国内13家纸浆厂和超过20个林场。

今年三月，国家林业局及公安保安局进行了一次全国的打击毁林活动，副局长雷加福谓这次打击活动主要针对有份参与毁林的商业财团、木材加工场及地方政府。去年十一月，绿色和平指责金光集团涉嫌在云南非法毁林，国家林业局已证实此事。

来源：绿色和平 25.05.2005，人民日报网上版 31.03.2005，新华网 31.03.2005

中国首个认证国有林面世

森林管理公会(FSC)对黑龙江和吉林的国有林发出认证，对它们的可持续管理手法表示认同。这两片面积共约4,200平方公里的森林

能取得认证，背后得到中国世界自然基金会、宜家家俱公司、德国投资及发展公司(DEG)、国家林业局、中国林业科学院及省级林业局的支持。友好和白河林业局分别被确认保证林场工人及当地社区的权益，限制采伐林木的数量与方法、保护森林生态系统，亦获取了好几种林产品。早期获得认证位于广东高要市嘉耀(52平方公里)和浙江临安市昌化(9.4平方公里)的两片森林都是私有的。

来源：中国世界自然基金会 19.04.2005 http://www.panda.org/news_facts/newsroom/news.cfm?uNewsID=19831，森林认证通讯第三期 28.07.2005 http://www.wwf.cn/sl/download/newsletter3.pdf

联合国推动森林管理的成功经验

联合国农粮组织刚出版亚太森林管理模范的报告。是次分析了21个国家逾170个的提名，从中挑选了28个别具创意的实例。该刊物公开赞扬森林管理者、农民及当地社区对平衡社会经济及环境对森林之需求的努力成果。来自中国的有中荷扶贫项目——安徽霍山县和浙江临安县的临安示范林。联合国农粮组织指出有效的森林管理需要强化林地权属、增加当地倚赖森林维生居民的生计方式及建立适切的体制。完善的管理计划、政府支持、森林管理目标的一致性和衷诚合作都是令森林得到更佳管理的重要因素。

如要阅读该书的个别章详可点击：http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/007/ae542e/ae542e00.htm 或

http://www.recoftc.org/03region/materials/new_materials/iseoe/insearch_of_ex.html

来源：联合国农粮组织新闻组，09.05.2005; Durst PB, Brown C, Tacio HD and Ishikawa M (eds.), 2005. In Search of Excellence: Exemplary Forest Management in Asia and the Pacific. *FAO/RECOFTC.*

黄嘴白鹭于华南再度繁殖

继在2004年5月发现福建南部沿海的菜屿列岛上有黄嘴白鹭*Egretta eulophotes*出没后，厦门大学生命科学学院和厦门观鸟协会开展了黄嘴白鹭的专项调查。研究员在低矮植被上发现20个黄嘴白鹭的巢、跟其他7种水鸟集群繁殖。窝卵数为2-4枚，孵化率92%。雏鸟在一个月后长出飞羽离巢。这次是自1982年在香港录得黄嘴白鹭繁殖以来再度于华南发现繁殖点。全球易危的黄咀白鹭大多在亚洲东北部，即黄海附近繁殖。它们繁殖时多与其他水鸟一起聚群，鸟蛋因此易被人发现，有见及此，林业局及当地群众开展了宣传教育。福建省林业厅计划在章浦菜屿列岛成立保护区。

来源：海峡都市报 26.05.2005 及 http://www.wwf.org.hk/chi/maipo/train_res/swinhoes_egret.html。 Carey GJ 等, 2001。香港鸟类名录。香港观鸟会，香港。

红树林的保护价值得到确认

在海南海口举行的全国沿海防护林体系建设座谈会上，海南省代表团提出种植海南岛海岸防护林，以抵御海啸和风暴潮造成的冲击。2004年12月26日于印度洋发生海啸，伤天数字多达174,000人，泰国的拉农却丝毫无损，使红树林的价值得到肯定。1996年于广东雷州半岛刮起的台风为当地带来100亿人民币的经济损失，但斗伦及金帮两县却因受广阔红树林带的保护而安然无恙。自1950年代起，中国的红树林面积已锐减了三分之二。

来源：新华网19.05.05 http://news.xinhuanet.com/st/2005-05/20/content_2978216.htm

中国被指走私非法木材

驻英国的环境调查局(EIA)声言中国是全球最大的非法木材进口国，危害巴西、西非、印尼及俄罗斯的森林。EIA的报告指出中国进口的木材由1997年的100万立方米上升到2002年的1,600万立方米，预期2010年更高达1亿立方米。其中一条据说由犯罪集团操控走私硬木的路线是从印尼出口到中国，每月会运送约20艘船货，对多样性异常丰富的印尼森林及依靠生态效益维生的林区民居造成沈重打击。观察员指出中国其实是作为非法木材转运到西方市场的中途站，为的是掩人耳目。EIA估计中国进口的木材有44%都是非法的。俄罗斯、马来西亚及印尼都是中国主要的木材供应国，另新畿内亚、加彭、缅甸、柬埔寨、纽西兰及巴西也大量输出木材到中国。这些国家伐林与土地利用的社会纠纷屡见不鲜。

环境调查局调查员朱利安纽曼(Julian Newman)说印尼出口的非法木材大多是来自巴布亚省的菠萝木*merbau*，于2001年起禁止出口，但因军方参与而屡禁不止。他指该处高地仍有森林存在，但正被快速地砍掉。中国利用偷运的菠萝木制成木地板，然后运往美国出售。报告续指，印尼及中国政府在2002年12月已签定备忘录打击非法林产品贸易，这个非法勾当侵犯了中国与印尼的法律，采取行动是有充足理据的。两国政府必须同心协力把犯罪集团彻底肃清。

来源：Kyodo, 22.02.2005, http://asia.news.yahoo.com/050222/kyodo/d88dfr501.html; Knight Ridder, 03.2005, http://www.realcities.com/mld/krwashington/11015170.htm; http://forests.org/.

转基因米种植造成商业压力

生物技术工业界有信心于两年内把转基因稻米的商业化种植生产打入中国市场，预期印度、巴基斯坦及菲律宾将陆续引入转基因米。经过八年的研究，科学家指中国更可能在本年底大量种植含有非洲国家马里野生稻米基因的Xa21型稻米，以对抗白叶枯病，并有助降低作物失收及化学物质的采用率。国际农业生物科技应

用推广协会(ISAAA)指中国每年至少会投入2亿美元来开发作物的生物技术。除了提高稻米产量，中国亦有意生产基因改造的玉米，计划于2020年便可应付未来八成动物饲料的市场需求。中美一项为期两年在湖北及福建进行的转基因稻米研究归纳出转基因稻米能为农民带来健康及利润，因为转基因稻米比传统的需要较少量的杀虫剂。据测试所得，转基因稻米能抵抗大螟/蛀秆虫，在研究地区里，目前只依赖喷洒杀虫剂去除这种虫害。

然而，其他专家学者却亟表关注。南京环境科学研究所的薛达元教授说，中国是世界上种植棉花最多的国家，在种植抗昆虫转基因棉花中亦遇到很多问题。在某些地区农民使用化学品的剂量其实并没有减少，这是由于非目标害虫的数量增多。他表示我们应该花时间仔细观察一下。很多研究都没有触及长远及对生态的影响。绿色和平发现抗虫害的转基因稻米已在湖北非法出售，反映控制转基因生物的困难。他们同时亦发现资讯较发达的城市如北京、上海及广州的市民都越来越抗拒食用转基因稻米，73%的人表示他们会选吃不含转基因的稻米。公众对食物安全的日益关注，令1999年一项大型有关开发转基因生物的项目最终告吹。

来源：http://www.bast.net.cn/bjkpzc/kpxx/33961.shtml

杨树蚕食洞庭湖

湖南省洞庭湖是国际重要湿地之一，由于近年大量种植外来种杨树，使保护区的湿地生态受到重大的冲击。洞庭湖环境保护监测站监测资料显示，至2002年，从欧美进口的速生杨树已取代了8,500平方米的原生植被，今年仅沅江市就计划新种杨树3,000平方米。养活著330多种鸟类、110多种鱼类和多种野生植物的洞庭湖，正受杨树蔓生带来的截流、泥土淤塞，土壤板结及农药污染的威胁。

来源：新华网 20.04.2005 http://news.xinhuanet.com/newscenter/2005-04/14/content_2826736.htm

科学及发展网上资源

科学与发展网路在6月份开通了中文版：http://www.scidev.net/chinese/gateway。除了新闻及特写外，还翻译了有关生物多样性、本土知识、转基因作物及气候变化的政策摘要。

来源：SciDev.Net, 22.06.2005

欢迎新成员

欢迎王海滨博士加入中国项目成为新的森林项目统筹主任！王博士在过去20年中一直致力于国内的自然保护工作，涉猎领域众多，包括自然保护区管理、濒危物种保护和社区发展等。他在美国获得野生动物生物学博士后，任职世界自然基金会北京办事处，从事西南温带森林生态区的保护规划工作。他于6月入职本园前是一位独立的自然保护谘询顾问。今后他在中国项目将会负责以扭转华南天然林生态系统的耗损和退化为宗旨的林业项目。

嘉道理农场暨植物园奖金消息

为配合中国项目的扩展工作，今年我们特别新增设了「可持续生活模式」研究范围，而嘉道理生物多样性奖学金亦更名为「嘉道理农场暨植物园奖学金」。我们共收到22份有关生物多样性及可持续生活模式的申请书，并分别于八月十二日假深圳仙湖植物园及八月十六日于中国科学院广州分院进行面试；今年共有四位研究生获得奖学金（见下表）。

特别感谢广西林业局的苏勇主任、广东林业局的林木科长、广西师范大学的薛跃规教授及华南植物园的刑福武教授莅临八月十五日的简报会，并给予很多宝贵意见，令我们的奖学金得主获益不浅。

2001年奖学金得主林宇小姐已完成「广西乐业大石围天坑植物多样性及保育」的研究并在本年于广西师范大学毕业。她将会从事生态设计、规划及建筑方面等工作，继续为保护环境作出努力。

姓名	程度	研究课题	学院
李广军	博士	中国不同城市的生态足迹研究与可持续性评估的比较	东北大学
覃勇荣	博士	广西石漠化地区不同植被恢复模式生态恢复效果的比较研究	中山大学
郑希龙	硕士	海南黎族民族植物学与生物多样性保护研究	中国科学院华南植物园
周友兵	博士	广西省果子狸对森林种子的传播及森林更新的作用	中国科学院西双版纳热带植物园

表一 · 2005 年度嘉道理农场奖学金结果名单

New Red Fire Ant imports

A number of further reports of the import of the invasive *Solenopsis invicta* (Red Fire Ant) have been made from Guangdong and Jiangsu. In Guangdong the ants were reportedly found several times from March to June by the Inspection and Quarantine Bureau, in scrap paper imported from Australia, USA and UK, wood chips from Taiwan, and timber from Germany. On 16 April red fire ants were detected in Jiangsu in imported logs from Cameroon. China's General Administration of Quality Supervision, Inspection and Quarantine has stepped up inspection and quarantine measures for red fire ants, such as examining nurseries, saplings, potted landscapes and vegetables in Guangdong. Seeds, turf, saplings, flowers, soil, waste and containers imported from affected countries have to be checked meticulously before entering the country.

Sources: *Xinhua News. http://news.xinhuanet.com/newscenter/2005-05/04/content_2914080.htm, 04.05.2005*

http://www.newsgd.com/news/Guangdong1/200506200062.htm, 20.06.2005 and

http://news.sohu.com/20050628/n226103679.shtml, 28.06.2005

Science academies plead for action on climate change

An unprecedented joint statement by the leading scientific academies of the world has called on the G8 governments to take urgent action to avert or alleviate a global catastrophe caused by climate change. Heads of the national academies of science for Brazil, Canada, China, France, Germany, India, Italy, Japan, Russia, UK and USA all signed the statement, which notes carbon dioxide levels are now the highest for at least 420,000 years due largely to human activities, and calls for the broad deployment of technologies that could contribute to stabilising greenhouse gas concentrations. The scientists also warn nations to prepare for the continued changes in climate that have already begun, such as increased frequency and severity of heat waves and heavy rainfall, melting of large ice sheets, sea level rise and flooding. Such adaptation will, they note, require worldwide collaborative inputs from a wide range of experts.

Source: Joint Science Academies' Statement: Global Response to Climate Change. *05.2005. http://www.royalsoc.ac.uk*

Climate change will threaten food crops

In June the Royal Society of the UK released a policy document drawing attention to new findings on the influence of climate change on agricultural productivity. The beneficial 'fertilisation' effect of increased levels of atmospheric carbon dioxide could be less than previously estimated. Meanwhile increased levels of near-surface ozone, caused by atmospheric pollutants, could reduce yields of some crops by up to 30% by 2050. But no studies have been carried out in the tropics, where the ability to predict effects remains poor. Further research is also needed on how local weather patterns and water availability will be affected by climate change, and on the associated impacts on crops. Climate-change scenarios suggest that critical temperature thresholds for food crops will be exceeded with increasing frequency in future.

Source: Food Crops in a Changing Climate: Report of a Royal Society Discussion Meeting Held in April 2005. *Policy Document 10/05, 06.2005, http://www.royalsoc.ac.uk*

China important in expanding world protected-areas system

A multi-author paper provides a global framework for strategically expanding the protected-areas network to cover mammals, amphibians, freshwater turtles and tortoises and globally-threatened birds. Using the 2003 World Database on Protected Areas (IUCN World Commission on Protected Areas, UNEP World Conservation Monitoring Centre) the analysis combines the irreplaceability value of sites in complementing the protected-area network with information on threat. Asia emerges as an extremely high-priority region for new protected-area investment; in East Asia the highest priorities are southern and eastern China and the Japanese Nansei-Shoto islands.

Source: *Rodrigues ASL* et al., *2004. Global gap analysis: priority regions for expanding the global protected-area network.* BioScience *54 (12): 1092-1100.*

Study shows limitations of plantations in forest recovery

In a study of natural woody plant regeneration success under different types of closed-canopy plantations, *Lophostemon confertus* plantations were found to have particularly poor colonisation by native plants. The finding complements a more limited study of ant communities that found very low species richness under *L. confertus*. Plant colonisation was poor on sites isolated from natural seed sources, and understoreys were dominated by a few species of bird-dispersed shrubs. Enrichment planting with poorly-dispersed shade-tolerant native tree species may be needed to facilitate forest regeneration.

Sources: *Lee EWS, Hau BCH and Corlett RT, 2005. Natural regeneration in exotic tree plantations in Hong Kong, China.* Forest Ecology and Management *212: 358-366. Fellowes JR, 1996.* Community Composition of Hong Kong Ants: Spatial and Seasonal Patterns. *PhD thesis, The University of Hong Kong.*

Greenpeace reports logging of Hainan natural forests by APP

In May Greenpeace China published an Investigative Report into Asia Pulp & Paper (APP) in Hainan, condemning the company for logging natural forests. The report identifies a raw material shortfall for the newly-founded Jinhai Pulp & Paper Plant, and revealed that APP has purchased timber logged in natural forests to feed the needs of the new mill. The NGO called for APP to guarantee the protection of China's natural forests, to fully comply with the legal procedures and authorisations as required by the China Government, and to develop a time-bound action plan to implement these commitments. APP, a subsidiary of the Indonesia-based Sinar Mas Group, wholly-owns or majority-controls 13 pulp and paper mills and more than 20 forestry farms in China.

In March the State Forestry Administration (SFA) and the Ministry of Public Security launched a nationwide crackdown on acts violating forest resources. SFA Deputy Director Lei Jiafu said priority would be given to cases of deforestation involving corporate firms, timber processing businesses and local governments. SFA confirmed Asia Pulp & Paper (APP) had been involved in illegal logging in Yunnan, as claimed by Greenpeace in November.

Sources: *Greenpeace, 25.05.2005, http://www.greenpeace.org/china/en/press/releases/app_hainan_20050525_html; People's Daily Online, 31 March 2005; Xinhua http://news.xinhuanet.com/english/2005-03/31/content_2766178.htm, 31 March 2005; http://www.greenwichtime.com/business/investing/sns-ap-china-asia-pulp—paper,0,7400275.story?coll=sns-ap-investing-headlines.*

China's first FSC state forests

Two state-owned forests in Heilongjiang and Jilin have been given Forest Stewardship Council (FSC) certification, signifying their sustainable management. The forests, covering 4,200 km^2, achieved certification through the efforts of WWF China, the furniture company IKEA, the German Investment and Development Company (DEG), State Forestry Administration, the Chinese Academy of Forestry and provincial forestry authorities. The Youhao and Baihe Forestry Bureaus were independently confirmed to be assuring the rights of forestry workers and local communities, controlling amounts and methods of forest harvesting, and protecting the forest ecosystems, while various forest products were harvested. Previously the only two certified forests in China – Jia Yao (52 km^2) in Guangdong and Changhua (9.4 km^2) in Zhejiang – were privately-owned.

Source: *WWF China, 19.04.2005, http://www.panda.org/news_facts/newsroom/news.cfm?uNewsID=19831.*

Seeking exemplary forest management

A new publication reflects the outcome of an initiative to identify instances of exemplary forest management in the Asia-Pacific region. More than 170 nominations were received from 21 countries, of which 28 innovative case studies were selected. The book celebrates the successes of forest managers, farmers and local communities in balancing the range of socio-economic and environmental demands made on forests. China examples include the Sino-Dutch Poverty Alleviation Project from Huoshan County, Anhui, and the Lin'an Model Forest, Lin'an County, Zhejiang. The Food and Agriculture Organization notes that keys to effective forest management included strengthening property rights, expanding livelihood options for forest-dependent people, and developing appropriate institutional structures. Important elements were a management plan, political support, consensus on forest management objectives, and collaboration between different parties. Book chapters are available separately at http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/007/ae542e/ae542e00.htm or http://www.recoftc.org/03region/materials/new_materials/iseoe/insearch_of_ex.html

Sources: *FAO Newsroom, 9 May 2005; Durst PB, Brown C, Tacio HD and Ishikawa M (eds.), 2005.* In Search of Excellence: Exemplary Forest Management in Asia and the Pacific. *FAO/RECOFTC.*

Chinese Egret breeding once more in the south

Following sightings of Chinese Egret *Egretta eulophotes* in May 2004 on the Caiyu Archipelago off Fujian, a survey was launched by Xiamen University (School of Life Sciences) and Xiamen Birdwatching Society. Researchers found 20 Chinese Egret nests in low vegetation, along with seven other waterbird species. Clutch sizes ranged from 2-4 eggs; 92% hatched, and chicks fledged in about one month. The last breeding record from south China was in 1982, in Hong Kong; most populations breed in northeast Asia around the Yellow Sea. The species is globally Vulnerable. Breeding alongside other species makes the eggs easy to find by people; education and conservation efforts have been initiated by the Forestry Bureau and the local community. Fujian Forestry Department plans to set up a nature reserve to protect the Zhangpu-Caiyu Archipelago.

Sources: *http://www.wwf.org.hk/eng/maipo/train_res/swinhoes_egret.html. Carey GJ* et al., *2001.* The Avifauna of Hong Kong. *Hong Kong Bird Watching Society, Hong Kong. www.redlist.org. 海峡都市报, 26.05.2005.*

Protective value of mangroves recognised

At a national forum in Haikou, Hainan, on shelter forest planting, delegates called for offshore shelter forests to protect against the devastating impacts of tsunami. The value of mangrove forests was confirmed when Thailand's Ranong areas were almost unaffected by the tsunami of 26 December 2004 which killed 174,000 around the Indian Ocean. In 1996 a violent typhoon in Leizhou Peninsula, Guangdong, caused losses of RMB 10 billion, but the counties of Doulun and Jinbang were protected by their broad mangrove belts. China has lost two-thirds of its mangrove area since the 1950s.

Source: *China View, 20.05.2005, www.chinaview.cn*

China accused of driving illegal logging

UK-based Environmental Investigation Agency (EIA) claims China is the world's largest buyer of illegal timber, threatening forests in Brazil, West Africa, Indonesia and Russia. An EIA report says China's log imports rose from 1 million m^3 in 1997 to 16 million m^3 in 2002, and by 2010 they are projected to reach 100 million m^3. One route for hardwood logs from Indonesia, reputedly controlled by crime syndicates, supplies some 20 shiploads a month, with massive impact on the mega-diverse Indonesian forests and neighbouring communities dependent on the ecosystem services they provide. Some observers say China is a part of a lengthy chain in which illegal logs are "laundered" on the way to Western markets. EIA estimated 44% of China's timber imports were illegal. China's main timber suppliers are Russia, Malaysia and Indonesia, although Papua New Guinea, Gabon, Burma, Cambodia, New Zealand and Brazil are also important. Many of these countries face social conflicts over logging and land use.

According to EIA's Julian Newman most of the illegal Indonesian timber is *merbau* from Indonesia's Papua province, whose export was banned in 2001, but continues with military involvement. "There's still forest in the uplands, but it is being stripped away quickly," he said. Merbau wood flooring, manufactured in China, is widely available in the USA. In December 2002, the governments of Indonesia and China signed a memorandum of understanding to combat illegal trade in forest products. "The smuggling of merbau logs between Indonesia and China violates the laws of both countries, so there is a clear basis for action," Newman said. "Concerted effort by both governments is needed to put the smuggling syndicates out of business."

Source: *Kyodo, 22 February 2005, http://asia.news.yahoo.com/050222/kyodo/d88dfr501.html; Knight Ridder, March 2005, http://www.realcities.com/mld/krwashington/11015170.htm; http://forests.org/.*

Growing commercial pressure for GM rice

The biotechnical industry is confident that commercial production of genetically modified (GM) rice will be permitted in China within two years, and spread from there into India, Pakistan and the Philippines. Scientists say China may even mass-produce Xa21 rice, which contains a gene from a Malian wild rice conferring resistance to bacterial blight, by the end of the year, following eight years of study showing reduced yield losses and chemical use. According to the International Service for the Acquisition of Agri-biotech Applications (ISAAA), China invests at least US$200 million a year in crop biotechnology. Besides boosting rice

yields, China seeks to develop GM maize to help meet a projected 80% consumer demand for maize in animal feeds by 2020. One joint two-year Chinese-US study of two types of genetically modified (GM) rice in Hubei and Fujian concluded they have health and profit benefits for farmers because they demand fewer pesticide applications than conventional rice. The GM varieties tested are resistant to rice stem borer, which is normally tackled using pesticides in the study areas.

But others urge caution. Prof. Xue Dayuan from the Nanjing Institute of Environmental Sciences said China has had problems with insect-resistant GM cotton, of which it is the world's top grower. He said in some areas farmers needed as many chemicals as before, because the number of non-targeted pests increased. "We should take time and look at it more carefully," he said.

Most studies have not addressed long-term or ecological effects. Greenpeace has already found GM pest-resistant rice on sale illegally in Hubei, illustrating the difficulty of controlling modified organisms. The NGO also notes that better-informed consumers in Beijing, Shanghai and Guangzhou are increasingly reluctant to eat GM rice; 73% said they would choose non-GM varieties. A previous large GM project was stopped in 1999 following public concern over food safety.

Sources: *Reuters, 1 and 10 March 2005, http://www.planetark.com/dailynewsstory.cfm/newsid/29759/story.htm, http://www.planetark.com/dailynewsstory.cfm/newsid/29873/story.htm; Greenpeace China, 14 March 2005;* Science *308: 688; SciDev.Net, 14 and 29 April 2005; http://www.scidev.net/chinese/gateway/; New York Times, 16 April 2005, http://www.nytimes.com/2005/04/16/business/worldbusiness/16rices.html; forests.org.*

Poplar encroachment around Dongting Lake

The planting of exotic poplars around Dongting Lake, the Ramsar-listed wetland in Hunan, is causing major ecological disruption to the nature reserve. The fast-growing poplars, imported from the USA and Europe, have been planted by residents in place of native vegetation, and according to Dongting Environmental Protection and Monitoring Station some 8,500 km^2 had been planted by 2002, with a further 3,000 km^2 scheduled for planting in Yuanjiang. The ecology of the lake, which supports over 330 bird and 110 fish species, is threatened by the spread of the trees, interception of water and resulting siltation, the use of pesticides and soil disturbance.

Source: *Xinhua news 20.04.2005 http://news.xinhuanet.com/newscenter/2005-04/14/content_2826736.htm*

New Chinese internet resource for science and development

In June the Science and Development Network (SciDev.Net) launched a Chinese-language section of its website. Besides the news and feature articles, available at http://www.scidev.net/chinese/gateway, the China website has translations of policy briefs including those on biodiversity, indigenous knowledge, genetically modified crops and climate change.

Source: *SciDev.Net, 22.06.2005*

Welcome new staff

A welcome to our new Forest Ecosystems focal area coordinator - Dr. Wang Haibin. In the past 20 years, he has been passionately involved in various conservation fields in China such as protected areas management, endangered species protection, and community development. After finishing his doctoral studies in wildlife biology in the United States in 1999, he worked for WWF-China as Southwest Temperate Forests Ecoregion coordinator, and was a freelance conservation consultant before joining KFBG in June. His new responsibilities in the China Programme will focus on reversing loss and degradation of natural forest ecosystems in south China.

KFBG Studentships news

To correspond with the expansion of the work scope of the China Programme, a new research area "Sustainable Living" has been added and the scheme renamed KFBG Studentships effective from this year. We have received 22 applications for studentships on sustainable living as well as biodiversity, for which the interviews were held at Shenzhen Fairy Lake Garden on 12 August and at the Chinese Academy of Sciences (Guangzhou) on 16 August. Four postgraduate students have been awarded as the following table.

Our sincere thanks go to Director Su Yong of Guangxi Forestry Department, Mr. Lin Su of Guangdong Forestry Department, Prof. Xue Yuegui of Guangxi Normal University, and Prof. Xing Fuwu of South China Botanic Garden who kindly attended the annual presentation session on 15 August and made constructive inputs to our current studentship holders' research projects.

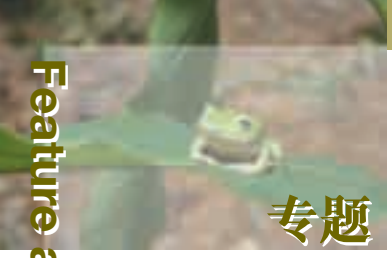
2001 M.Phil. studentship-holder Miss Lin Yu has finished her study on the 'plant diversity and conservation of the world's largest doline in Leye, Guangxi, China' and graduated from Guangxi Normal University this year. She will continue to work for the environment in the field of ecological design, planning and architecture in Guangxi.

Name	Degree	Project title	Institution
Li Guangjun	Ph.D.	Comparative analysis of eco-footprint and sustainability evaluation of China cities	Northeastern University
Qing Yongrong	Ph.D.	Comparative analysis of ecological recovery in vegetations of various erosion areas	Zhongshan University
Zheng Xilong	M.Phil.	Study on the ethnobotany and biodiversity conservation of Li minority in Hainan	South China Botanic Garden, CAS
Zhou Youbing	Ph.D.	Study on the roles of Masked Palm Civets in seed dispersal and forest regeneration	Xishuangbanna Tropical Botanic Garden, CAS

Table 1. List of 2005 KFBG Studentships Awards

华南地区的森林及生物多样性保育的近期出版物
A SELECTION OF RECENT PUBLICATIONS OF RELEVANCE TO FOREST AND BIODIVERSITY CONSERVATION IN SOUTHERN CHINA

- Belcher K, Nolan J and Phillips PWB, 2005. Genetically modified crops and agricultural landscapes: spatial patterns of contamination. *Ecological Economics* 53(3): 387-401.
- Ding Y and Zang R-G, 2005. Community characteristics of early recovery vegetation on abandoned lands of shifting cultivation in Bawangling of Hainan Island, South China. *Journal of Integrative Plant Biology* [formerly *Acta Botanica Sinica*] 47(5): 530-538.
- Hau BCH, Dudgeon D and Corlett RT, 2005. Beyond Singapore: Hong Kong and Asian biodiversity. *Trends in Ecology and Evolution* 20(6): 281-282.
- Kuvan Y, 2005. The use of forests for the purpose of tourism: the case of Belek Tourism Center in Turkey. *Journal of Environmental Management* 75(3): 263-274.
- Lam JCW, Tanabe S, Lam MHW and Lam PKS, 2005. Risk to breeding success of waterbirds by contaminants in Hong Kong: evidence from trace elements in eggs. *Environmental Pollution* 135(3): 481-490.
- Melnick DJ, Navarro YK, McNeely J, Schmidt-Traub G and Sears RR, 2005. The Millennium Project: the positive health implications of improved environmental sustainability. *The Lancet* 365: 723-725.
- Mikkila M, Kolehmainen O and Pukkala T, 2005. Multi-attribute assessment of acceptability of operations in the pulp and paper industries. *Forest Policy and Economics* 7(2): 227-243.
- Ng KL and Obbard JP, 2005. Strategic environmental assessment in Hong Kong. *Environment International* 31(4): 483-492.
- Siry JP, Cubbage FW and Ahmed MR, 2005. Sustainable forest management: global trends and opportunities. *Forest Policy and Economics* 7(4): 551-561.
- Sodhi N, Koh LP, Brook BW and Ng PKL, 2005. Response to Hau *et al.:* Beyond Singapore: Hong Kong and Asian biodiversity. *Trends in Ecology & Evolution* 20(6): 282-283.
- Zhao S, Li Zz and Li Wl, 2005. A modified method of ecological footprint calculation and its application. *Ecological Modelling* 185(1): 65-75.



Feature article

专题

唤醒心灵 —— 人与自然一线牵

Awakening empathy - Connecting visitors with Nature

艾加理 *(嘉道理农场暨植物园)*

***Gary ADES** (KFBG)*

亲亲大自然的奇妙旅程 造就永志难忘回忆

回想孩提时代使你著迷的第一次跟大自然接触也许亦是你一生中首次看到自然的本质而非它的价格(无论从保育或经济角度而言) — 其内在价值被充分体会。像这样扣人心弦的接触可能包括面对著那像鸟粪一样的毛毛虫或竹节虫，观察蝴蝶由虫蛹中蜕变出来，蜘蛛一丝一丝地结网，或蚁群列队步操!这一幕幕的情景或许会成为深刻的儿时记忆。

对于很多人，特别是儿童来说，第一次亲近大自然的难忘经验都是和动物有关 — 通常是其中一种昆虫 — 从近距离看它时总好像是巨大而可怕的！然而，有时候并不一定要与动物来个身体接触，哪怕只是一刻感动便可引发小孩的兴趣及求知欲。这样的经验往往为日后成为生物学家或保育专家的人埋下了种子。我们要让大众进一步认识和爱护大自然便要让他们提供合适的环境，使他们能留下永志难忘的美好回忆与得到自然的启迪。我们并不是刻意为了培养更多科学家，而是希望大家能与大自然有更深的融和，并显示出一旦人类与自然分离，只会为地球带来更多破坏。

动物教育工作的源起

基于上述和自然——特别是本地的大自然——融和为一的哲学理念，嘉道理农场暨植物园于1994年制定了早期游客展览的框架。即使是本园的新修订的使命——「提高大众对人与自然环境关系的认识」，也是与此相符的。

本园动物保育部成立初期，我们展出的动物乃是由其他机构及公众人士向我们转赠及借出的各类来自世界各地的鸟兽，而当时并没有向参观人士传达清晰的教育讯息。在新的使命下，这些动物都在更完善的设施下被悉心照料，富经验的动物护理人员也是不可或缺的。

我们把焦点放在：本土的动物与生境。我们在环绕本园的山坡保护和恢复天然生境，从员工们早期进行的调查与记录所得，栖息于山上的动物物种丰富。

A magical experience with nature creates a lasting memory

The first natural encounter that fascinated you as a child may also have been the first occasion in which you saw nature for what it is and not for what it is worth (in conservation or monetary terms) – its intrinsic value was realised. Such striking and memorable encounters might include marvelling at a master of mimicry like the stick insect or a caterpillar that looks like a bird dropping, or watching a butterfly emerge from its chrysalis, a spider building its web, or a regimented ant column marching somewhere. All such events might have left a lasting childhood memory.

For most people, especially children, the first unforgettable experience with nature relates to an animal – often one of the insects, which appear larger and more formidable when viewed from closer to the ground! It is not necessarily a physical contact with the animal but a moment that touches the child's quest for knowledge and cries out for more information and understanding. Such experiences are what mould our future biologists and conservationists. The challenge for those of us trying to promote better understanding and connection with nature is to provide visitors with the environment and experiences which might instil long-lasting memories and natural enlightenment. This is not necessarily to create more scientists, but to develop a deeper understanding of nature's connections with all of us, and in turn to demonstrate how disconnection may lead to escalating harm to the planet.

Development of fauna education work

It was with the above philosophy of making lasting connections with nature, and in particular local nature, that the framework for early visitor displays was developed at Kadoorie Farm & Botanic Garden (KFBG) in 1994. This was in keeping with KFBG's newly-defined mission: to increase the awareness of our relationship with the environment.

At the time the Fauna Conservation Department was established, live displays consisted of a menagerie of exotic animals that had been donated or loaned to KFBG by other organisations and members of the public. No clear educational messages were available to the visitor. These animals were maintained under the new mission with enhanced conditions of captive care and enrichment. This was helped by the recruitment of skilled animal husbandry staff.

但我们必需令游客看到这些不同的动物，并将动物及其生存需要联系起来。所以动物保育部的早期工作方针是向游客介绍这些本土动物及使他们对保护野生动物及其生境有更深的了解及肩负保护动物的责任感。当人们知道甚么可能会消失，便会想到保护它，对于被急速开发的天然环境，特别是在九十年代被开发的低地生境，这实在值得关注。

基于这些构想，我们在1994至1996年间建立了几所展览馆，包括淡水生物屋、昆虫馆、户外蝴蝶园、和两栖及爬行动物屋。这些简单的展览设施都是由已有的建筑物改建而成，而蝴蝶园则建在昔日的农地山坡上。野生动物拯救中心也是在这个时候成立，当游客与这些圈养及即将放生的动物作近距离接触时，便能加深他们的体验。

今日的香港有好几家运用展览彰显本土自然多样性的环境教育中心。回顾1994年的时候，嘉道理已早著先机，开始展示本土生态及保育问题。

教育展板(看不看由你?)

的确，不是所有游客都会细阅教育展板。如果要鼓励他们这样做，展板便得吸引他们的注意，尤其是放于色彩夺目展品旁的。在本园，现在自述式的展板是由从前制作简单的过塑文字标志慢慢演变而成的。展板是很重要的工具，因为很多游客都没有导赏员陪同，需靠自己领悟展品的背后的讯息。我们有意凭展出动物细说它们的故事，以加强成年人与小朋友对影响野生动物的因素之了解，从而增进他们对更加广泛的环保议题的意识。

近距离接触式教育的发展

要欣赏大自然，近距离接触动物是非常有效的方法。但如果处理不当则会传达错误讯息，并带来反效果，例如令人误解动物是供人娱乐的玩物。所以我们要如走钢线一样步步为营。经验丰富的专业人员有助发放正确讯息。以下是一些在本园以大自然近距离接触为设计意念的教育展览。

蝴蝶园

很多人会视蝴蝶园为一个供大众欣赏美丽蝴蝶的室内展览馆。像这样罗置不同地方蝴蝶的展览馆在世界上比比皆是。本园于1995年却以新畿内亚有一所为民众带来营商收入的社区蝴蝶园为设计蓝本，建造了香港第一个户外蝴蝶园[1]。香港拥有超过240种不同大小形态、色彩斑斓的蝴蝶，所以我们要做的并不是把它们采集和收藏起来，而是要为它们在山边寻找甚或植出一个舒适的安乐窝，这包括拣选一处不当风但有足够阳光的地方。为了吸引多一些本

The focus was simple: native animals and native habitats. We had the regenerating natural habitat all around us on our hillside, and from early survey work and accounts from staff we knew the hillside supported a diverse fauna. But we needed to find a way to show visitors this rich wildlife and make connections between the animals and their needs for survival. An early aim of the Fauna Conservation work was thus to introduce visitors to these native animals, and, instil better understanding and a level of responsibility regarding the protection of the wildlife and habitats. Once you know what you might lose you are more likely to take an interest in saving it, and with rapid development in natural areas, particularly the lowlands in the early 1990s, this was, and remains, a real concern.

With these thoughts in mind several displays were designed between 1994 and 1996 including the Stream-life Display, Insect House, outdoor Butterfly Garden, and Reptile and Amphibian House. These simple displays were developed in existing buildings or, in the case of the Butterfly Garden, on an area of hillside that was at the time under agricultural management. The Wild Animal Rescue Centre (WARC) was established at the same time and in fact has also contributed to the visitor experience through the close contact with imprinted captive and pre-release animals.

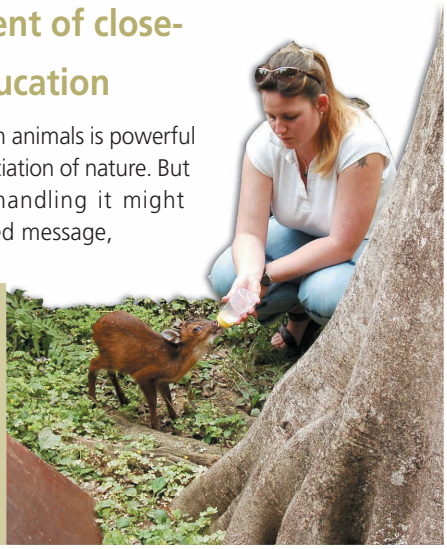
While today in Hong Kong there are several centres which champion Hong Kong's natural diversity through displays and exhibits, in 1994 KFBG was the only centre that had exhibits focusing on the local ecology and related conservation issues.

Signage (to read or not to read?)

It is a fact that not many visitors read signs. If they are to be encouraged to do so the signage needs to cry out to be read, especially when placed next to attractive visual displays, which naturally win the attention. At KFBG Self-interpretive signs have slowly evolved from simple laminated text. Signs are important since many visitors will not have an education guide and will themselves need to interpret the objective behind a certain display or exhibit. We are presently being encouraged to further develop the stories behind the animals on display, bringing adults and children closer to the factors affecting wild animals and therefore raising awareness concerning the wider environmental issues.

Development of close-contact education

Close contact with animals is powerful in arousing appreciation of nature. But with improper handling it might present a distorted message,



图一. 被遗弃的本土赤麂，经过长期与饲养人员的接触，现在是近距离教育的不二之选
Fig. 1 .Orphaned native Barking Deer, friendly enough for close contact education

相片由作者提供 Photo by author ©KFBG

土的蝴蝶，我们种植了提供花蜜及不同幼虫食物的植物。

一如所料，蝴蝶园成立后不久，便成为香港其中一个观赏这种动物的理想地点。晚上很多不同种类的飞蛾亦会在那里聚集。

从设计及成效看来，蝴蝶园可算是最简单的保育项目，不消一会便吸引了很多目标物种。为受保护的金裳凤蝶 (*Troides aeacus*)及裳凤蝶(*T. helena*) 等珍稀种幼虫而种植的植物亦提供了一个特定的保育成份。自蝴蝶园建成以来，该处已出现150种蝴蝶(占全港过半数的蝶类物种数目) 并会继续吸引栖息于新界中部那片幅员广阔的集水区内的蝴蝶。此外，园内亦录得1,100种飞蛾，即约50%的香港已知物种。植物保育部除了负责地貌及植树管理，亦兼任定期的植物监察与再生的工作。

蝴蝶园不单是昆虫的天堂，更是一众对蛾蝶为之著迷的人士及摄影爱好者的乐园，因为不费分文便可近距离饱览这些赏心悦目的昆虫！游客可沿小径到园内四周观赏蝴蝶；即使在蝴蝶不多的冬季，园内也有花团锦簇的景致供游客欣赏。在这里，保育的讯息不独寄托在教育展板上，而是让人亲身感受与大自然的联系。自然保护区附近的游客中心也可依样画葫芦办一个相似的教育园地，但切勿引入外来的植物或无脊椎动物。

图二. 野生的彩蛱蝶(*Vagrans egista*)正在蝴蝶园内摄食
Fig.2.Wild Butterfly *Vagrans egista* (The Vagrant) feeding in Butterfly Garden

曾德文摄 Photo by Tsang Tak Man

猛禽护理中心

自从展览设施启用以来，例如猛禽护理中心(用作安置身体残缺及由小被饲养而驯化了的猛禽和猫头鹰)，我们尝试把这些本应遨翔天际的飞鸟的遭遇人性化，包括给它们冠以一个名字及诉说它们被送到护理中心背后的故事。这些都是为了让游客能正确了解把鹰、隼困在笼内的原因，其实拯救工作的主要目的是为了把完全康复的本土物种放归野外。若我们认为禽鸟即使在康复后仍不能在野外生存[2]，那么委任它们成为我们的「教育大使」未尝不是好方法，因为大多的拯救工作都是在不为大众所见的情况下进行的。受伤或有病的禽鸟需要一个安静的环境，如果每天备受过百个面孔的注目可对它们构成压力。反而那些已驯化的会乐于和人打交道。其

and can be harmful if it gives the impression that animals are present to be exploited for our amusement. Thus there is a fine line to tread. Experienced, professional staff aid in sending out the right message. The following are examples of education displays that have been designed at KFBG with the close contact experience in mind.

Butterfly Garden

Many visualise a butterfly garden as an indoor enclosure in which attractive butterflies are placed for public viewing. There are many examples of such butterfly displays around the world stocked with exotic species. In 1995 KFBG developed the first outdoor butterfly garden in Hong Kong following the concept and designs of a community butterfly garden which had been set up in New Guinea as a commercial enterprise to bring in local income. The fact that the Territory had over 240 species of butterflies of many shapes, sizes and colours meant the challenge was not to collect and stock, but rather to find an area on the hillside, sufficiently sheltered from the wind and warmed by the sun, and to plant![1] By concentrating nectar and larval host plants it was hoped that the local butterfly fauna would simply like to visit.

This is exactly what happened, soon establishing the centre's Butterfly Garden as one of the best sites to see these animals in Hong Kong. At night the Garden is also host to a diverse assemblage of moths.

The Butterfly Garden was one of the simplest of conservation projects, in both design and result, quickly attracting many species as intended. The planting of some food plants for rare species such as the protected Golden (*Troides aeacus*) and Common Birdwing (*T. helena*) butterflies and provided a specific conservation component. Since it was established, the Garden has hosted 150 species (more than half the Hong Kong butterfly fauna) and continues to attract butterflies from our vast catchment area in the central New Territories. Also 1,100 species of moths, representing about 50% of known species in Hong Kong, have been recorded at the garden. Management of the landscape and planting by the Flora Conservation Department also means that regular monitoring and renewal of the flora is taking place.

The Butterfly Garden has not only been a success for the insects but continues to attract a growing number of butterfly and moth enthusiasts and photographers, who enjoy the opportunity of seeing these marvellous insects at close quarters and free! A small trail allows visitors to walk through the garden and watch butterflies easily; this also allows access in the winter months when butterflies are not so numerous but the garden itself is still colourful. At this location, the conservation message is spoken loudly not only by the educational signs but also by allowing visitors to connect with the real thing in its natural state. The model could be readily replicated around visitor-reception areas of nature reserves, taking care not to introduce exotic plants or invertebrates in the process.

[1] 蝴蝶园现址于1994年原为澳洲坚果树果园。嘉道理农场暨植物园创办人贺理士爵士得悉我们欲使用该地的想法后，欣然支持这个计划而甘愿放弃他所喜爱的澳洲坚果树及其产下的果仁！
[1] The present location of the Butterfly Garden was a macadamia orchard in 1994. KFBG founder Sir Horace Kadoorie, after learning of our wish to utilise the orchard area for the purpose, kindly agreed even though he had a soft spot for the macadamia trees and their produce!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图三. 野生动物拯救中心的员工正把(麻鹰/黑鸢)放归野外
Fig.3. KFBG animal rescue staff releases a Black kite

中一个留住这些禽鸟的用处是可以把它们从笼中取出，并在游客前作短距离飞行、或由训练员把那些伤残的禽鸟放在手上，让游客透过仔细观察及讲解，认识这类最高捕食者之生态及行为。提供这类亲近大自然的机会不单有效提高大众对影响个别动物存活事件的关注，更可引申到人类所面对的环境危机等更重大的议题。

我们在治疗猛禽时亦采用猎鹰训练技巧，为它们将来放回野外作好准备，同时保持适量的飞行练习，确保它们的身体健康。这种飞行练习亦成为游客教育项目的一部份。那些近距离看著大型猛禽大鹏展翅的经验教很多学生一见难忘！另一重点是要让他们知道这些鸟类原是栖息于野外，而不是人工饲养繁殖的。当禽鸟在游客面前表演飞行，训练员或教育主任可即时讲解有关生物或生态资料及解答提问。[3]

以上两个只是我们在嘉道理农场暨植物园内尝试把人与自然连系起来的一些例子。更大的使命是透过与大自然万事万物产生互动，以触动游客爱护环境之心。只有在明白当中的奥妙之处，才会下定决心为饶富意义的保育事业出一分力。我们作为保育及教育的一员，必箕找出能提高大众意识的方法，以达到保育目的及招揽对环境保护有热枕的人加入这个行列。要是我们能够众志成城，保育之声势必更为浩大。

我们希望嘉道理农场暨植物园能带给游客一种令人神往、有趣及回味无穷的游历。愿这种经验能帮助大家欣赏大自然真正价值、拉近他们与大自然的关系并连系到我们共同面对的环境问题。


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图四. 已习惯接触人类白腹海雕「Hayley」，有助提高公众对有关这些鸟类的保育议题的意识
Fig. 4 'Hayley' the imprinted White-bellied Sea Eagle is shown to visitors. Providing an opportunity to raise awareness of environmental issues affecting these eagles

Raptor Sanctuary

Since the development of displays such as the Raptor Sanctuary (which houses disabled and imprinted 'tame' birds of prey and owls) we have tried to humanise the issues faced by these majestic birds by giving them names and providing the story that has led to their presence in captivity. This information is critical as the main objective of the rescue work is to release natives back to the wild on full recovery – a message that may be distorted when visitors see the hawks and eagles being kept in enclosures! If we feel that birds are unable to survive in the wild following their rehabilitation[2] then we have the option of maintaining them as 'education ambassadors' since much of the rescue work takes place behind closed doors where the general public are not aware of the life-saving activities. This works with birds that are steady and not stressed by the hundreds of faces peering at them every day. In the case of the tame birds they may thrive on the human attention and possibilities for interaction. One advantage of maintaining such birds is that they can be taken out of the enclosure and flown over short distances in front of visitors or, in the case of the disabled birds, provide close-contact experiences where they can be presented on the fist by keepers, so visitors can learn through close observation about their ecology and physical adaptations as top predators. Providing more of this type of close-contact experience is seen as a powerful tool in not only raising awareness of the issues affecting the individual animal's survival in the wild, but also approaching the bigger issue of the growing environmental crisis.

Falconry techniques are used at KFBG during raptor rehabilitation to prepare the birds for release as well as regular flying exercise to keep the raptors physically fit. The flying exercise becomes the education programme for visitors. The experience of witnessing the beauty of a large hawk or eagle in flight and at close quarters will not be forgotten by most school children! It is also important to realise that all of these birds were wild and are not offspring of captive breeding as is the case at most bird displays around the world. While the bird performs its natural flying behaviour in front of visitors, the keeper or education officer provides biological and ecological information and responds to questions.[3]

The above are just two examples of how we at Kadoorie Farm are attempting to connect visitors to nature. The task of instilling in visitors a will to protect the environment, with all its complex components and interactions, is a big one. It comes with understanding and a will to be part of a worthy cause. We as conservationists and educators must find ways to raise the level of awareness that will aid this process and recruit visitors into the team that cares. The bigger the team, the wider the actions and the louder the voice!

We would like a visit to KFBG to be engaging and fun, and to create lasting memories. The experience will, we hope, also help develop an appreciation for nature's intrinsic value, and allow visitors to make the connection between their experience with nature and the wider environmental issues we all face.

[2] 有关决定的考虑因素已刊列在野生动物拯救中心的操作指引（请见http://www.kfbg.org) 及IUCN for Reintroductions 世界自然保护联盟重引指引（http://www.iucn.org/themes.ssc/pubs/policy/reinte.htm)
[2] Criteria for such decisions are included in the WARC Operational Guidelines (see http://www.kfbg.org) and IUCN Guidelines for Reintroductions (http://www.iucn.org/themes.ssc/pubs/policy/reinte.htm)
[3] 应注意这样的驯鹰技术需要由熟练及富经验的员工负责进行
[3] It should be noted that such falconry requires skilled and experienced staff

中国保护区的环境教育
Environmental education in protected areas in China

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环境教育对生物多样性保育扮演著重要的角色[1]。生物多样性公约第十三条已突显了公众环境意识教育对生物多样性保育的重要性[2,3]。「环境教育」一词首次用于1965年英国基尔大学一个探讨郊野保育及其教育含义的会议上[4]。至1970年，世界自然保护联盟及联合国教科文组织于美国内华达的一个会议上把这个词语界定为：「透过认知价值及厘清概念，培养技巧及态度，藉以了解和欣赏人与人、文化与生态环境的相互关系。环境教育也促成个人在决策和自我订立行为规范时实践环保[5]。」

环境教育是唤起社会支援及参与保护区管理的重要途径[6]。一些在发达国家中管理较佳的保护区，环境教育都是由政府单位或非政府组织实施。如香港特别行政区政府的渔农自然护理处在郊野公园内提供全面的环境教育活动：由静态的户内外展览、至导赏活动及其它环境宣教项目等等。世界自然(香港)基金会亦有在米埔自然保护区提供相类的活动。上述单位都得到相应的政策支援和资源配合，这包括能够拓展长期教育活动、拥有全面的保护区教材、专责环境宣教的全职人才和训练有素的导赏员之教育中心[6]。然而，嘉道理农场暨植物园队员在华南保护区的考察中鲜有发现具有如此多功能的教育中心。由此可见，中国许多保护区都缺乏宣教人才与设施。反之，最常见的只是充斥著动植物标本的博物馆，一般只能作有限度的教育用途，

图一.香港大埔滘自然护理区是上观鸟课的自然教室。观鸟可有效提高年青人欣赏大自然的兴趣。这些学生正在参与一个于2004年9月至2005年4月举行，结合理课堂理论与实地考察的观鸟课程
Fig.1. A bird watching class held at Tai Po Kau Nature Reserve, Hong Kong. Bird watching is a good way of raising young peoples' interest in the appreciation of nature. These students participated in a bird-watching course comprising lectures and field studies from September 2004 to April 2005

Environmental education plays an essential role in biodiversity conservation[1]. The importance of public education and awareness in biodiversity conservation has been highlighted in Article 13 of the Convention on Biological Diversity[2, 3]. The term environmental education was first used in a conference held in 1965 at Keele University, UK, with the purpose of investigating countryside conservation and its implications for education[4]. The classic definition was formulated in an IUCN/UNESCO conference in Nevada, USA in 1970 in which environmental education was defined as 'the process of recognising values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality' [5].

Environmental education is an essential tool to raise support for and to contribute to the management of protected areas[6]. In better–managed protected areas in the developed world, environmental education is often carried out by government agencies and environmental NGOs. For example, the Agriculture, Fisheries and Conservation Department of the Hong Kong SAR Government conducts a whole range of environmental education programmes in Hong Kong's Country Parks from the lowest level of passive indoor and outdoor displays to more sophisticated guided tours and hands-on projects. The World Wide Fund for Nature (WWF) Hong Kong provides a similar range of environmental education in the Mai Po Nature Reserve. In these examples in Hong Kong, the necessary institutional requirements and resources for successful and effective

图二.一群大学学生正在一个香港郊野公园的一个灌丛内进行一个样带调查。以往有关自然环育的研究均力证了在野外教学的好处14。在自然保护区教学授课应在中国的大学内大力提倡
Fig.2. Students in action: a group of university students conducting a transect survey of plant diversity in a shrubland in a Hong Kong Country Park. Previous research on nature education has shown very clearly the advantages of teaching and learning in the field14. Teaching in nature reserves should be promoted in all universities in China

鲜能提高大众对保育的意识。

在中国保护区成立环境宣教机制仍见滞后，这是由于认知水平不足或是资源匮乏呢？笔者认为两者皆有可能！中国环境与发展国际合作委员会中国保护区工作小组[7]新出版一本有关中国保护区的书中可见，重点仍放在保护区规划和土地使用纠纷等存在已久的议题上，环境教育方面的著墨委实不多。环境教育也许现在不是中国保护区的焦点，但肯定是未来的大方向。国内主要城市的中小学的环境教育已得到长足的进展[8]。也许现在是时候讨论如何在中国保护区推行环境教育了。

教育常被视为在课室或学院演讲室内的单向式讯息传递，即教与学当中的「传递」理论[9]。在保护区内这种教育形式不外乎提供被动式的教育展板、小册子、播放录像和有限度的导赏活动。单靠传递讯息或可提高公众意识，却不足以改变人的行为或加强其对保育的参与[10]。真正的转变不是来自知识，而是受情感、使命感和对自然的爱所牵引的。要产生这种变化，需要把资讯推敲、融会贯通，再转化为自己的知识[11]。话虽如此，单向式讯息传递的方式相对地花费较少，这大概是现时中国保护区能力所及的。对于一些只在保护区作短暂停留的旅客，如作生态旅游和来自城市中的学生，讯息传播或许是最合适的手段。

鉴于中国保护区许多大大小小的管理问题[7]，针对当地社区的传讯、教育及公众意识推广等项目对缓和为了满足当地需要和保护生物多样性之间所产生的冲突，起著举足轻重的作用[6]。教育中心的成立

environmental education programmes are available. These include education centres with long-term educational programmes; a comprehensive set of education materials about the protected area; full-time specialists on environmental awareness and education and guides well trained in interpretation techniques[6]. Unfortunately, none of these are available in most protected areas in Mainland China. None of the nature reserves that the KFBG team has so far visited in Mainland South China has a fully functional education centre. Very often, a local museum with stuffed animal specimens and herbarium specimens can be found, serving limited educational purpose and which cannot raise public awareness on conservation.

Is the lack of institutional set-up for environmental education in China's protected areas due to a lack of resources or of recognition? Probably both! In the new book on China's protected areas by the Protected Areas Task Force of the China Council for International Cooperation on Environment and Development (CCICED)[7], emphasis is still put on long-existing issues such as nature reserve planning and conflicting land use problems, but very little on environmental education. Perhaps, environmental education is not considered a top priority in China's protected areas now. It is nonetheless an important issue and may soon be required. Environmental education has been developing rapidly in primary and secondary schools in major cities in China[8]. Perhaps it is timely to initiate the discussion on environmental education in China's protected areas now.

Education is often perceived as a one-way delivery of information, usually in school classes and university lectures: the 'transfer' theory in teaching and learning[9]. Passive displays, pamphlets, video shows and to a lesser extent guided tours in protected areas are within this form. A mere transfer of information in environmental education may increase awareness but awareness may not go far enough in changing behaviour or increasing participation[10]. Real change is generated not by knowledge but by emotional needs, commitment and love. It requires that information needs to be refined and become understanding and wisdom[11]. However, transfer of information is relatively inexpensive and may be easier to achieve for many nature reserves in China now. For casual visitors that will not stay in the protected areas for a long time, such as ecotourists and students from the cities, transfer of information may be the best that can be done.

With respect to many of the management problems in nature reserves in China[7], communication, education and public awareness programmes for the local communities are important in resolving conflicts between satisfying local needs and biodiversity conservation[6]. An education centre is necessary for the development of long-term education programmes[11]. These will allow educators sufficient time to

是发展长期教育项目的必然手段[11]，好让宣教人员有充裕的时间引导当地社区发掘和领略保护生物多样性的价值，经实验证明，这样更能触动行为与态度上的转变。这种参与式环境教育方法源于一门先进的教学理论——「游历」理论[9]，这是指由导师引领学生亲身探索个别范畴的知识。一项对东非坦桑尼亚及乌干达两个长期环境教育项目的检讨研究，足以贴切地解释这个理论[12]。研究指出那些水土管理的项目较易得到公众广泛的支援。举例来说，建设树木苗圃及植草这一类防止水土流失的农林项目，可解决粮食与柴薪短缺的切身问题。又因当地社区常受食水污染和水源偏远所困扰，水质卫生和反污染运动等水源管理项目也较受公众关注。此外，由于伐林引致的积水会大大增加蚊蝇滋生和传播疟疾的机会，因此针对这方面的社区健康项目同样能成功取得公众对植林及保护现有林木的支援[12]。

长远来说，虽然资源短缺仍然是中国保护区发展与管理的一大桎梏，但相信未来将会有更多资源投放在这一方面。再者，中国作为生物多样性公约缔约国，有必要立即开始整合讯息交流、教育及公众意识并纳入保护区管理内。培训环境教育人员是在保护区成立环境教育中心之先的第一步。要找参考资料一点也不困难，有关保护区环境教育项目的发展与评估的文献不胜枚举[1, 3, 10, 13]呢！

act as guides in directing local communities to explore and experience the value of protecting biodiversity, which has proven more effective in stimulating changes in behaviour and attitudes. This participatory approach to environmental education is a developed theory in education – the 'travelling' theory[9]. In the travelling theory, the educator acts as a guide in directing learners to explore the subjects being studied. Good examples can be found from a study in Tanzania and Uganda, East Africa, evaluating two long-term environmental education programmes there[12]. The study revealed that land and water management projects were particularly useful in gaining widespread support from local communities. For example, agroforestry projects like setting up tree nurseries and planting grasses to prevent soil erosion addressed the immediate need for firewood and food. Water management projects including water sanitation and anti-pollution campaigns were also useful as local communities are often faced with unsafe and remote water sources. Lastly, community health projects correlating malaria incidence with the increased extent after deforestation of stagnant water bodies, where mosquitoes breed, also gained community support for reforestation and protection of existing forests[12].

Whilst the lack of resources will continue to be a major factor hindering the development and management of protected areas in China, more resources will gradually be available in future. Moreover, as a party to the Convention on Biological Diversity, China should start to integrate communication, education and public awareness in protected areamanagement now. The training of environmental education experts is the first step prior to the setting up of education centres in nature reserves in China. An enormous volume of literature is already available for the development and evaluation of environmental education programmes in protected are as[1, 3, 10, 13] .

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知识传递是否足够？浅谈价值观、态度与知识在野生生物保育上的关系

Is knowledge-provision enough? The relationship between values, attitudes and knowledge with respect to wildlife conservation

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野生生物学家和保育专家常强调，改变人的价值观、态度和行为是保育项目的重要一环。然而，要改变态度与价值观并不容易，尤其是当涉及到一些固有观念（见下文）就更加困难。事实上，要改变一个人对一个物种或对物种保育的极端反感看法，是绝少会成功的[1]。就改变态度来说，最成功的教育及公共关系项目，其主要对象（利益相关者或公众）都对相关物种或项目观念浮浅，例如美国的白头海雕（*Haliaeetus leucocephalus*）[2]、加勒比海的鹦鹉[3]、澳洲的袋狸（*Perameles gunnii*）[4]和巴西的金狮猴（*Leontopithecus rosalia*）[5]作保育对象的项目都能成功取得民众支持，归因于他们对这些物种或项目的认识不深。反之，若要教育一班对保育持敌视观感和态度的死硬派[6 7 8]，成效便会大为降低，这些失败的教育项目往往只向受众提供资讯。

过去有关狼（*Canis lupus*）、黑足鼬（*Mustela nigripes*）及草原犬鼠（*Cynomys ludovicianus*）的研究表明，越是对这些物种有很深入了解的人，越是对该物种持有最偏激的观感和态度[9 10 11]。由此可见，知识只是影响价值观和态度的其中一个因素。

价值、态度与知识

价值观、态度与知识等一类字眼的定义与关系，社会学家们向来都众说纷纭。因此必须将之界定清楚。我们根据Bem[12]和 Rokeach[13]的定义，价值观是指可取的行为模式（如诚实）或存在的终极状态（如公平）。人们为不同价值观划分等级，在价值之间发生冲突

Wildlife biologists and conservationists frequently stress the importance of changing people's values, attitudes and behaviours as part of a conservation programme. Yet changing values and attitudes is often difficult, especially when strongly held (see below). Indeed, changing strongly antagonistic values and attitudes toward a species or a species conservation programme rarely, if ever, occurs[1]. In terms of attitude change, the most successful education and public relations programmes have focused on stakeholder groups (or the general public) with poorly developed attitudes toward the species or programme in question. For example, programmes for Bald Eagles (*Haliaeetus leucocephalus*) in the United States[2], parrots in the Caribbean[3], bandicoots (*Perameles gunnii*) in Australia[4], and Golden Lion Tamarins (*Leontopithecus rosalia*) in Brazil[5] were successful in developing strong support among publics that previously knew little about the species or conservation programme in question. On the other hand, public relations/education programmes have been notably less successful when faced with antagonistic publics that already had well developed values and attitudes[6 7 8]. Often, unsuccessful public relations/education programmes simply provided information to target groups.

Past studies with Wolves (*Canis lupus*), Black-footed Ferrets (*Mustela nigripes*), and Prairie Dogs (*Cynomys ludovicianus*) found that often people with the greatest knowledge of the species also held the most diametrically opposed values and attitudes[9 10 11]. These results highlight the fact that knowledge is only one of several variables influencing values and attitudes.

Values, attitudes, and knowledge

Social scientists debate the definitions and interrelationships among values, attitudes, knowledge, and related terms, so it is important to define them. We follow Bem[12] and Rokeach[13] in defining a value as a preferred mode of conduct (e.g.

时便以其价值级系作出决策，通常会倚重核心价值观多于边缘价值[14]。态度是以信念为基础，对事物的取舍。信念是我们对人或物相互间的联系及事物与其属性之联系的认知[12 13]。价值、动机及观感都能影响态度[15 16]。观感就是个人对事物的感觉与体悟[17]。至于知识便是我们对资讯的探求、理解与记忆，知识多寡完全倚仗个人的阅历、领悟、观感、诠释、记忆及其他[16]。

人们以态度为尺度进行评价，及来衡量身边世界的秩序及规律[18 19]。透过选择性地接收、诠释及记忆信息[19 16]，态度往往影响个人的认知与知识吸纳，特别是在信息贫乏、含糊不清及复杂，或与接收者的态度大相迳庭的情况下，更是如此[19 18]。这解释了为何单是传递资讯并不足以改变既有的价值观和态度。虽然，知识是确立价值观与态度的一个重要决定因素，但生物学家及保育专家[20 1]往往高估了它的重要性。因为知识只是影响价值观与态度的多个因素之一，仅靠传递知识未必能改变人们的态度或赢得他们的支持[13 17 21 22]。

价值观与态度的转变

随著情况、知识与经验的不断转变[1 14 23 14]，价值观与态度亦随之改变。我们若盼望野生生物保育得到更多人支持，那必须了解改变的原因与过程。不过，要改变价值观与态度相当困难。

大多数社会学家认为，当人意识到各种不同价值观与态度出现内在矛盾[14 19]，这时要作出改变会比较容易。为减低相悖价值观与态度造成的冲击与不安，人会改变分歧较大的边缘价值观与态度，以确切地反映其核心价值观[14 18]。打个譬喻，教育项目通常都喜欢利用人对动物的爱心来克服他们对个别动物(如蛇)的厌恶。但这只有在人类对动物的宠爱(核心、主要的)远超于对蛇的恐惧(边缘、次要的)的情况下方能奏效。

透过朋辈压力，社群能增加或减小分歧，进而常常影响价值观与态度[20 18]。好像以往曾采访过一些牧场主人，他们为怕遭到邻居的仇视与排斥，并不敢公然支持草原犬鼠的保育[1]。然而在某些情况下，分歧出现了，却不能带来转变[18]。例如，牧场主人对野生生物保育的热忱不足以抵销他们对野狼与草原犬鼠的憎恶。

信息往往无法带来价值观与态度的转变。相比于态

honesty) or end-state of existence (e.g. equality). People maintain a hierarchy of values that they rely upon for making decisions when values clash, usually relying upon more core values over more peripheral ones[14]. Attitudes are affinities or aversions to objects or situations based on beliefs; and beliefs are perceived relationships between things or between a thing and its characteristics[12 13]. Values, motivations, and perceptions all influence attitudes[15 16], and perceptions are what an individual senses and understands about an object[17]. By knowledge, we refer to the acquisition, comprehension and retention of information, which in turn depends on exposure, receptivity, perception, interpretation, memorisation, and more[16].

People use attitudes to conduct evaluations and to impose order and consistency on the world around them[18 19]. Attitudes often affect cognition and knowledge acquisition through selective receptivity, interpretation, and memory of information[19 16]. As such, attitudes often influence knowledge, especially if information is poor, ambiguous, complex, or attitudinally extreme[20 18]. This helps explain why simply providing people with information does little to influence already well-developed values and attitudes. While knowledge is an important determinant of values and attitudes, its importance is often over-estimated, especially among biologists and conservationists[21 1]. Because knowledge is only one of several factors influencing values and attitudes, simply providing information to people may be insufficient to change values or even to increase support[13 17 22 23].

Value and attitude change

Values and attitudes often change over time as contexts, knowledge and experiences change[24 14]. Understanding why and how values and attitudes change is important if we hope to develop more supportive publics for wildlife conservation. But changing attitudes and values is difficult.

Most social scientists seem to agree that change is most easily accomplished when individuals become aware of internal contradictions among or between different values and attitudes[14 19]. People will seek to reduce the discomfort they experience due to inconsistent values and attitudes by changing more dissonant, peripheral values and attitudes to better reflect core values[14 18]. As an illustration, education programmes often capitalise on most people's love of animals (in general) to help them overcome their revulsion for specific animals, like snakes. Yet this only works if their fondness for animals is greater (more core) than their fear of snakes (more peripheral).

Social groups, via peer pressure, can either increase or decrease dissonance, often influencing value and attitude change[20 18]. For example, interviews found that ranchers who supported prairie dog conservation were afraid to voice their opinions for fear of a backlash from their neighbours[1]. In some cases, dissonance occurs, but does not lead to change[18]. For example,

度中立的人，带有强烈价值观与态度的人处理讯息时常常会比较有偏见，进而维护自己的一套[16]。对于一些与自己价值观与态度相近的讯息，这些人会有较深印象，但当遇到与自己相违背的讯息时，便会刻意扭曲，使内容与自己所想的吻合[19]。以草原犬鼠和黑足鼬的知识测试为例，牧场主人及保育界人员对这些动物各自持有强硬态度，这两班人在相关的知识测试中同获最佳成绩[9 11]。具有亲身经历的人对接收新讯息偏向保守，尤其当讯息与他们理解的经验存在冲突[16]。再者，有些人也不能把接收到的讯息准确处理。在这情况下新讯息反而会促使他们更加巩固和捍卫既有的价值观和态度[16]。倘若人对于某些事情已有透切认识，就好像与狼和草原犬鼠为邻的牧场主人一样，以上论点便更见正确[10 11]。

道德考量

有人质疑我们不应尝试影响他人的价值观与态度，这些人通常，但不一定，不同意被提倡的新价值观，表面上却摆出「道貌岸然」的姿态。其实，这种姿态是倾向维持现状，亦让人影响价值观和态度。我们应当尊重他人有权利持有与己有别的价值观与态度，亦要明白到每个人皆力图影响别人的价值观与态度。基于每个人都相信自己的价值观比别人优胜（否则他们便会改变自己的价值观／价值级系），每个人都希望自己的价值观被人采纳。改变价值观与态度的方式可以是公然进行，亦可以潜移默化，可是，每每在表达意见、做决定以至筛选「客观」的讯息给其他人会时，都会反映个人的价值观与态度，某程度上也是想对他人构成一定影响。

总论

知识只是影响价值观与态度的多个因素之一。此外，新的资讯虽然能增加人的知识，但同时也受到既有的价值观与态度的影响。因此，只是提供资讯往往不足以令人建立拥护物种或保育项目的价值观与态度，尤其是面对既有价值观与态度早已根深柢固的受众。过往的研究也支持了以上论点，并指出保育项目绝不能单靠资讯传递来企图改变反对人士的立场。

most ranchers express supportive values and attitudes toward wildlife, but these values and attitudes do not appear to moderate their disdain for wolves and prairie dogs.

Information often does not lead to value and attitude change. People with strong values and attitudes often employ biased information processing, and retain their values and attitudes more than people with weakly held values and attitudes[16]. For instance, people demonstrate better recall of information congruent with current attitudes, distorting incongruent information to make it more compatible[19]. As an example, for prairie dogs and black-footed ferrets, the groups with the strongest attitudes - local ranchers and members of conservation groups - also scored highest on knowledge tests[9 11]. People with personal experience tend to be less open to information that conflicts with their interpretations of their experiences[16]. In addition, some people are unable to accurately process the information they receive. Indeed, in such instances, the new information base may provide additional motivation and ability to defend current values and attitudes[16]. This is especially true of people who already possess high knowledge on an issue, such as ranchers who live with or near wolves or prairie dogs[10 11].

Ethical issues

Some people argue that we should not try to influence other people's values and attitudes. Usually, but not always, these are individuals who disagree with a value or attitude being promoted and strive to make it seem as though they are "taking the moral high ground." In reality, such a stance promotes the status quo and allows others to influence values and attitudes. While we should respect the right of people to hold values and attitudes that differ from our own, it is also important to recognise that humans are constantly striving to influence the values and attitudes of each other. Since everyone believes their value system is superior (otherwise they would change their values or value hierarchy), everyone is trying to convince others to embrace his or her values. Efforts to change values and attitudes can be obvious and overt or subtle and covert, but every expression of an opinion, every behavioural decision, and even the selection of "objective" information to provide to others reflects a person's values and attitudes and serves to influence others to some degree.

Conclusions

Knowledge is only one of several variables influencing values and attitudes. In addition, new information that contributes to a person's knowledge is often influenced by existing values and attitudes. As such, simply providing people with information about a species or a conservation programme is probably insufficient to develop support values and attitudes, especially if the target group already possesses well-developed values and attitudes. Past research supports this contention, suggesting that conservation programmes must go well beyond simply providing information to antagonistic publics if they hope to successfully address opposition.

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博物馆内的自然中心主义 - 加拿大的实例

Ecocentrism in a museum setting: A Canadian case study

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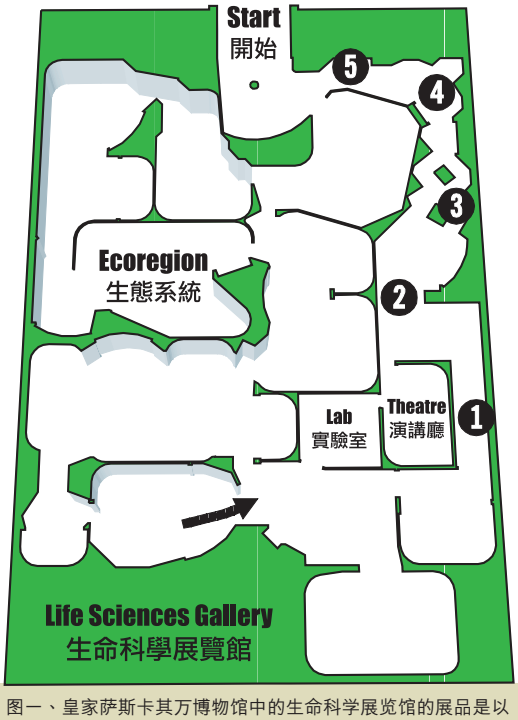
人类是否属于一个更大的值得尊重的生命体系，还是地球不外乎包含一些无生命的资源让我们任意使用而无需理会代价？这些问题涉及由「自然中心主义」至「人类中心主义」的整套价值观、态度及信念。在过去几个世纪，工业社会错失了几次走回正轨的机会，George Sessions[1]称此为「人类中心主义的偏差」。他认为自从有了农业，人们变得越来越以人类为中心，而这种偏差又得到自古希腊以来传统宗教哲学的支持。这种偏差对社会、经济及环境的影响广泛而确切[2]，那么为甚么一直以来人类的行为没有相应的改变？部份原因是源于基本需要，例如要满足庞大而不断增长的人口的食宿需求。David Chapman[3] 认为另外一个中心问题是「西方文化看来已迷失方向而引致的错误观念」，并描述各样窒碍人们再发现或发展自然主义的文化神话。

若Chapman 的论点正确，那么教育的基本目的，特别是可持续或环境教育的，便应该是帮助人们认清神话、「真正」醒悟、及最终以自然为中心。在加拿大雷嘉纳萨斯卡其万省，省级自然及人文博物馆「皇家萨斯卡其万博物馆」(Royal Saskatchewan Museum)内增设的「生命科学展览馆(Life Sciences Gallery)」便以此为设计目标。该馆背后很多的理念都受Stan Rowe及其他自然中心学说哲学家[4 5]的著作所启发。本文展述博物馆的故事式布置格局，并以其中一处带有明显的自然中心主义，名为「人文因



图一、皇家萨斯卡其万博物馆中的生命科学展览馆的展品是以一条故事主线贯穿

Fig. 1 The Life Sciences Gallery at the Royal Saskatchewan Museum is based on a linear storyline

Are humans part of larger, living systems that deserve respect, or does the Earth consist of inert (lifeless) resources that we are free to use, whatever the cost? These questions reflect a continuum of values, attitudes, and beliefs that ranges from ecocentrism (ecosystem-centred) to anthropocentrism (human-centred). Over the last few centuries, industrialised societies have missed several opportunities to alter their current trajectory, which George Sessions[1] calls an "anthropocentric detour." Since the onset of agriculture, he notes, people have become increasingly anthropocentric, supported by philosophic and religious traditions that date back to early Greece. The social, economic and environmental effects of this detour are pervasive and sobering[2], so why has there been no corresponding change in human behaviour? Some reasons are rooted in basic needs, such as the need to produce enough food and shelter for our enormous and growing population. David Chapman[3] suggests that another central problem is a "false consciousness in which western culture appears to be lost" and goes on to describe cultural myths that are preventing people from rediscovering or nurturing an ecocentric perspective.

If Chapman's diagnosis is correct, a general aim of education, especially sustainability or environmental education, should be to help people deal with these myths by becoming "truly" conscious and ultimately ecocentric. This goal was central to the development of a new Life Sciences Gallery (LSG) at the Royal Saskatchewan Museum (RSM), a provincial museum of natural and human history in Regina, Saskatchewan, Canada. Much of the thinking behind the LSG was influenced by the writings of Stan Rowe and other ecocentric philosophers[4 5]. This article lays out the storyline of the Gallery, focusing on a section called The Human Factor where ecocentrism is most obvious[6]. More details, including a virtual gallery tour and web-based interactive learning centres, are available at www.royalsaskmuseum.ca.

素」的部份为重点[6]。欲知更多详情，包括虚拟导赏游及网上互动学习中心，可浏览www.royalsaskmuseum.ca.

1990年博物馆被一场火灾损毁后不久，便开始构建生命科学展览馆。在差不多1,200平方米的可用展示空间内(图一)，设计组决定把重点定在系统的展示及物种互相倚赖的关系上，并采用「动态平衡」作为介绍自然中心主义的主题。在2001年的首次展览

图二. 生命科学展览馆展示的十四个自然历史立体模型之一
Fig. 2 One of fourteen natural history dioramas in the Life Sciences Gallery.

上，展出了全球生态系统，即生态圈[4]，怎样在千万年以来维持不断变化的平衡，为生命体提供理想的生存环境。随后是探究一些萨斯卡其万生态系统在没有人类活动下怎样运作的立体模型(图二) 及名为「全球观」部份，阐述当地怎样在生物及气候层面上和其他偏远地方，如北极圈、热带地区等相连系。跟著便是「人文因素」，审视了由地区至全球的问题，以及西方主流的观念和行为模式。

「人文因素」划分五个地区。时间隧道(图一#1) 展现不同阶段的文化发展及全球生态系统的变化。活著的地球(#2)除了描述地球在健康的生态系统下如何运作，亦提及全球饱受压力的徵兆。压力根源(#3)剖析失衡的态度和行为。解决方法(#4)探讨和可持续发展有关的个人及集体挑战。最后，展望未来(#5)提出可持续的文化可包含甚么。

「时间隧道」(图三)通过不同时期人类活动所引起的环境变化介绍人文元素。藉著把地球视为一个生命系统，这部份把展览馆的焦点回放到全球

图三. 「时间隧道」是不同展品的过渡区
Fig. 3. The Time Tunnel is a transition between different types of exhibits.

Planning for the LSG began in 1990, shortly after the museum was damaged by a fire. With almost 1,200 m^2 of exhibit space to work with (Fig. 1), the design team decided to focus on systems thinking and the interdependency of species, adopting "dynamic balance" as their ecocentric theme. The first exhibit in the gallery, which opened in 2001, describes how the global ecosystem, or Ecosphere[4], has maintained a variable balance for millions of years, providing conditions that are ideal for living organisms. This is followed by dioramas (Fig. 2) that examine how some Saskatchewan ecosystems operate in the absence of human activity, and a section called Global View, which illustrates how the province is biologically and climatically connected to distant locations, including the Arctic and the tropics. Next comes The Human Factor, where the focus ranges from regional to global, and dominant Western attitudes and actions are scrutinized.

The Human Factor is divided into five areas. Time Tunnel (#1 on Fig. 1) looks at stages of cultural development and temporal changes in the global ecosystem. Living Planet (#2) describes how the Earth functions as a healthy ecosystem and signs of global stress. Causes of Stress (#3) examines attitudes and behaviours that are "out of balance". Solutions (#4) looks at personal and collective challenges associated with sustainable development. Finally, Looking Ahead (#5) considers what a culture of sustainability could include.

The Time Tunnel (Fig. 3) introduces the human element by looking at temporal changes associated with human activity. It also shifts the focus of the gallery back to the global level (the perspective offered at the start) by focusing on the Earth as a living system. To bring humans into the picture, a "Wall of Trends" looks at biophysical changes that have affected the global ecosystem over time, a "Wall of Images" looks at major social and technological changes in hominid history, and impressions in the concrete floor reflect changes in the pace of human activities.

Living Planet (Fig. 4) looks at how the Earth functions as a global ecosystem, how that system is being stressed by human activities, and what we mean when we say that something is alive. The story on one side of a slowly rotating globe is that healthy ecosystems provide a range of services, such as climatic regulation, which are not considered in most measures of economic activity. On the other side are signs of social and ecological stress, including poverty and disease, pollution, and the uneven distribution of wealth and power. There are also digital clocks that show how rapidly world population is

相片由作者提供 Photo by author

图四. 缓缓转动的地球正是「活著的地球」的主要展品
Fig. 4 The Living Planet area features a rotating globe

层面(正如开始时提到的观点)。为把人类带入其中，「潮流之墙」说明生物物理环境上的改变如何不断地影响全球生态系统，「影像之墙」透视人类历史上所经历的主要社会性及科技性改变，而混凝土地板上的图像反映了人类活动步伐的转变。

「活著的地球」(图四)是关于地球怎样发挥全球生态系统的功能，这个系统怎样被人类活动影响及我们怎样理解有生命的东西。缓缓转动的地球一面道出整全的生态环境可提供不同种类的服务，例如一般衡量经济活动的机制都会忽略的气候调控功能。另一面是一些社会及生态面临压力徵状，包括贫穷、疾病、污染及财富权力分布不均。还有一个数码时钟显示世界人口的增长有多快，而同时生产地及全球生物多样性却在不断减少。一块靠近时钟的展示版指出，如果人人都有如加拿大人一般的生态足印，那我们将需要多几个地球！

「压力根源」的展品带出多以人类为主轴的工业世界观的不平衡之处。每一座「权力之塔」(图五)由特定物件、短文、语录或底座边框上的资料，一个电脑游戏及一个以姿态及动作表现主题的人像组成。这个部份假定众多影响社会及生态系统的压力都源自工业世界观[7]。这些展品并非要指出它们所描述的价值观、态度或行为在本质上是错误的，而是要把西方社会的社会、经济及政治权力中心的所在展示出来，并提出有关不平衡的问题。

「解决方法」进一步探视自然中心主义，首先是引出人与周遭世界及人与人之间关系的重要性。那里有一个旋转的地球仪记述了可持续发展的资料，一份不断增加的清单列出了个人、团体及企业共同努力下谱写的成功故事，及一座「希望之塔」让参观者明白若他们作出改变，其生态足印亦会随之改善。

increasing, while productive land and global biodiversity measures are both decreasing. A panel near the clocks points out that if everyone had the ecological footprint of the average Canadian, we would need a few more planets!

The displays in the Causes of Stress area reflect imbalances associated with the industrialised world view, which is mostly anthropocentric. Each "tower of power" (Fig. 5) consists of selected objects, brief essays, quotations or facts on the railings, a computer game, and a human figure whose mannerisms and actions reflect the topic. This section assumes that many stresses affecting social and ecological systems can be traced back to the industrialised world view[7]. The towers are not meant to suggest that the depicted values, attitudes or behaviours are inherently wrong. The intent is to show where concentrations of social, economic, and political power exist in Western society and to raise questions about these imbalances.

The Solutions area takes a closer look at ecocentrism, beginning with the importance of relationships that link people to the world around them, and to each other. There is also a gyroscopic Earth that provides details about sustainable development, a growing list of "success stories" based on the efforts of individuals, groups and corporations, and a "tower of hope" where visitors can see how their ecological footprints would change if they made different choices.

Looking Ahead, which brings the exhibit and the LSG to a close, considers what might lie in the future and how people might create it. Principles from the Earth Charter[8] are presented as an ecocentric foundation, and the last display, called Our Dreams (Fig. 6), is based on visions of the future that were created and interpreted by grade-school children. The Our Dreams display is positioned so the last word in the Gallery goes to children, and it includes a speech delivered by a Mother Earth, where the children join in to say

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图五. 七塔之一的「权力之塔」展示出压力的源头
Fig. 5 One of seven sculpted "towers of power" in the Causes of Stress area

作为展览馆的终站，「展望未来」勾划未来可能发生的情况及人类可以怎样创造未来。「地球宪章」(Earth Charter)[8]的原则被视作自然中心主义的根本。最后一组展品名叫「我们的梦想」(图六)，是根据中小学生们对未来的想像及构思做成的。这组展品所摆放的位置代表展览馆把最后的一番话交给儿童。它包括一段地球母亲的心声，并由孩子们在最后一句一齐作出呼吁。

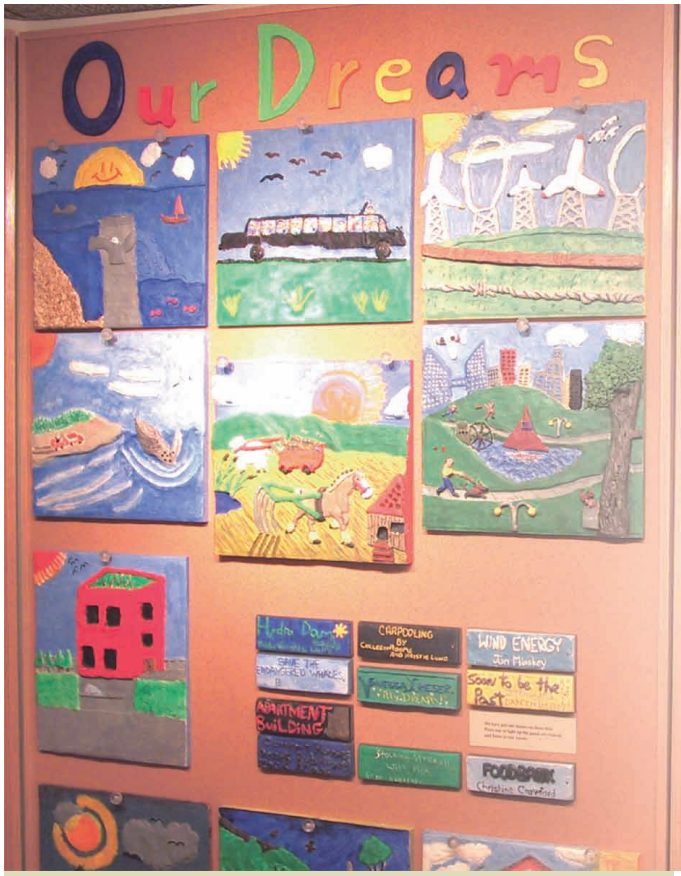
虽然「人文因素」主要针对眼前刻下的问题，但其实设计组亦想提出可能的解决方案。我们的目的是传播可持续发展或可持续性的挑战及优点，从而启发人们并令他们有能力作出改变。这是一项严峻的工作，但却是必需的。我们的全球足印早在七十年代中期已超越了地球的生产力，但却因著人口、财富及科技的发展而仍在不断扩大[9]。

要促进可持续的文化，我们需要合适的定义、科技、政策及规范，但亦需要藉教育彻底改变我们的思想及行为。重要的一步是要面对复杂又难的问题，鼓励由个人层面作出决定、行动及承担。「人文因素」尝试把个人放在地区性及全球性议题上，探求它们与工业世界观的关系及自然中心主义优胜的地方。我们希望参观者在展览馆及参观展品时的体验给他们一个思索的机会，想一想自己与地球的关系、甚么对自己真正有意义及甚么不可以掌握在自己手中。

the last line.

The Human Factor was conceived as a way to focus attention on urgent problems, but the design team also wanted to address potential solutions. Our goal was to shed light on the challenges and benefits of sustainable development, or sustainability, in ways that would leave people both enlightened and empowered. This was no easy task, but the need is clear. Our global footprint surpassed the productive capacity of the Earth in the mid 1970s and has continued to grow because of our numbers, affluence, and technologies[9].

To foster a culture of sustainability, we need appropriate definitions, technologies, policies and regulations, but we also need a fundamental shift in our thinking and actions, ostensibly through education. A critical step is to address complex, intangible problems in ways that encourage commitments, decisions, and actions at the personal level. The Human Factor attempts to put a personal face on regional and global issues by exploring their links to the industrialised world view and the benefits of an ecocentric perspective. Our hope is that experiences in the exhibit and in the gallery as a whole will give visitors a chance to reflect on how they relate to the world around them, what has meaning for them, and their beliefs about what lies within and beyond their control.



图六. 中小学生创作的「我们的梦想」
Fig. 6 The final "Our Dreams" exhibit was created by grade-school children

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把可持续发展教育纳入中国基础教育：世界自然基金会的中国中小学绿色教育行动

Embedding education for sustainable development in China's schools: WWF-China's Environmental Educators' Initiative

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我刚从重庆的西南师范大学回来，此行是为了帮助教师们编制大一的课程，让学生探讨在课堂及生活中的可持续议题。另外，我们亦计划推行一个「可持续发展教育」的启导课程给予那些完成第一年课程后打算执掌教鞭的学生。该校校长已答应把资源投放在培训职工及制作全新教材上，以示对这些课程的支持。

这项行动得以成功，全因西南师范大学内有一所成立于1997年的环境教育中心，中心的职工逐渐提升同事们对可持续发展教育的意识及认知。环境教育中心网络是世界自然基金会 - 中国中小学绿色教育行动的主要动力。这项合作项目由中国教育部、英国石油集团和世界自然基金会 于1997年联合发起，旨在把可持续发展教育纳入中国正规教育体系。过去8年间，在全国师范院校成立的教育中心已有20个； 为120所大学的导师提供了有关可持续发展教育的理论与方法；再由他们指导约3,000名教师及督学。世界自然基金会环境教育项目与中国教育部共同编订了一份国家环境教育指南，由人民教育出版社刊印新课程计划；及由北京师范大学及上海华东师范大学开发可持续发展教育的硕士及证书课程。中国中小学绿色教育行动现正实施第三阶段的工作，除了要建立更多教育中心，重点是把学会的可持续发展教育的理念及心得实践到更加广泛的课程上。

那甚么是我们的心得，而它又如何能跟《森林脉博》的读者及投身中国生物多样性保育行列的人拉上关系呢？作为中国中小学绿色教育行动的主要海外顾问，因普通话不太灵光的缘故，在翻译员的协助下向老师们提出以下建议：

首先，可以把目标定高一点。我们的行动主旨是通过传授知识、技术及价值观，让公众能积极及理性地参与建设及维持一个生态可持续、公平及民主的社会，并同时以改变全国50万所学校为目标。要达到这个目标必须考虑中国国情及历史背景，循序渐进、策略高明及因地制宜地进行。但其实很多教师都愿意公开讨论具争议性的环境及发展议题，及想出最佳的教学方式来阐释其各样归因与解决方法。

I have recently returned from a visit to South West Normal University (SWNU) in Chongqing Municipality where I helped tutors plan a course for all first year students that will explore issues related to living and studying sustainably on the campus. Additionally we planned an introductory course on education for sustainable development (ESD) for those students who after their first year decide to become teachers. The university's president expressed his support for these courses by promising resources for staff development and the production of new teaching materials.

This initiative at SWNU is possible because an Environmental Education Centre has existed at the university since 1997 and the centre's staff have gradually raised their colleagues' awareness and understanding of ESD. It is part of a network of such centres that are the principal change agents in World Wide Fund for Nature (WWF) - China's Environmental Educators' Initiative (EEI). This partnership between China's Ministry of Education, BP, and WWF began in 1997 and seeks to embed ESD in China's schools. Over the past eight years it has established 20 centres in normal universities throughout the country; trained 120 university tutors in the theory and practice of ESD; and they in turn have trained around 3,000 teachers and teacher supervisors. Staff in WWF's education department have worked with the Ministry of Education to produce new national guidelines on environmental education; with the Peoples Education Press to publish new lesson plans; and with Beijing and East China (Shanghai) Normal Universities to produce masters- and certificate-level courses in ESD. EEI is now in its third phase and while this involves the establishment of new centres, its primary aim is consolidation and communication of best practice and lessons learnt to a wider audience.

So what are the lessons learnt and in what ways are they relevant to readers of *Living Forests* and others seeking biodiversity conservation in China? My experience as the principal overseas consultant to EEI, a non-Mandarin speaker working through a translator, suggests the following answers:

Firstly EEI suggests that it is possible to be **bold in relation to goals and ambition**. The initiative seeks to enable people, through the acquisition of understanding, skills and values, to participate as active and informed citizens in the development and maintenance of an ecologically sustainable, socially just, and democratic society. At the same time it seeks to change all China's half-million schools. Such a goal has to be introduced gradually, tactically, and in appropriate language, with due regard to China's history and political culture, but I have found many tutors and teachers prepared to openly debate controversial issues of the environment and development, and consider how wide-ranging causes and solutions might best be presented in classrooms.

第二，肯定参与式讲授方式的价值。探究式学习是中国现时倡导的教育改革，老师从单单提供资讯的角色转化为学生在求知过程中的导航员。但中国传统以来的说教式授课，另师范大学的导师大都没有与中小学的教学经验，要改变并不容易。中国中小学绿色教育行动指如图片中的“毛线思考”等活动，当导师们亲身参与过后都表示它有很强的感染力，他们热衷于在课室示范、与学生们一同尝试，及发掘新的知识和点子使教学变得互动和实际一点。

第三，肯定了发展具有中国特色的可持续发展教育的必要性。我向老师们介绍了澳大利亚、南非、美国及英国的可持续教育项目及教学资源。可供借镜的例子多不胜数，但国内的教育界及非政府组织教育主任需因应国情取其所需，凭著合用的资料建立一套适用于中国的教学体系。实行时当然会遇到一些阻力，虽然现在仍是言之过早，很可能有些发展是我未知道的。

图一. 师范大学的教师正参与在昆明举行的中国中小学绿色教育行动「毛线思考」的活动。他们通过描述和讨论错综复杂的联系，来表达及厘清他们对造成山区贫穷的原因及解决方法的见解

Fig.1. Tutors from Normal Universities participate in the activity Woolly Thinking during an EEI workshop in Kunming. They created and discussed a web of connections which, in this case, expressed and clarified their understanding of the various factors that cause and alleviate rural poverty

最后一点是，肯定针对行动的研究的价值，并将此视为开拓教学课程、个人专业及社区发展之基础。中心导师在编制教学资源、视察工作进度及与试点学校、当地政府、企业及社区合作的过程中不断反覆检讨及修正。通过这样反思及缩减理论与现实的差距，让他们可以面对失败、把握机会。当老师们觉得可持续发展教育的资历无助于他们的晋升，硕士及证书课程因而招生不足时，我们应该怎么办？当老师们把我们主张的那一套来教授与可持续发展风马牛不相及的科目时，我们又应如何处理？此外，如何在研究北京某地区夜店增多的校内项目上结合戒酒教育与地球宪章的原则呢？

中国中小学绿色教育行动与嘉道理农场暨植物园的目标都是一致的，各从事环境教育的读者们如欲取得更多有关中国中小学绿色教育行动的资料或查询世界自然基金会环境教育中心的联系方法，请浏览http://www.wwfchina.org/chinese/ 或以电邮跟环境教育项目主任刘蕴华 (yhliu@wwfchina.org) 、赵云涛 (ytzhao@wwfchina.org)或本文作者(http://john.huckle.org.uk) 联系。

Secondly EEI has **confirmed the value of participatory workshops**. China's current educational reforms mean that tutors and teachers must embrace inquiry-based learning and change from being purveyors of information to facilitators of learning. Such change is not easy in China with its long history of didactic teaching where tutors in normal universities have not normally taught in school classrooms. But EEI shows that activities, like 'Woolly Thinking' shown in the illustration, once experienced by tutors prove infectious. They become keen to try them with their students, to demonstrate them in school classrooms, and to explore new knowledge and ideas that can be taught in interactive and experiential ways.

Thirdly EEI has **affirmed the need for an ESD that is appropriate for China**. I have introduced tutors to ESD projects and materials from Australia, South Africa, the USA and UK. There is no shortage of good practice models but Chinese teacher educators and NGO education staff should take only what they consider appropriate from overseas and build their own models that take account of national and local contexts. Understandably there appears to be some reluctance to do this, although it may be too early to judge and there may be developments of which I am not aware.

Fourthly and finally EEI has **affirmed the value of action research as the basis of** curriculum, professional and community development. Tutors in the centres have used the continuous process of reflection and action, followed by more reflection and action, to develop teaching materials, review their own development, and work with pilot schools, local government, local businesses, and the local community. By reflecting and acting on gaps between what they think they are doing, and what they are actually doing (theory/practice gaps), they are able to respond to setbacks and opportunities. What should we do when our masters and certificate courses fail to recruit because teachers perceive no prospects of promotion with a qualification in ESD? How should we respond when teachers start using 'our' experiential activities for purposes entirely unconnected with ESD? How can we bring together alcohol education and Earth Charter principles[1] in a school project about the growth of night clubs in a district of Beijing?

The aims of EEI are consistent with those of KFBG, and readers engaged in environmental education may wish to contact WWF to learn more about EEI and obtain contact details for their nearest EE Centre. WWF-China's website is at http://www.wwfchina.org/english/ and education officers Liu Yunhua (yhliu@wwfchina.org) and Zhao Yuntao (ytzhao@wwfchina.org) can be contacted by email. The author can be contacted via his website (http://john.huckle.org.uk).

[1] http://www.earthchartersummits.org/TheEarthCharter.htm

■ 尖喙蛇*Rhynchophis boulengeri* Mocquard, 1897

图一：在海南鹦哥岭自然保护区拍摄的一条成体
Fig. 1: An adult from Yinggeling Naure Reserve, Hainan

李国诚摄 Photo by Lee Kwok Shing ©KFBG

分布：全球只局限分布于中国的海南、广西及越南北部。

特徵：游蛇科中的一种中型蛇类，成体一般约1米长。这种蛇全身绿色，背面鳞片之间的皮是黑色或白色边缘。这种蛇较特别之处是吻端上有一细长、柔软的锥状突出物（图一），但其功用未明。幼体浅灰色，身体满布黑色条状小斑，由吻端经眼眶至颈项有一黑宽带（图二）。

生态：有关尖喙蛇的生态资料很少。这种蛇栖息于中海拔成熟天然阔叶林中，我们碰到的个体都是白天在地上发现的。相片中的成年个体是于正午在海南中部鹦哥岭海拔约900米的成熟林中小径找到的（图三）。

现状：跟很多亚洲的蛇一样，我们对它的野外状况所知不多，而世界自然保护联盟（IUCN）红色名录亦未对此蛇作出评估。在中国因为分布非常狭窄被列为易危（VU D2）[1]。

卢刚及陈庆摄 Photo by LU Gang & CHEN Qing

图二：在海南霸王岭国家级自然保护区拍摄的一条幼体
Fig. 2: A juvenile from Bawangling National Nature Reserve, Hainan

■ *Rhynchophis boulengeri* Mocquard, 1897
Indochinese Rhino Ratsnake

Distribution: Globally restricted to Hainan, Guangxi and northern Vietnam.

Identification: A medium-sized green snake in the Colubridae family; adult is around one metre long. Skin between scales on the back is either white or black. The species is characterised by an elongate, pointed and soft projection from the tip of the snout (Fig. 1); its function of this projection is unknown. Juvenile is light grey with black rod-shaped speckles along the body; a black eye-stripe extends from the tip of the snout to the neck region (Fig. 2).

Ecology: Very little is known about its ecology. The species inhabits mature natural broadleaf forest at mid-altitude; all specimens we have come across were seen on the ground during daytime. The adult snake illustrated was found around midday on a forest path in mature forest at Yinggeling, Central Hainan, at an altitude of around 900m asl (Fig. 3).

Status: Like many Asian snakes, not much information is available about its status in the wild and it has not been assessed in the IUCN Red List. Considered Vulnerable (VU D2) in China due to its very restricted distribution[1].

图三：海南鹦哥岭自然保护区的热带山地雨林是尖喙蛇的生境
Fig. 3: Lower montane tropical rainforest at Yinggeling Nature Reserve, a habitat for *Rhynchophis boulengeri*
李国诚摄 Photo by LEE Kwok Shing

图四：带叶的树苗
Fig. 4: Sapling with leaves

图五：美丽火桐的鲜橙色雌性花朵
Fig. 5: Bright orange female flower of *Erythropsis pulcherrima*

图六：结果的枝条上绿色带暗红的果荚和种子
Fig. 6: Fruiting branches showing the reddish green opened pods

图七：稀疏的石灰岩季节性雨林中的一株结果的美丽火桐
Fig.7: A fruiting tree in open limestone seasonal rainforest

■ 美丽火桐 *Erythropsis pulcherrima* (Hsue) Hsue

分布：海南中南与东南部的特有种。

特徵：梧桐科的落叶乔木，可达20米高；树皮平滑并带浅灰色；树叶呈圆形，3-5浅裂(图四)。由其名字可知，美丽火桐开花时非常壮丽；因为此树开花时正值落叶，而鲜橙色的花朵(图五)会同时盛放。它果实的形状也非常特别：绿色带暗红色的果实五个一束，每一个果实就像一个开裂了的豆荚，而黄豆大小的绿色种子就附在果荚的边缘(图六)。

生态：在海南较常见散生于低至中海拔的季节性雨林(图七)。相片中的美丽火桐摄于保亭县毛感乡的石灰岩地区 - 仙安石林。成熟的树木于旱季落叶，四至五月开花；成熟的果荚会整个的脱落，如一个翼果般掉落，靠风力传播。

现状：美丽火桐是海南岛特有种，并且是中国的濒危物种(EN A2c)[1]。在海南适合美丽火桐生长的季节性雨林，因为开采石矿和农业开垦等活动，正受严重威胁。

■ Erythropsis pulcherrima (Hsue) Hsue
Beautiful Iwil-Iwil

Distribution: Endemic to central-south and southeast Hainan.

Identification: A deciduous tree in the Sterculiaceae family, up to 20m tall bark smooth and pale grey (Fig. 4); leaves round, entire or 3-5-palmate (Fig. 5). As its names imply the tree is spectacular when flowering, as the bright orange flowers (Fig. 6) of a tree tend to bloom at more or less the same time, and flowering trees lose all leaves during the blooming season. The fruits have a peculiar shape: a cluster of five opened reddish green pods with seeds attached to their margins (Fig. 7).

Ecology: It can often be found scattered in low to mid-altitude open seasonal rainforest (Fig. 8). The photos were taken at Xian'an Stone-forest, a limestone area at Maogan Xiang, Baoting County. Mature trees lose their leaves in the dry season, blooming in April to May. When the fruit pods are fully ripen, each of the pods will fall off like a samara and dispersed by wind.

Status: The species is endemic to Hainan and is considered Endangered (EN A2c) in China due to habitat loss[1], in particular mining and agricultural encroachment.

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[1]汪松及解炎，2004。*中国物种红色名录，第一卷，红色名录*。中国环境与发展国际合作委员会生物多样性工作组。高等教育出版社，北京。

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2003年广西东北地区四个保护区的植物多样性调查摘要

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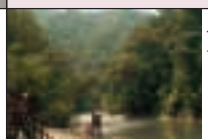
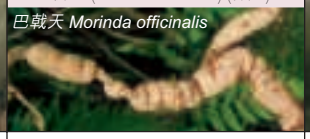
广西地处我国东南部湿润地带，跨越北热带与中亚热带气候区域，生物多样性相当丰富。建国以来，广西对野生植物资源开发利用与保护十分重视，区域性或全区性的野生植物资源普查、植被调查、专项的国家保护植物调查从未间断。然而，广西仍有不少我国乃至国际上具有重要生物多样性保育意义的关键性地区尚未进行过深入调查。这些地区中，以往仅仅是作过一些某一方面需要的调查，有的更从未作过调查，对其中蕴藏的濒危物种更是知之甚少，因而很有必要开展系统而全面的研究。

因此香港嘉道理农场暨植物园立项资助广西植物研究所于2003年开展对广西东部和东北部4个较少专家留意和研究的省级自然保护区进行植物多样性考察。它们分别是：姑婆山自然保护区、滑水冲自然保护区，银殿山自然保护区，与海洋山自然保护区。除了针对该4个保护区的植物资源和植被外，本调查组亦在考察过程中了解各保护区中具体面对的威胁及难题。本项目于2004年3月份结束，并已向有关部门提出了改善建议。本项目的调查结果现节录如下 [注解；国家保护植物依据于永福[1]，IUCN全球受危物种依据IUCN红色名录[2]，中国受危植物依据中国物种红色名录[3]：

	姑婆山水源林保护区	滑水冲水源林保护区	银殿山水源林保护区	海洋山水源林保护区
位置[4]	广西东北部，贺州市的西北部，湖南东南边境。北纬24°37'-24°41'，东经111°30'-111°36'	广西东北部，贺州市东部。北纬24°19'-24°27'，东经111°51'-111°15''	广西东北部，恭城县东部。北纬24°45'-25°00'，东经110°52'-111°15'[5]	广西东北部，阳明、恭城、灌阳、全州、兴安、灵川等6县交界处。北纬24°59'-25°28'，东经111°29'-110°55'。
面积[4]	65.5平方公里	105平方公里	480平方公里	904平方公里
设立目的[4]	省级保护区。建于1982年，保护对象主要是水源涵养林。于1990年成立为国家级森林公园。	省级保护区。建于1982年，保护对象主要是水源涵养林以及黄腹角雉(*Tragopan caboti*)、鬣羚(*Capricornis sumatraensis*)等珍稀动物。	省级保护区。建于1982年，保护对象主要是水源涵养林。	省级保护区。建于1982年，保护对象主要为水源涵养林。
自然地貌[4]	中山地貌，一般海拔高约600-1,100米，最高峰马牯顶海拔1,846米。	中低山地貌，地形起伏变化较大；一般海拔在300-800米之间，主要山峰海拔都在1,000米以上，最高的长冲顶达1,571米。	中低山地貌，海拔1,000米以上的山峰有9座，最高的主峰银殿山海拔1,885米。	中山地貌，海拔超过1,000米以上的山峰有11座，最高峰宝盖岭海拔1,936米。
气温[4]	年平均气温约20℃，最冷的1月约9.4℃，极端低温约-4℃，最热的7月约28.7℃。年降水量为1,500毫米以上。	年平均气温约19℃，最冷的1月约7.5℃，绝对低温约-5℃，最热的7月约27℃，绝对高温约38℃。年降水量约1,800毫米。	年平均气温17.2℃，最冷的1月均温7.3℃，极端低温-3℃，最热的8月均温25℃，极端高温34.7℃。年降水量1,600毫米。	年平均气温约16℃，最冷的1月约5.1℃，极端最低温约-6.8℃，最热的7月约24.6℃，绝对高温约34.9℃。年降水量为1,500毫米以上。
考察日期	2003年7月15-23日；2003年12月8-13日	2003年7月24-31日；2003年12月1-7日	2003年8月28日-9月5日	2003年11月7-28日
维管植物调查历史	2002年夏季广西大学林学院的黎向东教授曾带队对姑婆山保护区进行过植物资源调查，相关的调查成果尚未见报道。	据原广西农学院林学分院1985编印的考察资料，滑水冲水源林保护区有维管束植物178科517属1,046种。	银殿山保护区没有进行过系统的植物区系调查。	梁畴芬等人曾深入采集植物标本，但没有整理出相关名录。2002年国家林业局中南调查规划设计院曾进行过综合考察，相关的调查成果尚未见报道。
植被概况	现存森林覆盖率达90%，常见的植被类型主要有以壳斗科、木兰科植物为主的常绿阔叶林以及以安息香科、金缕梅科植物为主的落叶阔叶林。	现存森林的覆盖率约85%，地带性原生植被为中亚热带常绿阔叶林，现大多为小片残存在山谷两旁环境比较阴湿的地方。	现存森林覆盖率约75%，地带性原生植被为常绿阔叶林，次生植被主要有常绿阔叶林被破坏后天然更新发展起来的以马尾松(Pinus massoniana)为代表的针叶林，主峰以北的多个山峰顶部主要是草坡。	现存森林覆盖率约80%左右，地带性原生植被为常绿阔叶林，并有中山常绿落叶阔叶混交林、中山针叶阔叶混交林及山顶矮林等类型。
主要群落类型	1. 甜椎群落 (Comm. *Castanopsis eyrei*) 2. 栲树群落 (Comm. *Castanopsis fargesii*) 3. 金毛柯群落 (Comm. *Lithocarpus chrysocoma*) 4. 桂南木莲群落 (Comm. *Manglietia chingii*) 5. 枫香群落 (Comm. *Liquidambar formosana*) 6. 拟赤杨群落 (Comm. *Alniphyllum fortunei*)	 沟谷两边山坡的红椎林 1. 红椎群落 (Comm. *Castanopsis hystrix*) 2. 毛栲群落 (Comm. *Castanopsis fordii*) 3. 栲树群落 4. 甜椎群落 5. 泡花润楠群落 (Comm. *Machilus pauhoi*) 6. 荷木群落 (Comm. *Schima superba*) 7. 拟赤杨群落 8. 枫香群落	1. 荷木群落 2. 银荷木群落 (Comm. *Schima argentea*) 3. 红椎群落 4. 喜树群落 (Comm. *Camptotheca acuminata*) 5. 马尾松群落 (Comm. *Pinus massoniana*)  半山以上的马尾松林	1. 米槠群落 (Comm. Castanopsis carlesii) 2. 红椎群落 3. 甜椎群落 4. 黎蒴椎群落 (Comm. *Castanopsis fissa*) 5. 栲树群落 6. 钩栲群落 (Comm. *Castanopsis tibetana*) 7. 长苞铁杉群落 (Comm. *Tsuge longibracteata*) 8. 华南五针松群落 (Comm. *Pinus kwangtungensis*) 9. 拟赤杨群落

	姑婆山水源林保护区	滑水冲水源林保护区	银殿山水源林保护区	海洋山水源林保护区
调查结果与具特别保育价值物种	共542种，隶属于156科。 国家II级保护植物： 鹅掌楸 (*Liriodendron chinense*)、胡豆莲 (*Euchresta japonica*)、粉椤 (*Alsophila spinulosa*)、福建柏 (*Fokienia hodginsii*)、任豆 (*Zenia insignis*)、樟树 (*Cinnamomum camphora*)、金毛狗 (*Cibotium barometz*)及红椿 (*Toona ciliata*)。 IUCN全球受危物种： 八角莲 (*Dysosma versipellis*) (易危) 水青冈 (*Fagus longipetiolata*) (易危) 白桂木 (*Artocarpus hypagyreus*) (易危) 中国受危物种： 例如：沈水樟 (*Cinnamomum. micranthum*) (易危)	共645种，隶属于159科 国家I级保护植物： 伯乐树 (*Bretschneidera sinensis*) 国家II级保护植物： 粉椤、马蹄参 (*Diplopanax stachyanthus*)、观光木 (*Tsoongiodendron odorum*)、闽楠 (*Phoebe bournei*)、红椿、金毛狗、樟树、任豆及花榈木 (*Ormosia henryi*)。 IUCN全球受危物种： 八角莲 (易危) 水青冈 (易危) 银锤树 (*Halesia macgregorii*) (易危) 中国受危物种： 例如：沈水樟 (易危) 巴戟天 (*Morinda officinalis*) (易危)	共446种，隶属于145科 国家II级保护植物： 鹅掌楸、华南五针松(*Pinus kwangtungensis*)、柔毛油杉(*Keteleeria pubescens*)、观光木、花榈木、任豆、榉树 (*Zelkova schneideriana*)、金毛狗、樟树、喜树 (*Camptotheca acuminata*)。 IUCN全球受危物种： 水青冈(易危) 银鹊树 (*Tapiscia sinensis*) (易危)	共614种，隶属于180科 国家I级保护植物： 南方红豆杉(*Taxus wallichiana var. mairei*)、伯乐树 国家II级保护植物： 华南五针松、马蹄参、观光木、闽楠、红椿、金毛狗、樟树、任豆、花榈木、喜树、半枫荷 (*Semiliquidambar cathayensis*)。 IUCN全球受危物种： 穗花杉(*Amentotaxus argotaenia*) (易危) 八角莲 (易危) 银鹊树 (易危) 银锤树 (易危) 白辛树(*Pterostyrax psilophyllus*) (易危) 水青冈 (易危) 中国受危物种： 例如：沈水樟 (易危)
现状评价	姑婆山水源林保护区原为贺县国营姑婆山林场，90年代经林业部批准成为国家森林公园。保护区植被类型虽然较简单，但保存了一些比较典型的常绿阔叶林，并已基本停止了对森林植被的破坏，整个植被处于恢复与发展的阶段，这在连片森林基本不存在的桂东、桂东南地区比较少见。	保护区内历史上曾经有过零星村寨，对原生植被有过严重影响，村民后来基本上都已迁出，但仍然在保护区从事一些生产活动。从1982年保护区成立至今，植被进一步得到了恢复。根据我们的调查并结合前人的研究资料，我们认为滑水冲保护区是桂东地区天然森林保存最好的区域，植物种类丰富，植被类型多种多样，堪称桂东地区的物种宝库。	银殿山水源林保护区保存了一些典型的常绿阔叶林，但类型较为简单，且分布面积不太，植物种类的丰富度一般。因此本次调查在银殿山只进行了比较短的考察。	从本次调查看，海洋山植物种类比较丰富，植被类型也多种多样，且保存比较完好，植被垂直带谱比较完整，具有一定的典型性、自然性和完整性。
威胁与问题	旅游建设以及旅游活动将会对保护区内的植物资源和植被产生一定影响，急需分析评估自身的旅游承受能力，并进一步规范游人行为，维护生态环境的自然性。保护区周边一些群众农闲时常到林区内设置捕鸟、兽的圈套，湖南的群众也常到保护区砍伐竹子。需加强宣传，增强群众的保护意识。	当地一些群众仍在保护区内进行如开荒种植、采割松脂、伐薪烧炭、采挖药材等活动，保护区内采矿现象也较普遍，有些甚至到达了核心区，对森林及环境造成严重破坏。保护区目前的管理机构有待完善，并进一步加大管理力度。	保护区目前管理力量较薄弱，保护区森林及环境受破坏程度严重。在海拔400-1,000米地段的自然成林的马尾松林正遭到不断采伐，与马尾松混生的阔叶树或其他常绿阔叶林也受破坏。保护区目前的管理机构有待完善，并进一步加大管理力度。	保护区地处6县交界处，没有统一的保护机构，各县的管理力量较薄弱；群众对森林资源的依赖性较大，其生产经营活动直接对森林植被造成破坏；在阳朔、恭城、灵川等县的保护区范围内均有一些铅锌矿，也破坏了保护区的森林及其环境。


巴戟天 *Morinda officinalis*


鹅掌秋


相片由作者提供

Summary of 2003 botanical survey of four nature reserves in northeast Guangxi

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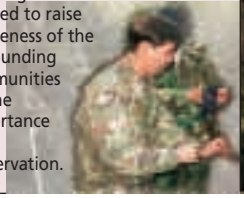
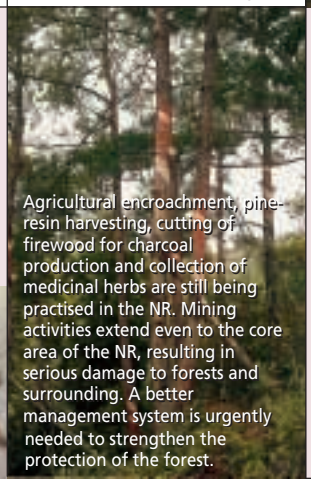
Spanning the humid tropical and subtropical zones of southeast China, Guangxi has a rich biota. The Guangxi Government has placed great emphasis on the utilisation and protection of its plant biodiversity. Surveys, at both regional and provincial level, of its flora, vegetation and specific nationally-protected species have been carried out more or less continually. Nonetheless, key areas of national or global conservation importance in Guangxi have yet to be studied. Some of these areas have been surveyed only superficially for specific purposes, others not at all. Since botanical knowledge especially of the endangered species in these areas was insufficient, it was high time for us to launch a comprehensive and systematic survey.

For this reason, KFBG sponsored Guangxi Institute of Botany to undertake a study in 2003 of the plant biodiversity of four lesser-known provincial reserves, namely Guposhan, Huashuichong, Yindianshan and Haiyangshan Nature Reserves, in northeast Guangxi. Besides studying the local vegetation and flora, the surveyors took the chance to look into the threats and problems of each reserve. The study was finished in March 2004, and generated management recommendations to relevant departments. The survey results are summarised in the table below. Protected status for plants is based on Yu[1], global status of threatened species is from IUCN[2], and status in China is based on the China Species Red List[3].

	Guposhan Headwater Forest Nature Reserve	Huashuichong Headwater Forest Nature Reserve	Yindianshan Headwater Forest Nature Reserve	Haiyangshan Headwater Forest Nature Reserve
Location[4]	Northeast Guangxi, northwest Hezhou City, bordering southeast Hunan. 24°37′-24°41′N, 111°30′-111°36′ E	Northeast Guangxi, eastern Hezhou City. 24°19′-24°27′N, 111°51′-111°56′E	Northeast Guangxi, eastern Gongcheng County. 24°45′-25°00′N, 110°52′ to 111°15′ E [5]	Northeast Guangxi, bordering Yangsuo, Gongcheng, Guanyang, Quanzhou, Xing'an and Ningcun Counties. 24°59′-25°28′ N, 110°29′-110°55′ E
Status, aims[4]	Provincial Nature Reserve. Established in 1982, mainly to protect headwater forests. Became a National Forest Park in 1990.	Provincial Nature Reserve. Established in 1982, mainly to protect headwater forest and rare animals including Cabot's Tragopan (*Tragopan caboti*) and Serow (*Capricornis sumatraensis*).	Provincial Nature Reserve. Established in 1982, mainly to protect headwater forest ecosystems.	Provincial Nature Reserve. Established in 1982, mainly to protect headwater forest ecosystems.
Size[4]	65.5 km²	105 km²	480 km²	904 km²
Landscape[4]	Moderately mountainous landscape. Altitude ranges from 600 to 1,100 m. Maguding is the highest peak (1,846 m).	Moderate to low mountainous and undulating landscape. Altitudinal range of most of the area is between 300-800 m, but some peaks are over 1,000 m. The highest peak is Changyongding (1,571 m).	Moderate to low mountainous landscape. Of the nine peaks over 1,000 m, Yindianshan is the highest (1,885 m).	Moderately mountainous landscape. Of 11 peaks over 1,000 m, Baogailing is the highest (1,936 m).
Temperature[4]	Mean annual temperature is around 20°C, ranging from 9.4°C (January) to 28.7°C (July). Absolute lowest temperature is -4°C. Annual rainfall over 1,500 mm.	Mean annual temperature is around 19°C, ranging from 7.5 °C (January) to 27°C (July). Absolute lowest temperature is -5°C, highest is 38°C. Annual rainfall is around 1,800 mm.	Mean annual temperature is around 17.2°C, ranging from 7.3°C (January) to 25°C (August). Absolute lowest temperature is -3°C, highest is 34.7°C. Annual rainfall 1,600 mm.	Mean annual temperature is around 16°C, ranging from 5.1 °C (January) to 24.6°C (July). Absolute lowest temperature is -6.8°C, highest is 34.9°C. Annual rainfall over 1,500 mm.
Survey period(s)	15-23 July 2003; 8-13 December 2003	24-31 July 2003; 1-7 December 2003	28 August -5 September 2003	7-28 November 2003
Previous surveys of vascular plants	Prof. Li Xiangdong of the Forestry College of Guangxi University led a survey team to study the flora in 2002, but results are yet to be reported.	According to data published by Forestry College of Guangxi Agricultural College in 1985, Huashuichong NR supports 1,046 vascular plant species in 517 genera and 178 families.	No systematic survey conducted before.	Liang Choufen *et al.* have collected plant specimens, but no checklist has been published. An SFA- initiated comprehensive survey was conducted by the Central South Institute of Forest Planning and Design in 2002, but results have not been released.
Overall vegetation	Forest cover 90%, made up of evergreen broadleaf forest dominated by species of Fagaceae and Magnoliaceae, and deciduous broadleaf forest dominated by species of Styracaceae and Hamamelidaceae.	Forest cover is about 85%. Original zonal vegetation was mid-subtropical evergreen broadleaf forest, of which relic fragments could just be found on both sides in shady and humid environment in ravines.	Forest cover is about 75%. Original zonal vegetation would have been evergreen broadleaf forest. The regenerated secondary coniferous forests following clearance are dominated by *Pinus massoniana*. Peaks to the north of the highest peak are mainly covered by grassland.	Forest cover is about 80%. Original zonal vegetation was evergreen broadleaf forest, including montane mixed-deciduous and evergreen broadleaf forest, montane mixed- coniferous and broadleaf forests and montane dwarf forest.

	Guposhan Headwater Forest Nature Reserve	Huashuichong Headwater Forest Nature Reserve	Yindianshan Headwater Forest Nature Reserve	Haiyangshan Headwater Forest Nature Reserve
Main plant communities	1. Comm. *Castanopsis eyrei* 2. Comm. *Castanopsis fargesii* 3. Comm. *Lithocarpus chrysocoma* 4. Comm. *Manglietia chingii* 5. Comm. *Liquidambar formosana* 6. Comm. *Alniphyllum fortunei*	1. Comm. *Castanopsis hystrix* 2. Comm. *Castanopsis fordii* 3. Comm. *Castanopsis fargesii* 4. Comm. *Castanopsis eyrei* 5. Comm. *Machilus pauhoi* 6. Comm. *Schima superba* 7. Comm. *Alniphyllum fortunei* 8. Comm. *Liquidambar formosana*	1. Comm. *Schima superba* 2. Comm. *Schima argentea* 3. Comm. *Castanopsis hystrix* 4. Comm. *Camptotheca acuminata* 5. Comm. *Pinus massoniana*	1. Comm. Castanopsis carlesii 2. Comm. Castanopsis hystrix 3. Comm. Castanopsis eyrei 4. Comm. Castanopsis fissa 5. Comm. Castanopsis fargesii 6. Comm. Castanopsis tibetana 7. Comm. Tsuga longibracteata 8. Comm. Pinus kwangtungensis 9. Comm. Alniphyllum fortunei
Results and findings of conservation importance	542 species in 156 families recorded. Class II nationally Protected species: *Liriodendron chinense, Euchresta japonica, Alsophila spinulosa, Fokienia hodginsii, Zenia insignis, Cinnamomum camphora, Cibotium barometz, Toona ciliata.* IUCN globally Threatened species: *Dysosma versipellis* (VU) *Fagus longipetiolata* (VU) *Artocarpus hypargyreus* (VU) Species Threatened in China: e.g. *Cinnamomum micranthum* (VU)	645 species in 159 families recorded. Class I nationally Protected species: Bretschneidera sinensis Class II nationally Protected species: *Alsophila spinulosa, Diplopanax stachyanthus, Tsoongiodendron odorum, Phoebe bournei, Toona ciliata, Cibotium barometz, Cinnamomum camphora, Zenia insignis and Ormosia henryi.* IUCN globally Threatened species: *Dysosma versipellis* (VU) *Fagus longipetiolata* (VU) *Halesia macgregorii* (VU) Species Threatened in China: e.g. *Cinnamomummicranthum* (VU) *Morinda officinalis* (VU)	446 species in 145 families recorded. Class II nationally Protected species: *Liriodendron chinense, Pinus kwangtungensis, Keteleeria pubescens, Tsoongiodendron odorum, Ormosia henryi, Zenia insignis, Zelkova schneideriana, Cibotium barometz, Cinnamomum camphora and Camptotheca acuminata.* IUCN globally Threatened species: *Fagus longipetiolata* (VU) *Tapiscia sinensis* (VU)  *Tsoongiodendron odorum*	614 species in 180 families recorded. Class I nationally Protected species: Taxus wallichiana var. *mairei, Bretschneidera sinensis* Class II nationally Protected species: *Pinus kwangtungensis, Diplopanax stachyanthus, Tsoongiodendron odorum, Phoebe bournei, Toona ciliata, Cibotium barometz, Cinnamomum camphora, Zenia insignis, Camptotheca acuminata and Semiliquidambar cathayensis.* IUCN globally Threatened species: *Amentotaxus argotaenia* (VU) *Dysosma versipellis* (VU) *Tapiscia sinensis* (VU) *Halesia macgregorii* (VU) *Pterostyrax psilophyllus* (VU) *Fagus longipetiolata* (VU) Species Threatened in China: e.g. *Cinnamomum micranthum* (VU)
Assessment of current status	Guposhan Headwater Nature Reserve (NR) was previously a state-owned forest farm. On the Forestry Department's approval in 1990, it was upgraded to a National Forest Park. Although the vegetation is fairly simple, it preserves fairly typical evergreen broadleaf forests. The vegetation is now recovering following the cessation of forest destruction. Such continuous cover of closed-canopy forest is exceptional, having almost vanished from eastern and southeast Guangxi.	In the past several villages inside the NR had devastated the original vegetation; now most villages have moved outside, although some villagers still enter the NR for various activities. Since NR establishment in 1982, the vegetation has gradually recovered. Based on the present survey and with reference to the documented data, we believe that Huashuichong NR is the best-preserved natural forest in the eastern Guangxi region. The rich flora and diverse vegetation types make it a site of outstanding conservation importance in eastern Guangxi.	Although Yindianshan has preserved some representative evergreen broadleaf forest types, they are relatively simple and of limited extent, and plant species diversity is only moderate. Thus the team paid only a short visit here. 	The present survey revealed a rich flora at Haiyangshan. Its vegetation is not only diverse in types, but also well-preserved and showed fairly complete altitudinal zonation. The forests, as a whole, are fairly representative of the zonal vegetation of the region and high in naturalness and integrity.
Threats and problems	New tourism development and activities will inevitably affect the flora and vegetation to certain extent. It is therefore necessary to assess the carrying capacity of the NR for tourism and limit tourist activities to conserve the naturalness of the NR. Nearby villagers often enter the NR to set bird and animal traps, people from Hunan also come for bamboo-cutting. Publicity campaigns are needed to raise awareness of the surrounding communities on the importance of conservation. 	 Agricultural encroachment, pine-resin harvesting, cutting of firewood for charcoal production and collection of medicinal herbs are still being practised in the NR. Mining activities extend even to the core area of the NR, resulting in serious damage to forests and surrounding. A better management system is urgently needed to strengthen the protection of the forest.	Management of the NR remains weak. The forests and the local environment are under severe threat. Natural pine forests (*Pinus massoniana*) at altitudes of 400 - 1,000 m frequently logged, and co-occurring evergreen mixed forests are also affected. A better management system is urgently needed to strengthen the protection of the forest.	Bordering six counties, Haiyangshan NR lacks sufficient supervision as these counties have been unable to form a unified management authority. Meanwhile local communities are still dependent on the forests of the NR for livelihoods. Their activities are causing direct damage to the vegetation. Zinc and lead mines in the Yangsuo, Gongcheng, and Ningchuan sections of the nature reserve are causing damage to the forests and surrounding habitats. *Photos by author*

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Excerpt 节录

优质教学的若干建议

A few suggestions for good teaching

「与小孩子探索大自然之前，咱们先思考一下作为老师响导的角色。怎样的教学方针才能让学生甚至我们自己能乐在其中，有所得著？」

我想跟大家分享五个户外活动教学的心得，不但可以安抚精力旺盛的小孩，引导他们停止胡闹淘气，追求身心益智的发展。下列所持的基本态度是尊重小孩及敬畏自然——这样，一定不会得到冷淡回应的。

一. 少教学、多分享。我除了向学生灌输基本的自然知识(如「小朋友，这是铁杉，在山上很常见。」)，亦会向他们分享一下我的内心感受：它能够屹立于夏季水源匮乏、冬季寒风刺骨的亚高山气候而不倒，已教人敬佩不已；其树根能从牢不可破的石隙中汲取足够的养分维生，更使我惊讶。

对比课堂上的解说，学生听过我的分享后，非常积极抒发己见。以我工作的户外教育营附近的铁杉为例，它矗立于两块巨石之间，树根要向下伸展25尺才能接触到粗糙的沙土。200多岁的杉树，当年只有8尺高。这棵树是学生们游山时经常也要绕道而来，将水壶内的水浇注树根。几名曾参加教育营的学生每年也重游旧地，看看树木如何在严峻的环境下挣扎求存。更贴切的说法是，他们一到达营地便二话不说，立即跑去探望这棵老树，看看它是如何熬得过秋凉与寒冬。他们的关爱使我对它更觉敬仰。

我相信成年人向小童剖白内心世界是很重要的。只有通过分享我们才能传达藏于心坎处的所思所感，继而启发他人爱护和尊重地球。当我们分享时，同时亦鼓励小孩们也来思考和窥探他们自己的看法和感受。成年人与小孩之间互相信任及友谊关系亦由此建立。

二. 接纳包容。教师要愿意聆听及体恤他人感受。这是与小孩沟通的重要态度。户外活动能促使小孩热情地自发学习，这时候，我们可以技巧地引导他们。

提高灵敏度：每条问题、每个意见，以至每次欢呼声都缔造了沟通的机会，所以应把握他们当时的情感并作出回应。如能乘势从零碎的好奇提问下传播知识，便可增进他们对自然的兴趣。当你尊重他们的想法，便会发觉教导小朋友会变得轻松愉快。

提高警觉：要细心留意自然界的一动一静，因为另人兴奋的趣事会差不多不停地擦身而过。只要你留

'Before we begin exploring nature with children, let's think for a moment about our role as teacher/guides. What are the basic rules for giving children – and ourselves –a joyous, rewarding good time?

I would like to share with you five tenets of outdoor teaching that have helped me work with children's lively energies—channeling them away from mischief, and toward more constructive, and ultimately satisfying, pursuits. Underlying these principles are basic attitudes of respect for children and reverence for nature – attitudes to which they will surely respond.

1. Teach less, and share more. Besides telling children the basic facts of nature ('This is a mountain hemlock tree.), I like to tell them about my inner feelings in the presence of that hemlock tree. I tell them about my awe and respect for the way a hemlock can survive in sub-alpine conditions – where water is scarce in summer, and mostly frozen in winter; where harsh winter winds twist and bend and kill its branches. And I tell them I always wonder how the roots of the hemlock ever manage to find enough nutrients to survive, in these solid-rock crevices.

Children respond to my observations much more freely than they respond to textbook explanations. Take the case of a hemlock tree that grew near a camp where I worked. This particular hemlock sits between two huge boulders, so it has had to send its roots down 25 feet to reach the rocky soil below. At the time, it was at least 200 years old, and only eight feet tall. The children would frequently make a detour on their hikes just to empty their canteens by its roots. Several of them returned to the camp year after year, watching the tree's stubborn struggle for life in its harsh environment. In fact, as soon as they arrived at the camp, they would run out to see how it had fared through the dry autumn and cold winter. Their loving concern awakened in me an even deeper respect for the mountain hemlock.

I believe it is important for an adult to share his inner self with the child. Only by sharing our deeper thoughts and feelings do we communicate to and inspire in others a love and respect for the earth. When we share our own ideas and feelings, it encourages a child to explore, respectfully, his own feelings and perceptions. A wonderful mutual trust and friendship develops between the adult and the child.

2. Be receptive. Receptivity means listening, and being aware. It is one of the most richly rewarding attitudes you can cultivate while working with children. The outdoors brings out a spontaneous enthusiasm in the child that you can skilfully direct toward learning.

心身边的事物，你的教学题材每分每秒都会不断丰富更新。

三. 时刻吸引小孩们的注意。在一开始时便定下户外探索的风格，尽量让每位小孩都能参与，透过发问问题及叫他们观察、聆听奇趣的事物和声音，可营造良好的户外学习气氛。有些小朋友可能不习惯近距离接触自然，因此必须找到令他们感兴趣的东西，再逐步引发他们养成细心观察的习惯。对于他们在野外的小发现，不要忘了流露出欣赏喜悦的神情。

四. 先体验后讨论。有时自然奇观能吸引小孩的驻足观看：如刚离开水面正在变态的小蜻蜓将血液输送到小巧的翅膀、鹿儿在森林内吃草等情景。即使没有碰上这些奇特景致，小孩还是可以透过细心观赏，从平平无奇的事物中领略自然的奥妙。小朋友拥有惊人的能力，能完全投入在他们正在注视的事物中。亲身感受会比从他人口中得知的有更透彻的认识。更重要的是他们绝少会遗忘亲身的经历。

毋需介怀自己不能准确说出动植物的名称，这不外是流于表面的标签而已。同样地，姓名、身体特徵与性格，也不能反映个人的本质。要认识橡树，又岂止是懂得学名和一大堆写实的资料呢！留意在不同光照下的橡树形态，你会对它有更深体会。尝试用另类的角度观察。用手、鼻去感受树皮和叶片。或静坐在树梢下，留意所有在它上及其四周依靠着它活著的各种小生物。

看一看、问一问、猜一猜，欢乐无限！当小朋友能和大自然协调时，你们的师生关系亦将演变成探索自然的伙伴。

五. 满载欢欣的体验。把体验注入欢乐元素或平静的专注。只要能令小孩感到决活、兴奋，他们便能自发学习。切记要以自身的热情感染他们，这也许是你作为教师最棒的特质。

授权节录自 Joseph Cornell 的 *Sharing Nature with Children — the Classic Parents' and Teachers' Nature Awareness Guidebook* (第二版，Dawn 出版社，1998；Sharing Nature Book Series 第一卷)。

Be sensitive: every question, every comment, every joyful exclamation is an opportunity to communicate. Respond to the child's present mood and feelings. Expand your child's interests by teaching along the grain of his own curiosity. When you respect his thoughts, you'll find your time with him flowing easily and happily.

Be alert to what nature is doing around you at the present moment. Something exciting or interesting is almost always happening. Your lesson plan will be written for you minute by minute if you tune in with sensitive attention.

3. Focus the child's attention without delay. Set the tone of the outing right at the start. Involve everyone as much as you can, by asking questions and pointing out interesting sights and sounds. Some children are not used to watching nature closely, so find things that interest them, and lead them bit by bit into the spirit of keen observation. Let them feel that their findings are interesting to you, too.

4. Look and experience first; talk later. At times nature's spectacle will seize the child in rapt attention: a newly-emerged dragonfly pumping blood into tender unfolding wings, a lone deer grazing in a forest clearing. But even if those special sights are lacking, the child can have an experience of wonder by just watching quite ordinary things with close attention. Children have a marvellous capacity for absorbing themselves in whatever they're looking at. Your child will gain a far better understanding of things outside himself by becoming one with them than he will from second-hand talk. Children seldom forget a direct experience.

Don't feel badly about not knowing names. The names of plants and animals are only superficial labels for what those things really are. Just as your own essence isn't captured by your name, or even by your physical and personality traits, there is also much more to an oak tree, for example, than a name and a list of facts about it. You can gain a deeper appreciation of an oak tree by watching how the tree's mood shifts with changes in lighting at different times of day. Observe the tree from unusual perspectives. Feel and smell its bark and leaves. Quietly sit on or under its branches, and be aware of all the forms of life that live in and around the tree and depend on it.

Look. Ask questions. Guess. Have fun! As your children begin to develop an attunement with nature, your relationship with them will evolve from one of teacher and student to one of fellow-adventurer.

5. A sense of joy should permeate the experience, whether in the form of gaiety or calm attentiveness. Children are naturally drawn to learning if you can keep the spirit of the occasion happy and enthusiastic. Remember that your own enthusiasm is contagious, and that it is perhaps your greatest asset as a teacher.

Excerpted with kind permission from Sharing Nature with Children — the Classic Parents' and Teachers' Nature Awareness Guidebook by Joseph Cornell (Second Editior, Dawn Publications, 1998, Sharing Nature Book Series Volume 1).

森林与树
Forests and trees

人类需要健康的森林，而这种需求在廿一世纪将是前所未有般殷切，原因再实际不过：为了生存、为了身心健全。要重新思考古人的习俗与对抗先要改革教育 — 强调森林是基础课程的其中一个重要部份。此外，不得不解决课程内一些根深柢固的矛盾，即森林与人类发展的关系。

马达夫·加吉尔（Madav Gadgil）与拉马钱德拉·古哈（Ramachandra Guha1）指出了两种矛盾，第一种是：

以狩猎及采集为生的人住在森林里，农人住在森林附近，城市人住在远离森林的地方。矛盾的是，离森林越远的人，对森林生态的影响越大，但所承受的恶果反倒越小！

换句话说，森林离开了人类的视线，也离开了人类的关注。文明植根于荒地这个说法既是写实也是比喻。人类越进步，森林便越退缩，在我们的想像空间及现实观感中都变得越来越微不足道。我们开采森林资源亦随著一股强大的外在力量驱使下而变得非理性，牺牲了我们的长远利益。

第二种矛盾对现行权威的学术界更具挑釁性：

科学界对森林类型的成份及功能的资讯掌握得越多，森林砍伐的速度也就越快 …持著科学是准确无误的明灯，人类对自然生态系统的主要干预便变得肆无忌惮，并酿成无法预料及往往是不幸的后果。渔业及森林管理充斥著为阻止生态破坏而实施的持续收成方案的失败例子。以宗教信仰或民生习俗的意识形态为本的资源利用方式或许比「科学化资源管理」更能配合知识尚未全面的状况。[1]

换句话说，当我们面对一些相对不熟悉而又复杂的机制时，保持谦卑的态度于长远而言是明智的，因为它能兼容谬误。根据理查德·曼宁（Richard Manning）的解释[2]，森林是我们知识范围以外的奇妙世界。就算科学亦不能解说其所有奥秘。因此，我们需要用另一种截然不同的态度去认识森林，并坦白承认对森林认识有限及不懂善加运用既有知识。

In the coming century humankind will need healthy forests more than ever, both for practical reasons of survival and to preserve sanity, an utterly practical reason. The effort to rethink ancient habits and antagonisms must begin with a different kind of education in which forests become a significant part of the general curriculum. That will require confronting paradoxes deeply embedded in the curriculum about forests and their relation to human progress.

Madav Gadgil and Ramachandra Guha1 describe two such paradoxes, the first of which has to do with the fact that hunter-gatherers live in the forest, agriculturalists live adjacent to but within striking distance of the forest, and urban-industrial men live away from the forest. Paradoxically, the more the spatial separation from the forest the greater the impact on its ecology, and the further removed the actors from the consequences of this impact!

In other words, forests out of sight are forests out of mind. Civilization was planted in a clearing both literally and figuratively. As civilization grew, forests receded, becoming ever more peripheral to our imagination and to our sense of reality. Our use of forests, accordingly, has become increasingly mindless, driven by large impersonal forces that undermine our long-term prospects.

The second paradox is even more threatening to our established academic ways:

The faster the development of formal, scientific knowledge about the composition and functioning of forest types, the faster the rate of deforestation. ...The belief that science provides an infallible guide has nonetheless encouraged major interventions in natural ecosystems, and these have had unanticipated and usually unfortunate consequences. The history of both fisheries and forest management are replete with illustrations of the failure of sustained-yield methods to forestall ecological collapse. ...Religion and custom as ideologies of resource use are perhaps better adapted to deal with a situation of imperfect knowledge than a supposedly 'scientific' resource management. [1]

In other words, in dealing with complex systems about which we know relatively little, humility that leaves a large margin for error is smart over the long haul. "The forest," according to Richard Manning[2], "is a wonder beyond our comprehension." Much of it will remain beyond our comprehension, science notwithstanding. Accordingly, we will need a different manner of thinking about forests that acknowledges forthrightly the limits of our knowledge and our inconsistency in using what knowledge we do have.

The observations of Gadgil and Guha have significant implications for education. Resolution of their first paradox

森林与树

Excerpt

加吉尔与古哈的观察对教育有重要的启发。解决第一种矛盾的方法需要提高人对树木的认知，可首先从园林景观管理方面入手，改变人们视校园树木仅供点缀装饰的想法。大部分中学及大学校园的建设都意图仿效乡村俱乐部的格调，但寸草不生，了无生机的环境都拜不同种类的有害化学物所赐。校园园林设计应该注入更多想像力以促进生物多样性及生态复原能力，

并提高校园群体的集体生态智商。校园应该尽量保存自然环境以维持生物多样性。校方每年举办的节庆活动或可以植树或景观修复的形式进行。或许某天，某某校长或领导也会突然心血来潮欲往树林散散心！

加吉尔与古哈的第二种矛盾的解决方法是把森林知识融会贯通在课程内，让学生清楚明白他们的将来与森林的命运是不可分割的。这一代需要深入了解森林的运作，因为他们比以往任何世代更需要森林生态效益[3]。他们需要更完善的政治和社会制度保护全球日益受破坏的森林、需要一个务实的经济体系以反映森林的所有价值[4 5 6]、需要知道森林和人类历史的历史性关系[7]、需要掌握很多关于树木在人工景观的实际用途[8]、需要理解森林与人类思想发展的关系[9]、需要洞悉森林和荒野有别于工业世界观的广义[10]、需要故事和神话，为森林中的体验加添意义[11]。再者，他们需要一些甘为每棵树、每根木、每片残存的片野荒地或完整的森林而战的前辈作为借镜。

摘录自戴维·奥尔（David Orr）的 Earth in Mind (Island Press, 1994), 67-69 页。

requires bringing trees to the forefront of our consciousness. This can be done first by changing the philosophy of landscape management in which trees on the campus are regarded as little more than decoration. Most colleges and universities intend their campuses to look like country clubs, weedless and biologically sterile places maintained by an unholy array of chemicals. Campus landscapes ought to be more imaginatively designed to promote biological diversity and ecological resilience and to raise the collective ecological IQ of the campus community. Campuses ought to be maintained as natural areas that harbor biological diversity. The institutional calendar might also include annual celebrations around tree planting and landscape restoration. Who knows, perhaps even administrators in vulnerable moments might be persuaded to take a walk in the woods!

Resolution of Gadgil and Guha's second paradox will require the integration of forests throughout the curriculum so that all students know beyond any shadow of a doubt how their prospects are intertwined with those of forests. A generation that will need the ecological services of forests more than any previous generation will need a deeper comprehension of how forests work[3]. They will need better political and social mechanisms to protect forests, now vulnerable to the tragedy of the commons on a global scale. They will need an honest economics that accounts for all the values of forests[4 5 6]. They will need to know the historical relationship between forests and their own history[7]. They will need to know a great deal about the practical uses of trees in working landscapes[8]. They will need to understand the relationship between forests and the evolution of the human mind[9]. They will need a larger idea of forests and wildness than that contained in the industrial worldview[10]. They will also need stories and myths that give purpose and meaning to the experience of forests[11]. And they will need the example of mentors willing to fight for every tree, wood, scrap of remaining wildness, and decent forest.

Excerpted with kind permission from *Earth in Mind* by David Orr (Island Press, 1994), pp.67-69.

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投稿须知

《森林脉搏》投稿须知

范畴

《森林脉搏》由嘉道理农场暨植物园中国项目出版，每年两期，为致力从事华南地区自然保育人士报导环保资讯，提供讨论及交流渠道，藉以启发读者。《森林脉搏》的内容题材包罗森林和生物多样性各个保育范畴，尤以改善资源管理与减少威胁为报导主题。凡从事相关保育的工作者、森林管理人员、科研人员及顾问等都欢迎投稿。

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Scope

Living Forests magazine is published twice a year by the China Programme, Kadoorie Farm and Botanic Garden. It aims to inform, inspire and serve those dedicated to nature conservation in the South China region, providing a platform for discussion and information exchange. *Living Forests* publishes material on all aspects of forest and biodiversity conservation, particularly with the potential to improve management and reduce threats. We welcome submissions by forest managers, researchers, advisers and practitioners with related objectives.

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1. **Articles**
   Feature articles (1,000-1,200 words) and short articles (500 words), with photographs, are invited on topics relevant to the magazine's focus in South China.
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