

Proceedings
2nd International Congress
on Education in Botanic Gardens



Cultivating Green Awareness

3-8 May 1993

"Viera y Clavijo"

Botanic Garden

Las Palmas de

Gran Canaria

Canary Islands

Spain

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Islas Canarias

Las Palmas de

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Jardín Botánico

"Viera y Clavijo"

3-8 Mayo 1993

Cultivando una Conciencia Verde

Actas

2º Congreso Internacional de
Educación en Jardines Botánicos

CULTIVANDO UNA CONCIENCIA VERDE

CULTIVATING GREEN AWARENESS

Actas del

Segundo Congreso Internacional de Educación
en Jardines Botánicos

Las Palmas de Gran Canaria, España

3 al 8 de mayo de 1993

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Botanic Gardens

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PRÓLOGO

El Segundo Congreso Internacional de Educación en Jardines Botánicos tuvo lugar en Las Palmas de Gran Canaria en mayo de 1993, siendo anfitrión el Jardín Botánico Canario «Viera y Clavijo». Gran parte de los talleres y conferencias presentados se encuentran en este libro. Los objetivos de este congreso fueron dar a conocer el importante papel de los jardines botánicos en la educación ambiental y en la conservación de los recursos naturales así como discutir e intercambiar ideas sobre la Estrategia de Educación Ambiental en Jardines Botánicos. Este congreso se propuso el reto de ser eminentemente práctico, dónde los participantes pudieran compartir e intercambiar sus experiencias personales sobre educación.

Más de un centenar de participantes de 23 países participaron en el congreso. Directores, educadores, gestores y coordinadores de programas educativos de jardines botánicos y de la administración compartieron durante cinco días en sesiones simultáneas sus experiencias y discutieron el borrador de la estrategia de educación ambiental en grupos de trabajo (inglés, francés y español). Las sesiones de talleres y conferencias se separaron por materias abarcando los siguientes temas: educación activa, concienciación pública y perspectivas sociales sobre educación. En estas actas se puede ver la gran variedad de acciones que los jardines botánicos están realizando en el campo de la educación y concienciación ambiental de las diferentes sociedades a través del mundo. También se vio la necesidad de potenciar las redes locales y nacionales de educación en jardines botánicos conectando con los programas educativos de la enseñanza formal o reglada.

Esperamos que este documento aunque con cierto retraso sirva para recordar aquellos intercambios, rememorar los cinco días que compartimos intensamente y, para los que no pudieron asistir, un compendio de ideas y experiencias que pueden poner en práctica en su jardín botánico.

Agradecemos de nuevo a todas las instituciones y organismos que hicieron posible la realización de este encuentro.

FOREWORD

The Second International Education Congress in Botanical Gardens took place in Las Palmas de Gran Canaria on May 1993, in the Canarian Botanical Garden "Viera y Clavijo". Most of the workshops and conferences presented are found in this book. The objectives of this congress were to introduce the important role of the botanical gardens in environmental education and in the conservation of the natural resources, as well as to discuss and exchange ideas on the Strategy of Environment Education in Botanical Gardens. The aim of this congress was to be practical, were the participants could share and exchange their personal experiences on education.

More than a hundred participants from 23 countries participated in this congress. Directors, educators, business agents and coordinators of education programs of botanical gardens and of the administration shared their experiences during five days in simultaneous sessions and discussed the draft for the strategy of environment education in working groups (English, French and Spanish). The sessions of workshops and conferences were separated by subjects including the following themes: active education, public awareness and social perspectives on education. In these minutes we can see the great variety of actions that the botanical gardens are doing in the education area and environmental awareness of the different societies around the world. Also, the necessity of promoting the local and national nets of education in the botanical gardens connecting with the education programs in the formal or ruled education was seen.

We hope this document, although late, will help you remember those exchanges, those five days that we shared intensively, and for those who could not attend, a summary of ideas and experiences that can be put into practice in your botanical garden.

Again, we are grateful to all the institutions and organisms that made possible this encounter.

INTRODUCCIÓN

El papel de los Jardines Botánicos en relación a la conservación de los recursos naturales del medioambiente lleva implícito el conocimiento, la conservación y la educación ambiental. En los últimos años se ha producido un incremento cualitativo en los departamentos de educación ambiental de los jardines botánicos, aunque el próximo reto es conseguir los recursos necesarios para llevar a cabo las acciones que se proponen. La repercusión que esto ocasionaría a la sociedad mundial es muy valiosa, si se considera el inmenso resultado que se puede obtener con un esfuerzo social casi imperceptible económicamente a nivel mundial. Se trata de obtener una conciencia verde mundial a bajo coste a través de la educación ambiental donde los jardines botánicos juegan un papel primordial ya que pueden llegar a todas las capas de la sociedad.

El papel educativo de los jardines botánicos está asociado a ellos casi desde sus comienzos; de hecho muchos fueron creados para apoyar las enseñanzas de la botánica o la medicina. Más recientemente, los jardines botánicos han cambiado sus actuaciones dando un paso hacia delante al centrar también su atención hacia el público en general en un intento de educar y concienciar a la gente sobre la necesidad de la conservación. Desde estos centros de conservación de la biodiversidad se puede enseñar a la población sobre las plantas, sus ecosistemas, su importancia a nivel mundial y cómo pueden ayudar a proteger la biodiversidad. Hay que educar para conservar.

Gracias a todos los participantes en este congreso y a los que han contribuido con sus trabajos para la realización de estas actas. Durante el acto de clausura se propuso como anfitriona del Tercer Congreso Internacional de Educación en Jardines Botánicos a la ciudad de Nueva York (Estados Unidos de América) en 1996, organizado por el Jardín Botánico de Brooklyn junto con BGCI.

INTRODUCTION

The role of the Botanical Gardens in relation to the conservation of the natural resources of the environment has implied the knowledge, conservation and environmental education. In these last years there has been a qualitative increase in the departments of environmental education of the botanical gardens, although the next aim is to get the necessary resources to execute the proposed actions. The repercussion that this would have on the world's society is very valuable, if the immense result that may be obtained with a social effort almost economically imperceptible at global level, is considered. We try to obtain a *global green conscience* at low cost through the environmental education where the botanical gardens play an essential role as they can reach all the levels of society.

The education role of the botanical gardens is associated to them from its beginnings; many were created to support the learning of the botanics or medicine. Lately, the botanical gardens have changed their way of acting taking a big step forward when centering as well their attention to the public in general when trying to educate and make people aware of the necessity of conserving. From these centers of conservation of the biodiversity we can show the population about plants, their ecosystems, their importance at global level and how to help protect the biodiversity. *We must educate to conserve.*

Thanks to all the participants in this congress and to those who have contributed with their works for the realization of these minutes. During the closing act it was proposed that in 1996, the International Congress of Education in Botanical Gardens take place in New York (United States of America), organized by Brooklyn Botanic Garden together with BGCI.

SALUDO DEL PROF. ANDREA DI MARTINO

Señor presidente, autoridades, amables señoras y señores, queridos colegas.

Me causa verdadera alegría tomar la palabra, brevemente, en ocasión de la inauguración de este importante Congreso y dirigir a los organizadores y a todos los participantes, el saludo más cordial y felicitación de la Sociedad Botánica Italiana que tengo el honor de representar por orden expresa de su presidente Profesor Fabio Garbari y del Consejo Directivo.

La Sociedad Botánica Italiana sigue con particular interés las actividades educativas que desarrollan los jardines botánicos, excelentes centros para la promoción de la educación ambiental en el mundo.

Hay muchas expectativas de los resultados de este Congreso y estoy convencido de que, considerando los temas que se van a tratar, éstos serán para todos una guía preciosa para los años próximos venideros. Es éste el voto más grande que en nombre de los botánicos italianos les formulo a los señores organizadores y a los numerosos participantes.

Muchas gracias.

CONFERENCIAS

LECTURES

BOTANICAL GARDENS AND ENVIRONMENTAL EDUCATION

David BRAMWELL

The World botanical gardens have a very long history and tradition in the field of education. The first gardens founded in Europe at Padua and Pisa, were created specifically as gardens for the cultivation of medicinal plants for use in the teaching of medicine at the ancient city universities and later ones such as Oxford Botanical Garden were established for the teaching of botany as a separate science from medicine. Many gardens are still closely associated with universities, Cambridge and Utrecht for example, and have a very strong formal education component in their work and, in some cases, in the lay-out of their botanical displays. Others are famed for their prestigious schools of horticulture, Adelaide, Kew and Edinburgh for example.

This traditional specialized, higher education role has, in many gardens, been complemented by a more popular public education component and this has been actively pursued at places such as Kew and Missouri but at others has been simply a passive and generally unplanned -for side effect of sho-

wing a wide spectrum of plant life to the general public.

These traditional activities are, however, insufficient to contribute to the fulfillment of the needs of a modern society faced with an ecological and natural resources crisis on what is a previously unimaginable scale. Modern botanical gardens have a role in society with new and extremely important elements in it. These include the "ex situ" maintenance of rare and endangered species using advanced techniques such as low temperature seed storage, "in vitro" cultivation, field gene-banks, research on reproductive biology, ecology and demography of endangered plants as a contribution to the "in situ" management of species and communities in reserves, National Parks etc. Possibly the most important element is education and informing society about the environment and presenting the case for a conservation-orientated sustainable development solution to the global environment crisis based on the protection of and rational use of natural resources. The message that "Huma-

nity must live within the carrying capacity of the Earth", which is the theme of the new World Conservation Strategy - **Caring For The Earth**, is the basis for such a conservation policy and should be the source for our general education programmes. On the other hand, however, the need for education and the means and resources available to educators are so variable from place to place that most programmes for education in botanical gardens must be specifically designed to meet local means, requirements and social circumstances. The idea of teaching the captains of British industry to have a social and environmental conscience by taking them to afternoon tea with Prince Charles is hardly a technique that Terry Keller could adapt for use in the Bronx.

We are often told that botanical gardens are in the wrong places, that is they are mainly concentrated in the northern hemisphere in the developed regions of North America and Europe. Perhaps they are the wrong places if we are considering their proximity to the natural centres of biodiversity which are mainly in tropical and subtropical regions of South America, Africa and Asia. If, however, we consider the location of botanical gardens from an environmental education point of view, those in Europe and North America close to or in large cities are ideally situated, located as they are next to the great capitals of our consumer society where, for example, one European citizen (according to World Bank figures) consu-

mes at least 40 times as much of the world's natural resources per year as one East African and a North American even more than 40 times with the difference increasing annually!!! These are the places where we need to inform and educate people about the rational use of the earth's resources, about biodiversity, the need to protect major ecosystems as a cushion against climatic changes and so on, and where we really need to produce new generations of administrators and legislators who understand what environmental issues are about. I'm sure we don't need to educate the Indians of the Amazon or the Aborigenes in the Australian outback about the sustainable use of their local natural resources of flora and fauna, they could probably teach us all we need to know about the process if only we had the sense to listen.

So I'm sure that the world distribution of botanical gardens is not quite so unbalanced after all, indeed, it fits quite well into a pattern of where we really need to educate people.

There is a good analogy to which I have referred on other occasions, between the role of botanical gardens and the world of life insurance. The botanical garden with its living collections, seedbank, trained specialist scientists and horticultural staff is like an insurance policy against the loss of species, the depletion of biodiversity and it is a provider of resources to build for the future - for the reintroduction of spe-

cies, restitution of ecosystems and so on.

Insurance policies even have what might be termed an information and education content -the small print- I'm sure you've all read the small print, it usually advises you not to fly on unscheduled flights or planes with only one engine or not to ski off the piste.

The analogy between insurance policies and botanical gardens goes even further, it is a very well known fact about insurance policies that if you don't keep them up to date, if you don't religiously pay the regular premiums (including increases, inflation factor and so on, if required to do so) when you most need your policy when something goes wrong you find it out of date, cancelled, null and void or even revoked, to put it simply no use whatsoever and you certainly don't get the final bonus at the end. This should be a lesson for those who have it in their power to pay for botanical gardens, for those who can help to insure and ensure the survival of ecosystems and plant diversity on the planet. National parks which can protect "in situ" our major ecosystems and concentrations of species are also a good example of this insurance policy analogy.

Our plant diversity insurance policy with the world network of botanical gardens at its heart certainly has its information and education clause, and not just in the small print. As we can all see here by the response to this confe-

rence, botanical gardens have a major commitment to education and if we are going to use this commitment to attack the problem of making people aware of the environment and its difficulties we have to have a working plan to use as a basis. Fortunately as we will see later in this congress this plan, The Environmental Education Strategy for Botanical Gardens, is in a very advanced stage of preparation. This gives me a good deal of personal satisfaction because in November 1985 we held a conference here in Las Palmas de Gran Canaria following the publication of the IUCN/WWF World Conservation Strategy. The conference was, in fact, called Botanical Gardens and the World Conservation Strategy and its mission was to see what botanical gardens could do to help implement the strategy. One of the main results was the creation of BGCI (Botanical Gardens Conservation International) and the decision to produce a Botanical Gardens Conservation Strategy to define the Botanical Garden role in conservation. This has now been published. Both the new guidelines for the "ex situ" conservation of wild plant germplasm and the guidelines on reintroduction which are to be published later this year, as well as the Education Strategy to be discussed at this meeting, are part of the on-going process of integrating botanical gardens into the mainstream, perhaps better the vanguard, of plant conservation.

So what are the social perspectives

and prospects for education in botanical gardens??

In general within the framework of plant conservation we should not let it be considered that we are playing a minor role, botanical gardens are already the custodians of somewhere between 80,000 and 100,000 species of wild plants in our living collections and seed banks. We are also by our research and experience also increasingly contributing to and participating in the management of "in situ" plant populations and ecosystems and to reintroduction projects etc. but we must also make sure we make full use of one of our main assets - those 150,000,000 people of more who come in through our gates every year. To them we must sell the message of the importance of plant and indeed of all nature conservation.

We also have in our hands, for at least a few hours of their young lives, enormous numbers of schoolchildren and other young people. They are a generation who will eventually become

the decision makers of the future, the generation who will have to manage what little of nature we will have left to them because of our short-sighted politically expedient policies. The least we can do is leave them with the knowledge and wisdom to manage it better than we have. As a part of our programme we should try to go outside the garden and reach out to get the message over to even more millions of people. Botanical gardens should try to become an integral part of local society and local cultures and

to be recognised as important centres with a major mission in the management of natural resources in the future. We are now very close to having a strategy to apply and we must be ready to grasp the nettle, to take up the challenge, because at this moment there are few other organisations as well situated or well equipped to do it as are the botanical gardens forming as they now do a major world plant conservation network.

LA EDUCACIÓN EN LOS JARDINES BOTÁNICOS DE LA AIM-JB, ESPAÑA

Dr. Francisco VILLAMANDOS DE LA TORRE

RESUMEN

La atención a los escolares en los niveles no universitarios se ha ido desarrollando en los Jardines Botánicos en las últimas décadas. Es un hecho que hay una creciente preocupación y dedicación por las cuestiones medioambientales. Siguiendo esta tendencia, los Jardines Botánicos han ido incrementando paulatinamente sus esfuerzos y recursos para educar a la población, poniendo especial atención a los niños en edad escolar.

De esta forma, los Jardines Botánicos están poco a poco implicándose, a nivel particular, en la realización de nuevas tareas que hasta ahora les eran desconocidas y para las que no había soporte instrumental y funcional. Como resultado de todo ello y paralelamente a los cambios que también está sufriendo el sistema educativo, se han organizado equipos pedagógicos en la mayor parte de los Jardines Botánicos de titularidad pública de España. Sin embargo, los presupuestos teóricos, la composición e incluso la organización de los mismos no sigue unos criterios semejantes.

ABSTRACT

Education in the Botanic Gardens of the IMA-Spain

Botanic Gardens have increased their attention to the scholars at a non-university level in the last few decades. It is a fact that there is an increasing dedication and concern about the environment. Following this tendency, the Botanic Gardens are gradually intensifying their efforts and resources in order to educate the population, paying a special attention to the school children.

This way, Botanic Gardens are little by little getting involved, at a particular level, in the accomplishment of new tasks that were unknown so far and for which

there was no functional and instrumental support. As a result of this, pedagogical teams have been organized in most of the public Botanic Gardens of Spain, coinciding with the changes that the educational system is also going through. However, the theoretical budgets, the composition and even the organization of them do not follow similar criteria.

La AIM-JB es la Asociación Ibero-macaronésica de Jardines Botánicos, integrada por los miembros de las instituciones españolas y portuguesas que, denominándose Jardines Botánicos o Bancos de Semillas en este ámbito territorial, pueden demostrar su actividad con la edición periódica de un *Index Seminum*. Esta Asociación se creó a mediados de la década de los ochenta y entre sus finalidades prioritarias se cuentan las de fomentar la creación de nuevos jardines botánicos, la realización de proyectos comunes, la organización de jornadas de trabajo para el intercambio de experiencias y, en general, la coordinación de las actividades de los Jardines Botánicos de España y Portugal en diferentes aspectos. A lo largo de su corta historia, ya han sido varios los diferentes proyectos comunes realizados. Entre ellos, merece un especial mención la edición conjunta de un *Index Seminum* del que ya se ha editado la tercera anualidad.

Sin duda la Asociación ha sido el marco en el que se han desarrollado gran número de actividades bilaterales. La celebración de jornadas periódicas de intercambio de experiencias y resul-

tados de investigación ha servido de plataforma para muchos de estos trabajos y fue en la celebrada en Canarias en 1990, de donde parte la iniciativa de la coordinación de los esfuerzos educativos de los Jardines de la AIM. A los pocos meses, en junio de 1991, se celebró en Córdoba la primera convocatoria específica para este tema y en la que se sentaron las bases para esta coordinación.

Pero antes de entrar en aspectos concretos, hagamos una referencia teórica al significado de la Educación como parte de las ocupaciones de un Jardín Botánico. La preocupación de los jardines por la educación en los niveles no universitarios de enseñanza o en la educación no formal, es fruto de los últimos tiempos. Coincide ésta y se explica en base a la preocupación por la conservación y el medio ambiente en general, por las situaciones de extrema gravedad por las que atraviesa el planeta.

Los jardines, como tantas otras instituciones, han girado en los últimos tiempos sus objetivos originales hacia la conservación y defensa de la naturaleza, cuando no se han creado

específicamente con ese fin. En este nuevo enfoque han encontrado una nueva razón de ser y una justificación ante la sociedad. Pero la acción de protección de la naturaleza va indisolublemente unida a la divulgación y se nutre de ella. Como en un proceso de retroalimentación biológica, la difusión de la problemática medioambiental supone la creación de una demanda que solicita cada vez más y mejor información a medida que recibe nuevos informes. De esta forma los jardines encuentran nuevas fuentes de financiación al predisponer a la opinión pública a favor de la labor que desarrollan. Así, los jardines encuentran en la divulgación y en la educación sobre medio ambiente, una forma eficaz de dar a conocer su actividad y de mejorar su imagen social.

Pero todo esto no explica totalmente la situación actual, en la que proliferan reuniones sobre educación y medio ambiente, y la preocupación específica de los jardines botánicos por este tema. En el caso español los jardines que han ido incorporando esta actividad con más interés han sido los de más reciente construcción. En la mayoría de los casos, estos jardines han nacido ya con una definición fundamentalmente conservacionista y, quizás por esta razón, han asumido con más claridad su papel en la educación de la población. En este contexto, el jardín pionero en su preocupación por la educación y difusión por la problemática medioambiental es el Jar-

dín Botánico Canario. La actividad de este jardín ha servido indudablemente de ejemplo a otros en cuanto a la repercusión que la actividad de divulgación tiene para la propia imagen del jardín en la sociedad, así como a la eficacia de esta actividad en cuanto a incrementar la repercusión de los programas de conservación.

Este tipo de ejemplos es el que ha guiado la definición de otros jardines botánicos en España. En el caso del Jardín que se funda a continuación, el de Córdoba, inaugurado en 1987 e igualmente, con unos planteamientos claramente conservacionistas, aparece definido desde el principio en su esquema de funcionamiento inicial, un Área Cultural Educativa en estrecha relación con la dirección. Los jardines botánicos que se han fundado con posterioridad han contemplado esta faceta en su organigrama y los ejemplos más recientes son los de Sóller, en Mallorca y Málaga.

Por otra parte, los jardines con una más dilatada historia, que lógicamente no se planteaban originalmente objetivos de conservación, se han incorporado a esta corriente con algo menos de decisión, sobre todo en cuanto a la consideración estructural de la función educativa. Al igual que lo ocurrido en otras partes del mundo, la puesta en marcha de esta actividad en instituciones históricas, tiene lugar frecuentemente en forma lateral, al margen de la organización principal del jardín, sin

que sea asumida por toda la institución como una de las tareas que han de cumplirse de forma regular y al mismo nivel que otras. En muchos casos, el personal encargado de la misma no pertenece administrativamente a la institución y su trabajo no es asumido como parte esencial del jardín.

En este tema entramos en una de las variables más importantes de la actuación de los jardines en educación. Pensamos que se ha demostrado por la experiencia que, la actividad en educación y divulgación de los jardines, puede llegar a ser una actividad rentable para la institución. Pero para que esto llegue a ser así, esta actividad debe estar suficientemente consolidada y asumida por la totalidad del personal del mismo. En el caso contrario, cuando la actividad educativa de los jardines se estructura como una actividad lateral, sin una coordinación suficiente con la dirección y sin una implicación real de todo el personal del jardín, se suelen producir, más tarde o más temprano, tensiones y discrepancias entre los miembros del equipo pedagógico y el resto de la institución, que han llegado en algunos casos a posicionamientos ideológicos contrapuestos. Esto supone indudablemente que la educación sea considerada más como una molestia que como una actividad que aporta rendimientos eficaces.

Por supuesto hay que aclarar que tanto las situaciones extremas, desde el éxito al enfrentamiento, se producen

en aquellos casos en los que la labor educativa ha sido más brillante o de mayor repercusión social. Cuando esta actividad empieza a tener repercusión social se hace necesario que esté integrada en la arquitectura organizativa del jardín y, si esto no es posible por discrepancias de planteamientos, se producen necesariamente pérdidas de eficacia. Se requiere pues que sea la dirección de cada institución la que se implique en la definición del proyecto educativo. Posteriormente, deberá asignar recursos materiales y humanos acordes con el proyecto, pero la dirección es el único nivel jerárquico que permitirá una implicación real.

La situación real de los Jardines españoles es diferenciada. Evidentemente en algunos como el de Córdoba, el Canario y Madrid, el equipo educativo está perfectamente integrado en el esquema del Jardín con personas de su propia dotación encargados de esta actividad. En otros, como el caso de Valencia, La Orotava, Sóller y Málaga se les ha asignado a personal que, a través de convenios con las autoridades educativas locales, se han adscrito a ellos. En muchas de estos casos, sin embargo, este personal ha llegado a un buen nivel de entendimiento con el resto del personal, aún así, pensamos que sería más estable esta actividad con una mayor implicación estructural de la institución. En otros casos, la actividad educativa que se lleva a efecto se delega a la comunidad educativa local y no hay un diseño global en el que participe

directamente el jardín.

DEFINICIÓN DE LOS EQUIPOS EDUCATIVOS

Si hasta ahora hemos hablado de la premisa principal común a aquellos jardines que han desarrollado una mayor actividad educativa en los últimos tiempos, hemos de referirnos ahora a las condiciones técnicas para que esto se lleve a efecto. Se ha discutido mucho, y aún se hace, sobre la composición ideal que han de tener los equipos pedagógicos. El equilibrio entre el componente científico y el pedagógico de la composición de los equipos pedagógicos de los jardines sigue estando en cuestión en muchos lugares. En la AIM este tema fue tratado en el seno de la primera reunión monográfica sobre educación celebrada en junio de 1991. En esta sesión se llegó a la definición de lo que, en función de la experiencia previa, se suponía como una composición ideal, formada por cuatro elementos esenciales:

a) Un coordinador, que ha de participar de una formación científica suficiente como para poder dirigir la transferencia de información entre el equipo científico del jardín y el equipo de educación. Al tiempo, debe tener una formación pedagógica suficiente para poder evaluar y seleccionar la información más interesante.

b) Un conjunto de profesionales de la enseñanza estables del equipo. Estos han de ser los responsables de la programación de las actividades y, en gran medida, de su aplicación práctica. Por supuesto han de tener una cierta especialización en la enseñanza de las ciencias o de la biología en particular. Sin embargo se valora más en este personal su experiencia docente en diferentes niveles de la educación.

c) Un equipo técnico. Todo equipo pedagógico necesitará editar materiales, confeccionar o adecuar recursos o incluso, instalaciones. Para ello se requiere siempre un apoyo profesional a nivel de facilidades técnicas. Si bien no es preciso contar con un equipo de personas dedicadas a tiempo completo a esta labor de apoyo técnico al equipo educativo, sí se reconoce como fundamental que en el diseño de esta actividad se contemple expresamente los diferentes caminos que habrán de arbitrarse para tener acceso a estas ayudas. Por otra parte existe una necesidad creciente de atención al trabajo administrativo que supone la gestión de las visitas escolares, hasta el punto de necesitar en algunos casos de una dotación a tiempo completo para esta finalidad.

d) Colaboradores. La actividad docente de los jardines, si quiere tener repercusión a una amplia gama de la población, requerirá de acciones

que se dirijan a un gran número de personas. Normalmente, estas actividades no se realizan de forma constante a lo largo de todo el año, sino que se centran en determinadas campañas. Por otra parte, los distintos grupos de público, presentan necesidades de horarios o calendarios que son difíciles de ajustar a una plantilla estable. También suele suceder que existan actividades de tipo esporádico, sin secuencia fija, normalmente debidas a unos libramientos presupuestarios que se corresponden más con campañas publicitarias que con programaciones escolares. Todo ello hace necesario contar con un colectivo de colaboradores o voluntariado del que se hace uso cuando las condiciones lo requieren. La definición de este colectivo es muy variado entre unos jardines y otros por lo que sólo se pueda hablar de casos concretos sin que puedan ser extrapolables de unos lugares a otros, sin embargo sí ha de contemplarse por cada institución en función de sus propias circunstancias.

La realidad de lo que ocurre en los jardines españoles se aleja de esta definición. Sin embargo, poco a poco se van dando los pasos para el acercamiento a este esquema ideal.

En cuanto a la figura del coordinador, en la mayoría de los jardines se ha conseguido que este papel sea cubierto de forma fáctica, aunque no siempre

con reconocimiento formal, por un biólogo con mayor o menor experiencia docente en los niveles no universitarios de enseñanza. Este es el caso de jardines como el Canario, el de Valencia, La Orotava, y, en cierta forma el de Córdoba, que es un caso particular, ya que la figura del coordinador está cubierta por una persona que participa de una formación académica doble, tanto biológica como educativa. En otros casos, la persona responsable de la coordinación procede de otras funciones, como el caso de Madrid, o pertenece a cuerpos docentes no universitarios no directamente ligados con la formación biológica.

En cuanto al equipo de profesorado estable al que se pretende llegar, existe también gran disparidad. El caso más generalizado es la adscripción de profesorado al jardín por parte de las autoridades locales con competencias en educación. Así, y salvando las distancias entre unos y otros, se puede decir que este tipo de convenios existen o han existido en jardines como el Canario, Córdoba, Málaga, La Orotava, Sóller y Valencia. En otros casos como el de Madrid y, en ciertos períodos, también el de Córdoba, el profesorado del equipo pedagógico corre a cargo de la institución.

En cuanto a los colaboradores o voluntariado a tiempo parcial, hay que hacer notar previamente que en España está poco desarrollado el sistema de voluntariado existente en otros países y

que cuando se da en los jardines, ocurre con marcadas diferencias no extrapolables a otras latitudes. Sin embargo, se han desarrollado algunas experiencias similares en algunos jardines. En Madrid, es un colectivo de profesores de niveles no universitario el que colabora con el Jardín en el desarrollo de actividades educativas. En otros jardines existe la colaboración de estudiantes universitarios de las titulaciones de maestros de enseñanza primaria. En otros casos, se están organizando algunas asociaciones de profesorado como las de amigos del jardín, de los que se extraen colaboraciones a tiempo parcial o esporádicas.

En cuanto a las disponibilidades técnicas, no se puede decir que estén regladas en ningún caso. Sin embargo, en todos se cuenta con ciertas facilidades en cuanto a la edición de materiales o al apoyo para la confección de materiales de exposición, con una implicación más o menos directa de los integrantes del propio equipo educativo. En este aspecto es preciso hacer notar que en los últimos años, hemos asistido en los jardines españoles a un incremento sustancial en cuanto a la dotación de instalaciones dedicadas a la difusión o a la enseñanza. Así, las remodelaciones de algunos jardines como el de Valencia, han supuesto una considerable inversión en la documentación del propio jardín de cara al visitante. En otros casos se han construido nuevas instalaciones para la difusión y la enseñanza como es el caso

del Aula de la Naturaleza y del nuevo Museo Exposición de Etnobotánica en Córdoba. En todos los casos se está observando un mayor cuidado por los aspectos didácticos en las nuevas instalaciones que se van creando y en las remodelaciones que se vienen efectuando. Si bien no estamos hablando de presupuestos directamente dirigidos al programa educativo del Jardín, sí tienen una incidencia fundamental en cuanto a la cantidad y calidad de los recursos disponibles para la educación.

Para una mejor clarificación del estado actual de la composición de los equipos educativos, nos referimos a la tabla 1 en la que se muestra la configuración de los equipos pedagógicos de los cinco jardines botánicos españoles presentes en la última reunión monográfica de educación en 1992.

PROYECTOS Y ACCIONES MÁS SIGNIFICADAS

Con el tipo de estructura que hemos descrito para los jardines españoles que se han coordinado en los trabajos conjuntos sobre educación podemos ahora referirnos a cual ha sido su actividad a grandes rasgos sin menoscabo de que en sus comunicaciones específicas concreten y delimiten más adecuadamente sus actuaciones.

Centrándonos en aquellos que remitieron su informe en la citada reunión de 1992, sobre el curso 91-92, sus ac-

Tabla 1: CONFIGURACIÓN ACTUAL DE LOS EQUIPOS PEDAGÓGICOS

		Nº de personas				
		CANARIO	CÓRDOBA	MADRID	LA OROTAVA	VALENCIA
DEL JARDÍN	A TIEMPO COMPLETO					
	A TIEMPO PARCIAL	2	1	1		
NO DEL JARDÍN	A TIEMPO COMPLETO	1	3		1	1
	A TIEMPO PARCIAL					
	ESPORÁDICA		8	6		6

tividades en este año se han diversificado en diferentes frentes, pero en resumen, podemos decir que el total de alumnos atendidos directamente por estos programas asciende a unos 120 000.

El tipo de actividades que estos alumnos han desarrollado en el marco de estos programas han sido variadas pero podemos resumirlas en unas pocas categorías:

- Visitas de grupos escolares guiadas por el propio personal del equipo. Lo que ha ocurrido en cuatro de los cinco jardines a los que nos referimos.
- Visitas autoguiadas en base a material impreso. Esta modalidad es compartida por todos los jardines.
- Visitas autoguiadas en base a cursos

o entrevistas previas con el profesorado. Igualmente, esta modalidad es compartida por todos.

Algunos Jardines han organizado actividades especiales durante este curso que varían de unos a otros. Así, Jardines como el Canario y el de Córdoba, han realizado exposiciones temáticas tanto dentro como fuera de sus instalaciones y, en el caso Canario, su producción ha corrido a cargo del mismo equipo. En el caso de Córdoba, al final del curso se han inaugurado unas nuevas instalaciones dedicadas básicamente a la educación y divulgación: el Museo Exposición de Etnobotánica, cuya aplicación comenzará en el curso presente.

En otros casos, sobre todo en aquellos que llevan más tiempo, existen

ya programas específicos que funcionan sin dedicación expresa del equipo de educación. Es el caso del programa "Jardín Escolar" desarrollado en Canarias, que ha generado la colaboración de algunas escuelas que organizan y asesoran las actividades de otras en dicho programa.

En resumen se puede concretar que la actividad de los equipos educativos en funcionamiento actualmente, se diversifica en:

- Confección y edición de materiales de apoyo.
- Cursos de distinta índole para el profesorado.
- Atención directa a grupos escolares.
- Organización y/o montaje de exposiciones temáticas.
- Coordinación de actividades educativas fuera del Jardín
- Gestión administrativa de la atención educativa.

Toda esta diversidad de actividades no se llevan a cabo en todos y cada uno de los Jardines con un calendario y periodicidad constantes. De unos años a otros existen variaciones importantes.

DISEÑO DE UNA ESTRATEGIA COMÚN

De la puesta en común de los

problemas e inquietudes comunes de los diferentes equipos pedagógicos nace la necesidad de clarificar el futuro, explicitar cuales son las tendencias dominantes y las posibilidades de abordar los problemas. A nivel exclusivamente técnico, en el grupo de educación de la AIM, se produjo la discusión sobre cuales serían las líneas de actuación prioritarias para los próximos años.

- 1.- Conectar con los proyectos curriculares de los colegios y posible relación con los CEPs de la zona. Este es considerado como un aspecto fundamental. El profesorado es el que tiene la responsabilidad educativa en último extremo y ha de facilitarse que pueda desarrollar su actividad en el jardín. Para ello es necesario tanto que la oferta del jardín sea concordante con los temas escolares, como que se le facilite la información necesaria para poder desarrollar los diferentes temas. Por este motivo, la relación con los C.E.P. (Centros para la formación permanente de los profesores en ejercicio), puede suponer un vehículo adecuado para hacer llegar a los profesores interesados esta información con un coste mínimo para la organización del jardín.
- 2.- Desarrollo de ofertas temáticas escalonadas por niveles de enseñanza. Si se pretende que los jardines sean un verdadero recurso educativo para el aprendizaje de los diferentes aspectos del mundo ve-

getal y no un mero museo que se dedica a explicarse a sí mismo, se requiere un diseño cuidadoso de la oferta temática para los centros educativos. La información presente en los diferentes instalaciones de un botánico es muy amplia y compleja. Dificilmente una persona no especialista podrá retribuir convenientemente esta información y, por lo tanto, menos aún podrá transmitirla. Por otra parte, la información que demandan los diferentes niveles educativos es dispar no sólo cuantitativa sino también cualitativamente. Sobre todo, si estamos pensando en que un mismo alumno pueda acudir al jardín en diferentes niveles de su formación, se requiere que la oferta temática sea atractiva para las diferentes edades.

- 3.- Mejora y adaptación de los sistemas de rotulación de los jardines. Es un problema constante de los jardines mantener constantemente un buen nivel en la documentación y rotulación de sus colecciones. Sin embargo, en muchos casos estos trabajos se dirigen fundamentalmente a unos aspectos estrictamente científicos. Se descuida a menudo un sistema de rotulación que se dirija al visitante, para que sea capaz de interpretar lo que ve y retribuir fácilmente la información que solicita.
- 4.- Mayor implicación del personal científico en el programa educativo.

La información técnica, la actualidad de los mensajes, el rigor científico de la información que se facilita a los escolares, deben estar asegurados y apoyados por aquellos que mejor pueden hacerlo. No habría justificación para que la información que se facilita a los escolares en los jardines no cuente con la supervisión de los equipos técnicos y de investigación de los mismos.

- 5.- Dar a conocer a la sociedad lo que hoy en día representa un jardín botánico, estructura, fines actividades y evolución histórica. Igualmente, dar a conocer la labor educativa desarrollada en ellos. Hemos abordado en diferentes ocasiones la importancia de la imagen del jardín ante la sociedad. La forma más permanente y cualificada de hacer esto es a través de la educación. Hemos de asegurarnos que cada escolar que desarrolle actividades educativas en el jardín saque al menos una idea clara de los fines y actividades del jardín. Para la mayor parte de la población la idea de un jardín botánico tiene más relación con las concepciones decimonónicas de su utilidad que con los nuevos planteamientos. Estaremos perdiendo una oportunidad única si no aprovechamos la oportunidad de cambiar estas concepciones en la población más joven. A corto o medio plazo la propia existencia de los jardines botánicos va a depender de la imagen que proyecten en la sociedad.

AN ENVIRONMENTAL EDUCATION STRATEGY FOR BOTANIC GARDENS

Julia WILLISON

Author's note: the title of the strategy has since been changed to: Environmental Education in Botanic Gardens: Guidelines for developing individual strategies.

ABSTRACT

Setting up environmental education programmes in botanic gardens is vital for plant conservation. Yet for many educators working in botanic gardens it is a daunting task. Where do you start? What is your message? Which audiences do you target? What sort of activities can you do? Such questions highlight the need for developing an environmental education strategy.

In collaboration with botanic gardens around the world, Botanic Gardens Conservation International will publish an environmental education strategy for botanic gardens. A draft of this strategy was discussed and commented on by delegates during the congress.

The aims of the strategy are to:

- focus botanic gardens on environmental education
- provide botanic gardens with a framework within which to develop environmental education programmes
- equip botanic gardens with a document that can be used to help raise funds for education programmes.

This paper will outline the awesome task botanic gardens face in developing an environmental education programme from start. It will argue the case for producing a coherent set of guidelines which gardens can use and the necessity for more resources to be allocated to education both from inside and outside the garden.

RESUMEN

Establecer programas de educación medioambiental en los jardines botánicos es vital para la conservación de las plantas. Sin embargo para muchos educadores trabajar en jardines botánicos es una tarea que les intimida. ¿Por dónde empezar? ¿Cuál es tu mensaje? ¿A qué audiencias te diriges? ¿Qué tipo de actividades puedes hacer? Tales cuestiones evidencian la necesidad de desarrollar una estrategia de educación medioambiental.

En colaboración con jardines botánicos de todo el mundo, la «Conservación Internacional en Jardines Botánicos» publicará una estrategia de educación medioambiental para los jardines botánicos. Un borrador de esta estrategia fue discutido y comentado por los delegados durante el congreso.

Los objetivos de la estrategia son:

- enfocar a los jardines botánicos hacia la educación medioambiental
- proveer a los jardines botánicos de un sistema dentro del cual desarrollar programas de educación medioambiental
- equipar a los jardines botánicos con un documento que pueda ser usado para ayudar a obtener fondos para los programas de educación.

Este documento esbozará la imponente tarea que los jardines botánicos encaran en el desarrollo de un programa de educación medioambiental desde el principio. Planteará cómo producir un conjunto coherente de líneas maestras que los jardines puedan usar y la necesidad de que sean asignados más recursos para la educación tanto desde dentro como fuera del jardín.

WHY ARE WE HERE?

Here we are in Las Palmas, 85 delegates from 25 countries around the world. We've spent about \$34,000.00 just to get here. In doing so we've burnt up about 690 litres of fuel and by doing so have emitted 2,115 kg of carbon dioxide and 14,582 kg of nitrogen oxide into the atmosphere. Both gases we know contribute to the greenhouse effect. So what can possibly justify this

huge expenditure in resources?

Well no doubt this congress will give us a unique opportunity to meet other people working in the same field as ourselves. It will enable us to gain new ideas and new ways of thinking about education. It will renew our energy and make us realise that, although it may feel like it a lot of the time, we're not actually working in isolation - there are people out there in other botanic

gardens struggling to overcome the same problems we face in our own.

These are very important reasons for coming to the congress, I'm sure you'll agree, but let's remind ourselves of the fundamental reason of why we're here, which is, through education, to help save the diversity of plants living on the planet.

Lets just consider some of the facts:

- world population is growing at a rate of around one billion every 12 years;
- the rich North consumes 80% of the world's global resources while 75% of the world's population who live in the poor south share what is left;
- Over the next 40 years, sea level could rise by as much as 20 cm a decade - 20 times as fast as over the past 100 years;
- About 17 million hectares of tropical forests - an area four times the size of Switzerland - are now being cleared annually;
- within 40 years a quarter of all flowering plants will either in danger of extinction or serious genetic erosion.

Plants are under threat from all sides! And as botanic gardens are among some of the only institutions in the world whose primary concern it is, is to save wild plant species it is clear that the existance of botanic gardens is vital for plant conservation. But conser-

ving plants alone will not save them from extinction in the wild.

As the state of our planet affects us all we all have to be involved in its conservation. We are not mere observers witnessing the inevitable destruction of our planet. We are the key players in its future. So who's going to tell the public about the need to conserve plants? Without a doubt botanic gardens must be involved. We know through experience that very few other institution will do this.

WHAT CAN BOTANIC GARDENS OFFER IN TERMS OF EDUCATION?

If you consider the sheer diversity of plants that botanic gardens possess and the fact that plants touch every area of our lives - food, clothes, medicine, music, building, the air we breathe, even the water cycle, you can see the scope for education is endless. Imagination is the only thing that limits what you can teach. And I have certainly not found a lack of that in educators!

Botanic gardens are ideal places to teach people about.

- the richness of the Plant Kingdom;
- the relationships that plants have developed with their environment;
- how we use plants - economically, culturally and aesthetically;

- ▶ what the major threats are to plants and the consequences of plant extinction ;
- ▶ what we can do about the major threats.

Botanic gardens are wonderful places for people to learn more about plants - where they come from, what they're for and why they're important. They give people a chance to see plants, not only from the country they live in, but also from other countries.

For many people living in urban environments botanic gardens offer a window to nature. They are tremendous places to help people get in touch with the wonders of nature; to understand that everything is interdependent and that we are an integral part. Botanic gardens give people a chance to reclaim their unity with nature.

HOW BIG IS THE TASK OF EDUCATION?

Developing an education programme is an enormous challenge for a botanic garden. So how do you start?

This question was one of the prime reasons for developing the environmental education strategy, the draft of which will be discussed and finalised at this congress. The strategy won't provide botanic gardens with prescriptive answers as every botanic garden is different. Rather it is intended to help bo-

tanic gardens focus on the issues they need to address to develop an effective education programme. The aim of the strategy is to give help and guidelines for educators setting up education programmes.

HOW DO YOU START?

Botanic gardens need to develop an education plan that will fit into the overall garden strategy. Who should be involved in the development of an education plan? Everyone who will be involved in education - the director, curator, education officer, gardeners, volunteers, local people. They all have different experiences and views on how the gardens function and involving everyone is one of the ways to make sure the education programme will be a success.

WHAT DO YOU NEED TO DISCUSS?

It is important that the education programme is delivering the same message as the garden. The message will of course vary from botanic garden to botanic garden depending on their circumstances. In the strategy we have included questions to help botanic gardens decide on the conservation message they want to deliver whether it be at a local, national or international level.

For example the Royal Botanic Garden in Edinburgh, Scotland has spent

the last couple of years running a project on the rainforest. It's message has focussed on international conservation issues. The New York Botanic Garden, USA on the other hand, has concentrated on matters closer to home: the greening-up of the Bronx. Their message has focussed on local conservation issues.

Through discussions staff of botanic gardens will come to their own decisions about their priorities. It is worth remembering that these may be very different to those of your audiences'.

Depending on what conservation issue botanic gardens want to become involved in will depend on who they work with. For example, several botanic gardens, concerned about the depletion of the soil, are working with farmers to develop sustainable farming methods. This leads us to consider:

WHO ARE YOU GOING TO EDUCATE?

If we just consider for a minute the number of people a botanic garden could reach, if it were to develop its education programme, and multiply that by the number of botanic gardens there are in the world, we can see the enormous potential we have to influence millions of people. Thinking about this we have every reason to be optimistic.

But let's not get carried away, the problem as always is that botanic gar-

dens have limited resources and so will be unlikely to be able to be involved in everyone's education. The Strategy asks botanic gardens to identify their priority groups in the local and wider community.

Botanic gardens need to address how they will reach all their priority audience even if this is at the expense of another audience.

Let's consider a hypothetical town with a population of around 1,000,000 people. Like most towns, there is one botanic garden with one education officer. The botanic garden has decided to address its conservation message to the under 15 year olds. What methods can it use to reach the 250,000 children and how long will it take? There are several ways:

- a) receiving groups of children in the garden
- b) teaching teachers
- c) outreach programmes
- d) producing education packs

For the sake of this exercise we can compare two of the most usual methods:

- running education programmes in the garden for children;
- teacher training.

Running education programmes in the garden for children

If a botanic garden teaches four classes of children a week (with an ave-

rage 35 children in a class) it will take 34 years to have contact with every child in the town (if the education officer works every week of the year).

If the education officer on the other hand aims to have contact with every child in the town in say five years then she or he will have to teach 27 classes per week, that is 945 children (again working every week of the year).

Teacher training

If the education officer however, decides to only concentrate on teaching teachers then to reach every teacher in five years, she or he will have to receive 27 teachers per week. This is a huge difference. Clearly if botanic gardens want to get a particular message across to all their audience, then teaching teachers makes much more sense - especially when botanic garden resources are limited.

Which ever audience the garden chooses to work with, there is a lot of work leaving often very little time for the educator to do preparation work or follow up work. Let alone educate any other group or do any other activity such as sign writing or making education packs etc.

Reaching all of one audience is a full time job for **one** education officer. It is not reasonable to expect one education officer to reach every target audience. Botanic gardens need to be rigorous in their approach. There are diffe-

rent ways of targeting the education programme but the important thing is to be clear about what your overall aims are. Botanic gardens need to decide whether they are going to concentrate on one section of the community, for example school groups or farmers, or are they going to try to run several programmes at the same time.

If education officers do work with a variety of audiences, botanic gardens still need to consider whether the education officer has the experience, knowledge and qualifications suitable to meet such a wide spectrum of needs.

Of course all botanic gardens will say, yes, we'd love to target everyone but we can't because we don't have the resources. This is exactly the reason why it is so important to look at the resources you've got: the education staff, the collections, educational material, education budget, volunteers - and decide how you're going to use them most efficiently.

DO YOU WANT THEM TO DO ANYTHING AS A RESULT OF THE PROGRAMME?

Having prioritised your conservation messages and your target groups and having assessed your garden's facilities, gardens need to think about what teaching programme they can offer and what message, if any, they want to put across. Several educators have written

about their programmes and these have been included in the strategy with the hope that they will be useful to gardens.

Before embarking on a programme however, the strategy stresses that botanic gardens need to think about whether they want the group to do anything as a result of their programme.

Botanic gardens are excellent at providing information to people either in leaflets or on tours. This is great. We now need to think about what we want them to do with this information. Giving people information is just part of environmental education. We need to be in the business of teaching new skills and encouraging a change in attitudes and behaviours.

How do you learn to communicate, for example? Not by reading about it, but by actually doing it. How do you change your attitude about something? Again, not by reading about it but by being in a situation where your existing attitude is confronted and you have to evaluate it in light of this new information. This work is challenging and exciting and is at the heart of conservation.

WHAT FORM IS THE EDUCATION GOING TO TAKE?

This is the fun part and throughout this congress we will see the numerous teaching methods that botanic gardens use - exhibitions, classes, courses, dra-

ma, posters.

As we develop education programmes, botanic gardens need to develop an effective way of monitoring them. One of the important functions of the proposed strategy is to suggest ways in which this can be done. Evaluation is crucial for the development of an education programme and we need to make sure that our results are fed back so we all learn from each other.

HOW WILL YOU LET PEOPLE KNOW ABOUT THE PROGRAMME?

Developing an education programme is of course only part of the work, you now have to think about how you are going to publicise or market it. Publicity can be used as a tool to get your conservation message across and is also important for the success of your programme. There's no point after all, in spending months developing an exhibition which no one visits! Several delegates at the congress have a great deal of experience in this field and for those of you who are new to public relations, I urge you to take make contact with them this week and take advantage of their knowledge!

There is a section in the strategy which helps botanic gardens look at how they are going to advertise their work and it does suggest creative and inexpensive ways in which this can be done.

CONCLUSIONS

By just glimpsing at the diverse number of elements involved in running an education programme, I am sure you will agree that we need this congress to discuss the environmental education strategy.

Over the last few years we have seen a real surge in enthusiasm by botanic gardens wanting to develop their

education programmes. We have a real opportunity this week to agree on an environmental education strategy which will take us forward and help even more botanic gardens develop their education programmes. If we fulfil our expectations, then I believe we will have gone a long way towards justifying this massive expenditure in resources.

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NUTRITION POTENTIAL: VEGETABLES FROM NATURAL SURROUNDINGS

P. PUSHPANGADAN

ABSTRACT

Vegetables are essential constituents of diet system as they are rich source of vitamins A,C and E, minerals and roughage. The term vegetable is applied to plants and plant parts taken with main course of a meal salted and boiled or as dessert and salad. Ancient cultivators were aware of many of the species of vegetables that we use today but their wild ancestors can no longer be identified with certainty as many of them have undergone much alteration as a result of world wide programmes on selection and breeding. These programmes have drastically reduced the number of plant species now used for food.

RESUMEN

Los vegetales son constituyentes esenciales en el sistema dietético ya que son una fuente rica en vitaminas A, C y E, minerales y diversos componentes. El término vegetal se aplica a plantas y a partes de plantas tomadas en el transcurso de una comida, cocinadas y saladas, o como postres y ensaladas. Los antiguos agricultores conocieron muchas de las especies que usamos hoy, pero sus ancestros silvestres no pueden ser identificados con certeza ya que muchos de ellos habían sufrido muchos cambios como resultado de amplios programas mundiales de selección y producción. Estos programas han reducido drásticamente el número de especies de plantas que actualmente usamos para comer.

India's ancient literature on Ayurveda for the period from 5000 BC to 2500 BC has documented the use of about 150 species of leafy vegetables for food as well as for preventive and promotive

medicine. Recent nation wide study (AICRPE, 1991-92) has revealed that the rural and tribal folk in India use about 1500 species as vegetables and more than 300 species are worthy of

attention as alternative source of food the world may require tomorrow. Commercialized marketing of vegetable crops and introduction of exotic vegetables have conquered even the rural markets wiping out the rich traditional and diverse use of native vegetables. Introduced being beyond reach and ignorant of what is locally available, the present generation in Indian rural set-up finds themselves in difficult situation. It is evident that unless the use of locally available vegetables is popularized seriously the poor in India are bound to face many health problems.

Man, being part and parcel of Nature, can co-exist to the extent possible with the food and medicine available in the surrounding flora. It is presumed that early wandering primates selected flowers, fruits, nuts and roots as their food after careful observation on the surrounding flora. The early man who lived in the forest might have selected the edible plants and plant parts by trial and error or by his keen observation of the eating habits of wild animals. With the discovery of fire man was able to consume more food articles including those that were in raw form quite unpalatable or indigestible items. Gradually he learned to detoxify certain food items by processing and cooking. By the time he began to select and start using a large number of plants, he had already domesticated and cultivated certain edible plants. But these plants were those consumed as the main course or

as staple food. Along with this main course or in between he always ate many plants and plant parts. These constituted mainly the vegetables, fruits, berries and nuts. They were cultivated or collected wild from near or around his dwellings or from forests. The term vegetable is applied to plants and plant parts taken with main course of a meal salted and boiled, or as dessert and salad.

DIET AND HEALTH

India's ancient literature on Ayurveda for the period from 5000 BC has documented the use of about 150 species of leafy vegetables for food as well as for preventive and promotive medicine. According to this great Indian classical systems of medicine body of any organism including man is in a state of flux to adjust constantly in the changing environment. So Ayurveda advises that one should take a diet that helps him to adapt better to the local environment and recommends various food items particularly of local origin for different seasons.

A recent nation wide investigation carried out under the All India Coordinated Research Project on Ethnobiology sponsored by the Govt. of India has revealed that the rural and tribal folk in India use over 1500 species as vegetables. Of these more than 300 species are worthy of attention as alternative source of food the world may require tomorrow. Commercialised mar-

keting of vegetable crops and introduction of exotic vegetables and fruits have now conquered even the rural markets wiping out the rich traditional and diverse use of native vegetables. Alongwith, forgotten are the locally developed formulae of recipe for palatability. Introduced being beyond reach and ignorant of what is locally available, the present generation in Indian rural set-up finds themselves in different situation. It is evident that unless the use of locally available vegetables is revived and popularised the poor in India are bound to face many health problems.

There is increasing scientific evidence to the fact that one must use the local food stuffs that help to maintain the normal body balance in accordance with the changing climatic conditions. As example, we may consider the case of some important seasonal fruits like watermelon. It is the best in summer season. This fruit not only compensates the loss of minerals and water through sweating but also reduces the body temperature helping one to adapt well in the hot and humid tropical environment. Similarly the tender coconut water taken during the hot and humid climate of coastal tropical countries is considered far superior to any salted or sweetened synthetic drinks. Tender coconut water is shown to be better balanced in essential nutrients like easily assimilable sugars and minerals than the best saline glucose solutions of the modern pharmaceutical companies. In fact some local doctors in Kera-

la (a Southern Coastal State in the Indian Union) prefers tender coconut water to saline glucose for intravenous injections.

Almost everybody must be observing a shift to trend in favour of natural wholesome plant products as health giving food or medicine. Reports are from different research centres which suggest that processed or refined fiber free foods of the modern world are responsible for many metabolic disorders or diseases in man. There is now overwhelming medical evidences to suggest that the fast food can play havoc with the digestive tract. This unhealthy changes in diet and life-style have in fact, contributed to the rapidly growing incidence of such diseases as obesity, heart ailments, hypertension, diabetes and various forms of cancer. As a matter of fact, most of our present day health problem can be traced back sooner or later to our present day diet system.

Nutritionists have done much to raise public awareness about the link between diet and health. But their understanding on nutrition has a major drawback. They look at the chemical components of food, rather that food in its totality. They have never attempted to understand the seasonal or climatic condition or dimension of food.

The Indian tradition particularly the traditional system of medicine like Ayurveda gives a detailed account on the type of food to be taken by people at

different seasons. Its prescriptions include various vegetable and fruits to be and not to be taken in particular seasons. For example the Ayurvedic masters recommend vegetables like bottle gourd, lady's finger, snake gourd, spinach, red pumpkin and ask to avoid sunflower, drumstick, gourd, brinjal etc. for the Hemant season _ (i.e. December - January). Similar suggestions are given for other seasons of the year.

ROLE OF SEASONAL VEGETABLE AND FRUITS IN DIET

Vegetables and fruits consumed at different seasons of the year contribute to the requirement of calcium, iron and proteins and avert deficiencies of vitamins particularly A, C and E. Vegetables are thus essential constituents of the diet system of man. These vitamins are essential for people living in humid tropical regions as it could afford protection against radiation and better immunity against many tropical diseases. It is now well known that diversity serves dietary sufficiency to the extent that it amplifies the range of available nutrients with respect to essential amino acids, vitamins, minerals and provide roughage (fibres) for the proper digestive function in the stomach. Such foods enter outside of designated meals and function as nutritive supplements promoting good health or preventing many ailments. People living at different agroclimatic conditions have thus developed a seasonal regimen in their diet consu-

ming specific vegetables and fruit items that enabled them to adapt best with the change of seasons in the specific agroclimatic conditions. The traditional food or dietary habits thus essentially enhanced the health and prevented many diseases.

The dietary dimension of plant utilization and human health is an area very poorly understood. Most of the eastern traditions particularly those of India and China stress the importance of the dietary regimen of vegetables and fruits. When the village-urban civilizations evolved, collection of many of the supplementary food from wild sources became difficult and scarce leading to the domestication of many plant species and development of home gardens. This kind of development was more prominent in asiatic countries. Domestication of many such plants could essentially afford conservation and protection of many rare, endemic and endangered plant species, apart from a good number of land races.

HOME GARDENS IN RURAL INDIA

Home gardens in rural India, particularly in coastal states like Kerala, Goa, Karnataka and Tamil Nadu are unique example of how the rural people conserved many lesser known wild edibles. They domesticated many vegetables like *Amaranthus* spp., *Chenopodium* spp., *Moringa*, *Murraya* etc. while some others like *Hibiscus furcatus*, *Phaseolus* spp., *Portulaca oleracea*,

Emilia sonchifolia, *Lactuca indica*, *Malva* spp. and *Boerhavia diffusa* were collected from natural vegetation in and around the home gardens. These vegetables provided good source of fibre, vitamins and nutrients and functioned as good diuretics that helped good flushing of the kidneys helping to clean blood and expell many toxic and morbid substances from the body. It is worth mentioning that *Boerhavia diffusa* used by rural folk as a seasonal vegetable reportedly helps to control high blood pressure. Similarly kidney and gall bladder stones are seldom noticed in communities which, though use hard water for drinking, consume this plant traditionally as vegetable.

Rural people evolved the home gardens in line with the tropical ecosystem with its multiplicity of tree, shrub and herb complex. Farming system was then evolved in rural India particularly in the States of Kerala, Karnataka and parts of Tamil Nadu and Maharashtra. Such systems of a multiple tree, shrub, herb mixed farming system, however, were generally not intended to raise crops or farm animals for market. It was mainly to meet the needs of the household.

Kerala has in fact evolved one of the most intensive and sustainable agriculture ever known. The whole Kerala village used to be a delightful garden

where people lived in apparent harmony with their environment. Nearly fifty to sixty plant species are grown in their home gardens to supply most of the personal needs throughout the year. While some of the plant species are carefully cultivated many of them are part of natural vegetation (Table 1) which is protected and used to meet people's dietary and other needs. But unfortunately this multiple species garden system is disappearing with the introduction of hybrid and exotic varieties of fruits and vegetables. Inclination of rural folk to monoculture of cash crops has further damaged this system. The traditional food habits are also fast disappearing along with the knowledge system. There is urgent need to conserve this knowledge system and re-educate the society on the importance of a come back to the traditional dietary regimes the people to domesticate many local vegetables in the home gardens as well as protect and preserve many rare and endangered plant species growing as wild or semiwild around their habitation.

In developing countries like India where majority of human population is below poverty line, modern balanced diet is beyond their reach and so it is essentially important to revive and popularize and use of such supplementary edibles from natural surroundings.

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Table I
Important traditionally used vegetable plants from local resources in South India
 (Kerala, Karnataka & Tamil Nadu)

Sl.No	Scientific Name	Family Name	Vernacular Name	Edible parts & use
1	<i>Abelmoschus moschatus</i> (L.) Medica	Malvaceae	Kasuri Venda	Tender leaves and shoots as vegetable, diuretic & demulcent
2	<i>Abutilon indicum</i> (L.) Sweet	Malvaceae	Velluram	Tender leaves as vegetable, diuretic
3	<i>Acacia farnesiana</i> Willd	Mimosaceae	Arivelum	Tender leaves used in chutneys
4	<i>Achyranthes aspera</i> L.	Amaranthaceae	Kadaladi	Young leaves served as spinach
5	<i>Amaranthus gangeticus</i> L.	Amaranthaceae		Tender shoots rich in Vitamin A & C
6	<i>Amaranthus paniculatus</i> L.	Amaranthaceae	Cheera	Tender shoots and leaves used as vegetable Tender leaves as vegetable
7	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Kattumullen cheera	Considered sudorific and febrifuge, recommended for eruptive fevers; also used as lactagogue. Leaves emollient. Infusion of shoots used in eczema.
8	<i>Amaranthus viridis</i> L.	Amaranthaceae	Kuppacheera	Taste like spinach when boiled

Sl.No	Scientific Name	Family Name	Vernacular Name	Edible parts & use
9	<i>Anadendrum montanum</i> Schott	Araceae	Panichembu	Leaves used in curries. Considered useful in remittent fever.
10	<i>Antidesma diandrum</i> Heyne ex Roth	Euphorbiaceae	Areepazham	Leaves used as a vegetable and made into a pre-serve
11	<i>Basella alba</i> L.	Basellaceae	Basla	Tender stems and leaves make a wholesome spinach and consumed as a pot herb. Mucilaginous leaves are pulped and used as poultice. Juice of leaves given to children and pregnant woman to remove constipation.
12	<i>Basella rubra</i> L.	Basellaceae	Basla	Tender stem and leaves as vegetables
13	<i>Centella asiatica</i> (L.) Urb.	Apiaceae	Kodangal	Leaves are eaten raw im proves memory
14	<i>Cleome gynandra</i> L.	Capparaceae	Karaveilam	Leaves used for flavouring sauces; also eaten as a pot-herb and pickled.
15	<i>Colocasia antiquorum</i> Schott.	Araceae	Madantha, Chembu	Tender leaves and stalks as a vegetable.
16	<i>Dregea volubilis</i> (L.f.) Benth. ex Hook. f.	Asclepiadaceae	Vattakkakkodi	Leaves, flowers and the rind of unripe fruits are boiled and eaten as a vegetable or used in curries.
17	<i>Enhydra fluctuans</i> Lour	Asteraceae	Manakkera	Leaves eaten as a vegetable, also used in Salads.

Sl.No	Scientific Name	Family Name	Vernacular Name	Edible parts & use
18	<i>Erythrina variegata</i> L. var. <i>orientalis</i> (L.) Merr.	Fabaceae	Murukku Mandaram	Leaves and tender shoots consumed as a pot-herb. Leaves considered laxative, diuretic, antihelmintic, galactagogue and emmenagogue
19	<i>Glinus lotoides</i> L.	Aizoaceae		Tender shoots eaten as a pot-herb. Used in abdominal disorders.
20	<i>Hibiscus cannabinus</i>	Malvaceae	Pulichikkeera	Leaves used as a vegetable.
21	<i>Fleurya interrupta</i> Gaud	Urticaceae	Vattachorithanam	Leaves used as vegetable.
22	<i>Ipomoea aquatica</i> Forsk	Convolvulaceae		Young terminal shoots and leaves used as a vegetable and in salads; leaves good source of minerals and vitamins, especially carotene.
23	<i>Ipomoea eriocarpa</i> R. Br.	Convolvulaceae	Madhuravalli	Leaves and stems eaten as vegetables.
24	<i>Lactuca indica</i> L.	Asteraceae		Leaves of selected races used as vegetable, possess tonic, digestive and depurative properties.
25	<i>Malva sylvestris</i> L.	Malvaceae		Leaves eaten as a vegetable; good source of carotene and calcium.
26	<i>Merremia emarginata</i> (Burm.f.) Hall.f.	Convolvulaceae		Eaten as a pot-herb. Considered deobstruent and diuretic, used in rheumatism, neuralgia and also for cough.

Sl.No	Scientific Name	Family Name	Vernacular Name	Edible parts & use
27	<i>Merrremia umbellata</i> (L.) Hall.f.	Convolvulaceae		Young leaves eaten as a pot-herb. Poultice of leaves applied to burns and sores.
28	<i>Oxalis corniculata</i> L.	Oxalidaceae	Puliarlia	Leaves are pleasantly refreshing and eaten as a salad or cooked as a vegetable also used for sandwiches, pickles and chutneys. Leaves are good source for Vitamin C and Carotene.
29	<i>Plantago major</i> L.	Plantaginaceae		Leaves eaten, also used as a pot- herb. Leaves cooling, febrifuge, diuretic, astringent vulnerary, their infusion used in diarrhoea and piles.
30	<i>Sauropus quadrangularis</i> Muell. Arg.	Euphorbiaceae	Madurakeera	Leaves and tender shoots are used as vegetables.
31	<i>Sesbania gradiflora</i> Pers	Fabaceae	Agathi	Leaves are used as vegetable; good source of protein, minerals & vitamins
32	<i>Solanum denticuliatum</i> L.	Solanaceae	Kaippakeera	Leaves and tender fruits used as vegetables.
33	<i>Solanum nigrum</i> L.	Solanaceae	Manathakkali	Tender leaves and fruits used as vegetables.

PROYECTO DE EDUCACIÓN AMBIENTAL DEL JARDÍN BOTÁNICO NACIONAL DE CUBA

Marta Aleida DÍAZ DUMAS

RESUMEN

El programa educativo del Jardín Botánico Nacional de Cuba fue estructurado en 1991 de acuerdo con las Estrategias de Conservación para los Jardines Botánicos.

Se definieron cuatro líneas específicas de trabajo de acuerdo con los grupos destinatarios que identificamos. Cada línea desarrollaba proyectos con grupos de 20 personas las cuales trabajan parcialmente en proyectos de educación.

ABSTRACT

The education program of Cuba's National Botanical Garden was structured in 1991 according with the Conservation Strategy for Botanicals Gardens.

Four lines of specific works were defined according with the target groups those we identified. Each line development projects with a staff of 20 person those work partially in education projects.

El Jardín Botánico Nacional de Cuba fue fundado en 1968 y su ejecución responde a modernos criterios científicos.

En 1984 abre sus puertas al público con la mayoría de sus áreas en exhibición y los objetos de obra fundamentales terminados. Desde su apertura venían realizándose actividades edu-

cativas pero no estructuradas orgánicamente por un programa.

En 1991 en Consejo Científico del centro, siguiendo las directrices de la BGCI acuerda la estructuración del trabajo educativo. Se crea así la Comisión de Educación la cual tuvo a su cargo la realización del proyecto de programa educativo.

La primera labor fue la elaboración de los objetivos (Anexo 1) y la definición de las líneas de trabajo fundamentales. Nuestra pregunta en este sentido, de acuerdo a la estrategia de educación para jardines botánicos fue: ¿a quién va dirigido nuestro trabajo? Fueron tomados los registros de visitantes de 1984 a 1990 y definimos los sectores poblacionales que se diferenciaban: estudiantes, público en general y turismo internacional. Dentro de la categoría de estudiantes, y por ser el Jardín un centro de la Educación Superior, se definían actividades específicas que realizaban profesores de la Facultad de Biología de la Universidad de La Habana. El turismo internacional, que pudiera ser considerado como público en general se definía como una línea con intereses propios y que a su vez necesitábamos desarrollar por el peso que tiene en el país este renglón. A partir de estas definiciones se establecen cuatro líneas de desarrollo del programa educativo: educación primaria y media, educación superior y media superior, educación masivo-popular y turismo internacional (Anexo 2).

En cada línea de desarrollo se elaboran proyectos con objetivos específicos para los cuales cada equipo ejecuta el diseño y planeamiento para su posterior ejecución. Existen proyectos de ejecución inmediata y de ejecución futura. De ejecución inmediata son aquellos que cuentan con las condiciones mínimas para su realización y de ejecución futura son los que necesitan

de determinadas inversiones para su puesta en marcha.

En 1992 se elaboraron 11 proyectos, de los cuales cinco están en ejecución y los seis restantes fueron recibidos en la 1ª Jornada Científica de Instructores Guías del Jardín Botánico Nacional donde además de asistir el colectivo de Educación del centro y miembros del Consejo Científico participaron personal científico de diferentes instituciones y usuarios de nuestros servicios.

Cada proyecto lleva un informe final donde se recogen logros, deficiencias, modificaciones propuestas y evaluación de resultados. Estos últimos se realizan a través de la documentación de materiales didácticos en los casos que los posean o a través de encuestas.

Un total de 20 profesionales tienen a su cargo la elaboración y ejecución de los proyectos, 18 instructores guías con nivel universitario, en su mayoría graduados de ciencias pedagógicas en la especialidad de Biología. Un doctor en Ciencias Biológicas y una especialista en divulgación quien además es bióloga (Anexo 3).

El trabajo se organiza a través de la comisión donde cada miembro dirige los proyectos de una línea de desarrollo (cuatro) y la especialista en divulgación. El resto del personal se agrupa en equipos de trabajo por proyectos. Este personal dispone de tiempo parcial para la elaboración y ejecución de pro-

yectos ya que realiza otras labores de docencia, investigación o servicios.

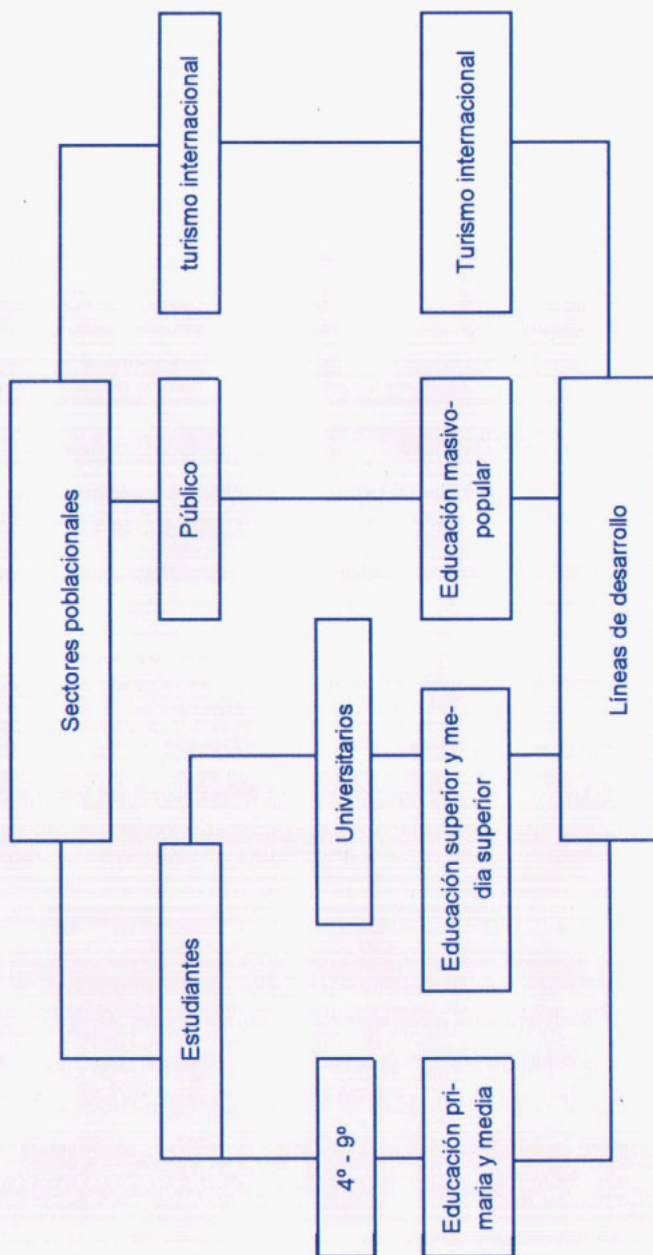
ANEXO 1

Objetivos del Programa Educativo del Jardín Botánico Nacional de Cuba

1. Promover la Educación Ambiental mediante el desarrollo de un programa de educación masivo popular en todos los aspectos concernientes al conocimiento y conservación del medio ambiente con énfasis especial en la Flora de Cuba.
2. Como recurso turístico importante promover ofertas que divulguen los valores de la Flora tropical y en especial de la Flora de Cuba.
3. Servir de amplia base material a estudiantes de todos los subsistemas educacionales del país que incluyen las disciplinas botánicas en sus planes de estudio, facilitando la necesaria vinculación entre teoría y práctica y posibilitando el contacto con la naturaleza.

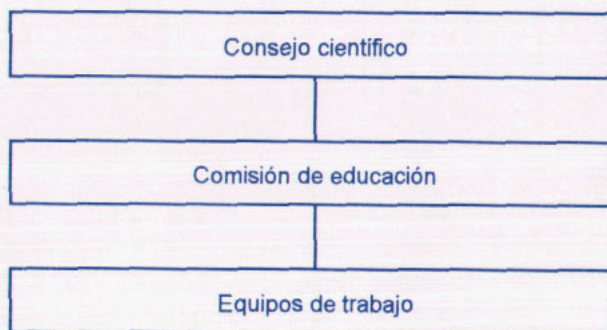
ANEXO 2

Definición de líneas de desarrollo



ANEXO 3

Estructura de trabajo



Funciones

- Consejo Científico:** aprueba el programa general y controla el trabajo de la comisión a través de su presidente.
- Comisión de educación:** elabora el programa, propone proyectos y controla el trabajo de los equipos a través de sus integrantes quienes dirigen metodológicamente el trabajo de cada línea de desarrollo. Además participan en la elaboración y ejecución de proyectos.
- Equipos de trabajo:** elaboran y ejecutan los proyectos.

SACRED GROVES- THE FORGOTTEN TRADITIONAL BOTANICAL GARDENS IN TROPICAL AFRICA

Stephen OSEI-AMAKYE

Ladies and Gentlemen

I am highly privileged to extend to you, the warm greetings from Ghana and the continent of Africa and again thank the Congress organisers- Botanic Gardens Conservation International and the Viera y Clavijo Botanic Garden of Gran Canaria, Spain for making funds available for me to attend this all-important Congress.

It is my hope that my contributions will go a long way to promote conservation education among botanic gardens and traditional conservation managers.

The theme under discussion "Sacred Groves- The forgotten Traditional Botanic Gardens in Tropical Africa" may appear strange in our situation, especially when one considers the unfamiliar nature of sacred groves and how they can be related to botanic gardens.

The purpose of this paper is to look at the Congress theme- Cultivating Green Awareness, from the traditional conservation practice point of view.

In the presentation, effort will be made to show what sacred groves are

and the way they support conservation practices and traditional education in general.

Again, the vital connections between sacred groves and botanic gardens will be shown. Further, some highlights will be thrown on how modern economic development and changes in traditional beliefs have affected sacred groves in diverse ways. Finally, recommendations or suggestions will be made in respect to the future of sacred groves and botanic gardens in developing world in an attempt to stimulate national and international understanding among participants.

SACRED GROVES

Sacred groves may be considered as small pockets of residual closed-canopy forest, sometimes near human settlements which are scattered throughout African countries.

They are considered as "Sacred" or "Fetish" groves because they are forest preserved for local socio-cultural reasons, primarily religious purposes.

Sacred groves in effect are areas often associated with cultural and rituals such as rain-making, sacrifices to totems, earth spirits and burial grounds. Within their boundaries members of the community are prohibited from performing certain specified activities which may include hunting, gathering, wood cutting, cultivating, grazing and many others.

Many have been allocated special dwelling places (streams, lagoons, forests) that are usually left undisturbed and only visited for important life cycle ceremonies- ie. puberty rites, religious rituals or secret society meetings.

Sacred groves vary in sizes- at times varying between the size of a living room to hectares of untouched forests. They abound in different areas in Africa and Asia.

In Ghana for example the nearly one-hectare sacred grove in Malshegu Community is the largest in the northern part of the country while the smallest among others is sited in the middle of a road in Cape Coast, Central Region of Ghana.

The community has preserved these forests for nearly 300 years by establishing and enforcing land use rules and practices designed to safeguard the abode of the guardian fetish.

Except for taking cuttings to propagate new sacred trees, most groves are inviolable. Any clearing or cutting is regarded as sacrilege and treated as a

serious anti-social act requiring expiation.

It is a general rule that, "No one is to disturb a grove and a leaf can not be picked from such a tree" according to Saberwal (1970).

These measures restrict human interferences, limit the use of forest products and protect them against natural disasters and other events including annual bushfires.

They have enabled groves, originally open canopy forest to develop a partially closed canopy which is usually striking in the semi-arid surroundings.

Importance of Sacred Groves in Africa

By protecting the grove, the people derive many benefits in addition to the spiritual rewards of serving their faith. Some of these are as follows:

MEDICINAL PLANTS

The medicinal plants and herbs collected by traditional medicine men and "prophets" serve important health needs for the community.

There are some scarce herbal species that can only be found in fewer sacred groves in Africa. Groves serve as refuge and repository just like botanical gardens where at times a large variety of fauna and flora and numerous native species found nowhere else

in such concentrations (either small or large) exist.

The groves maintain a higher biodiversity than the open-canopy forest where there are no restrictions on their use.

SEEDS

The groves like botanic gardens are important source of seeds and also serve as seed dispensers.

In Africa, this is vital to the traditional shifting cultivation practices. The traditional shifting cultivation practices invariably involving slash-and-burn methods destroy species, seeds and the environment in general. Endangered species found in the groves are left undisturbed and can bear fruits, produce seeds and seedlings which are frequently used in establishing new sacred groves.

WATER SHEDS

In most cases, sacred groves serve as watersheds and protect water sources. According to Dr. C. Dorm-Adzobu and Okyeame Ampadu-Agyei, G. Veit (1991) where even groves are small, their presence ensures that the water table remains high in the immediate area.

WIND BREAKERS

Sacred Groves also protect settlement from wind and rain storms, bushfires and other climatic hazards in most cases.

CENTRES FOR TRADITIONAL EDUCATION

Like botanic gardens, sacred groves are used as centres where the young generations are taught names of trees, herbs and the various illness that they are able to cure.

More frequent has been the ceremonial transfer of power from one generation set to another- referred to as rites of passage ceremonies - for circumcision and elderhood.

This, by tradition is the period when children of age, are initiated into adulthood. Elders impart to the young ones the culture and history of their communities by way of oral teachings and demonstrations in their groves.

These rites are very important in traditional societies of Africa because they are used as periods of socialization process to educate the younger generations about plants and animals, folks stories, history of tribes and traditional occupations which are related to nature and the environment- ie. hunting and farming.

Lessons about seasons which are usually indicated or ushered in by flowers of certain trees and plants are taught during these ceremonies. These were very helpful in traditional societies where recording of time and seasons were virtually non-existent.

The calm and uninterrupted conditions prevailing in sacred groves just

like botanical gardens create the needed atmosphere for learning in traditional societies.

The present state of Sacred Groves

Modern economic activities, increasing population growth and foreign debts in developing Africa have given rise to over-exploitation and hence resource shortage.

People are always looking for ways to secure fuelwood and other forest products and land for settlement. All these have contributed to severe encroachment on the once protected groves.

In Ghana alone, it is believed that a greater percentage of existing sacred groves got burnt during the severe drought seasons of 1980's through bushfires.

A lot more continue to be destroyed to make room for development. There has been the realisation that these practices affect the groves and the environment in general and hence every effort to halt this trend must be put in place.

Sacred groves are real and important and as a result, indigenous communities in Africa and Asia have held them in high esteem for many centuries, this stems from the useful role they have played in conservational practices just like botanic gardens.

The United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in June 1992 recognised and supported this idea as stated in principle 22 of its declaration.

"Indigenous people and their communities and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognise and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development.

The foregoing therefore makes it imperative for everyone to take a serious look at the traditional conservation practices and to make sure that they are preserved.

SUGGESTIONS

There is the need for policy implications that are supported by research from sacred groves- these include government recognition, both at the national and sub-national levels; of the importance of effective local level natural resource management. This can greatly increase the ability of communities to safeguard their natural resources.

- Traditional communities seeking to protect sacred sites threatened by non-believers need the support and backing of the government and the

entire populace for the legal authority to implement and enforce traditional resource management strategies and practices.

- Community initiatives in resource management can benefit from the timely input of technical expertise and assistance from trained government officials particularly with regard to improved management practices and techniques.
- There is the need to give recognition to the importance of traditional religious beliefs in areas or countries where local natural resource management are involved to empower communities to take greater control of their resources- ie. through

educational programmes etc.

Finally, there is the need for the northern and southern countries to pull resources together to research into sacred groves and botanical gardens in the south, with a view to promoting them. Identified groups- ie NGOs and a lot of others can assist in programmes to support botanical gardens and all forms of indigenous practices that conserve the environment in general.

This will go a long way to improve the existing conditions in botanic gardens in some countries of the South to set up educational units to promote education in botanic gardens in general.

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THE ENVIRONMENT-MONITOR

W. NIEUMAN

Utrecht Botanic Gardens have a long tradition in education which started three- hundred and fifty three years ago. The gardens are still very active especially in the traditional activities for scientific education and research. It has, over the last decade, acquired an important educational function. One example of this can be found in one of the special parts of the gardens; the Environment Monitor. For this part, we have made special signs.

At Utrecht the public is informed in several ways: by guides, who have received a special training; signs and labels near the plants; various brochures and a weekly self-guided tour along flowering or otherwise striking plants.

There are special Childrens' Afternoons, and each year special guided thematic tours are held. So far, Utrecht Botanic Gardens are hardly different from any other garden.

A subject which deviates from the familiar pattern is known as the Environment Monitor.

In many botanic gardens there are signs explaining certain matters to be

observed in the garden. These signs are present year after year, giving the impression that nature doesn't change.

Of course, the contrary is the case; seasons change, and especially in the temperate zone there is a marked difference between summer and winter. Apart from that, a gradual change in the landscape can also be observed. Trees grow, and what was a treelet today, will develop into a large tree in 25 years. Ditches disappear, brushwood develops to bushes, and meadows get overgrown with shrubs, with or without human interference, also when man interferes: cuts trees, mows meadows, cleans out ditches, the landscape is constantly changing.

At Utrecht Botanic Gardens these changes are visualized using easily modifiable signs. All this takes place in the Environment Monitor. The Environment Monitor is an area about 100 m away from the main entrance, outside garden grounds. In 1989, during the 350th anniversary of Utrecht Botanic Gardens, this area was donated by the city of Utrecht. At the time a threatened site, were building activities where under

consideration, was hereby safeguarded.

The Environment Monitor consists of a variety of terrain types, with grasslands, hay-fields, groves, ditches and coppice. A trail through the terrain reveals the different aspects; along the grass-land still used for production, but also along hay-fields no longer fertilized, and no longer grazed by cattle. Differences to be observed even by the layman are a cultivated forest of oaks next to a spontaneous brushwood of Willows, Blackthorn, and Hawthorn. Part of a ditch has been cleaned 2 years ago, the other part is slowly starting to get overgrown.

RELATIONSHIP WITH THE BOTANIC GARDENS

The Environment Monitor is not a part of the garden, which means that visitors can enter the area at any time. The difference between the extensive maintenance in the garden with its exotic aspects and the Environment Monitor with its more natural landscape and low maintenance is striking. As part of the Biology Faculty the Environment Monitor is the place where we can bring our message across; what is the influence of human interference. This time not illustrated by lengthy explanations by a scientifically trained guide, but through examples which can readily be seen and understood. Apart from information on for instance tropical flo-

ra, alpine flora, or a systematic approach of the plant kingdom, we now have information on biological processes "next door".

INFORMATION-FLOW

No dreary stories from a guide who explains how biological processes work, and which you have to believe as innocent bystander. Information through signs where all the visible differences are explained. Why select information-flow through signs? The public character of the area already indicates that visitors can enter the area at will, deciding where and when information is consumed.

Therefore we chose a system of panels on which the information can be changed on a weekly basis. The panel-system consists of a desk mounted with a Trespa-plate, protected by a perspex-plate. The latter can be removed, in order to mount laminated text-sheets.

In most cases two text-sheets, format A4, have been mounted per information panel. So, in one information panel we can show the difference between a hay-field and a field grazed by cattle, or the difference between a coppice and a wood of ash. On a smaller scale we can also show the difference between a dry, an acid, a chalky and a wet part of the field. Realise, that most differences, which can be seen and interpreted by the specialist, are not visible for

the bystander.

The other signs consists of socalled window-panels where a rectangle has been cut in the Trespa-plate. The visitor looks through the window and on what he sees an explanation is given on the rim of the window. This information is written on the perspex, using a felt-writer, and can easily be changed. The goal of this information-system is to involve the visitor in what happens in the landscape.

So, for instance, we have made a window near a felled tree. With the felt-writer the surroundings from the treestump are given and also the the difference in the annual growth. Now we can explain on the rim of the window, why growt in some years was bad, how old the tree was and how you can see that. Several institutes with an educational department concerned with nature-education have shown much interest in this system.

On the pictures you can see how the signs are made.

Picture A: Standard sign with Trespa-plate and perspex-plate. It is very easy to remove the perspex-plate and to mount a laminated sheet with text and pictures. Laminating the text is necessary to keep the information clean and visible. Some information will stay there for a long period, in other cases it is removed within a week or a month.

Picture B: The sign with a window.

It is a very simple system and it works very well. You only needs a felt-writer for writing on the perspex-plate. If you will change the information, clean the plate with alcool and you can make a new text or picture. Sometimes it is for the visitor difficult to see on what part of the landscape behind the window information is given. In that case: set a point on the window which correspondense with a point (stake, red-pointed sign on a tree) behind the window.

Picture C:

These signs are the standard signs for our plants. They consist of a sheet of paper, laminated in plastic. The advantage of this system is its flexibility and low costs. The information on the sign can be printed directly, using any type of printer. The laminate makes it weather-resistant. For lamination we uze our own equipment. The poles are standard poles of green plastic. These are available in several sizes.

We also use this type of signs for education. Several trails have been laid out in the gardens using this procedure.

The main disadvantage of the material is that it becomes brittle after a few years.

The maximum size of laminates are approximately one meter wide, infinitely long.

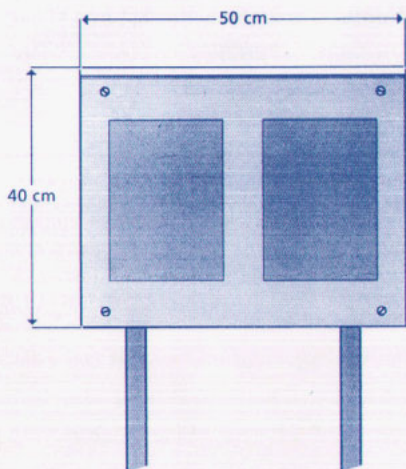
More information on lamination can

best be obtained through

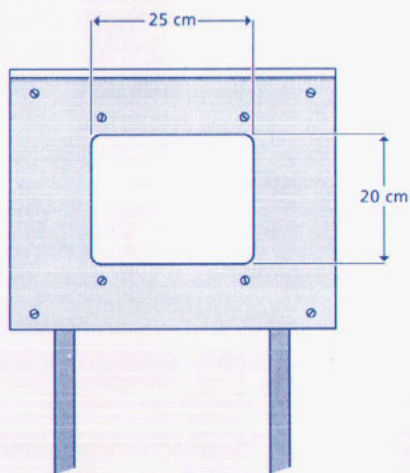
Dorned BV, div. Codor Coating
Herengracht 331
1016 AX Amsterdam
The Netherlands

Dorned is an international company,
there may be a division in your country.

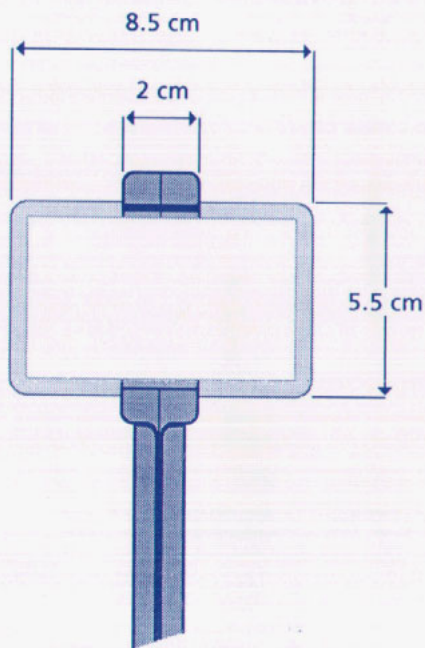
It is not the only producer of laminating
materials. We heard of products called
Cartex and Tuff-mark which would be
available in Germany.



Picture A



Picture B



Picture C

CHANGING IMAGES

Eve ALMOND

ABSTRACT

The introduction of a new Board of Management offers the Royal Botanic Gardens, Melbourne exciting new possibilities for expanding its public image. The review of the Gardens publications and sign system, the employment of a media consultant, the establishment of an annual exhibition program, and the building of a new Visitor Centre at one of the major gates, are all helping to raise and change the profile of the Gardens.

RESUMEN

La introducción de un nuevo Consejo de Gestión ofrece al Real Jardín Botánico de Melbourne nuevas posibilidades interesantes para la divulgación de su imagen pública. La revisión de las publicaciones de los jardines y los sistemas de señales, el empleo de medios de consulta, el establecimiento de un programa anual de muestras y la construcción de un nuevo centro de visitantes en una de las entradas principales, están contribuyendo a levantar y cambiar el perfil de los jardines.

The Royal Botanic Gardens, Melbourne has for some years known suffered from an identity crisis. In the minds of the general public and our many overseas tourists we are simply the most beautiful public garden in Australia. While it is a justly deserved reputation, it is in fact not the primary public image that we want to promote. We

would far rather be known as an excellent botanic garden than as a lovely tranquil backdrop for a family picnic. While the provision of recreational opportunities and the conservation of the Gardens' beautiful cultural and heritage landscape are legitimate objectives, it is the other objectives as described under the recently introduced Botanic Gar-

dens Act, namely the conduct of scientific research, the conservation of endangered species and the curation of plant collections, that we want to promote in the wider community.

Recently we set about to change deliberately the public's perception of the role and functions of the Melbourne Botanic Gardens. It is this process, which is still on-going, that I want to describe to you this morning as an example of an integrated public relations exercise in a botanic gardens. I have used the term "public relations" in its widest possible sense and have taken it to include all those activities undertaken to promote the Gardens and its programs (including education) throughout the community (ie to private individuals, public bodies, corporate organisations and other scientific and cultural institutions), in line with the institute's mission and corporate identity. Consequently it includes media liaison, advertising and tourism.

I don't for a moment imagine we have all the answers and what worked in one garden may not necessary work in another. However there may be some principles here that are useful to you in your own situation. Certainly many of the things will be "old hat" to some of you. In our case we have been significantly helped by the introduction of an independent Board of Management after 146 years of direct control by a State Government Department. This has allowed us to develop new marke-

ting and sponsorship policies as part of the formulation of a five year Corporate Plan.

Here are some of the strategies we using to change our image.

1. We reviewed our current range of publications, discarding some and introducing a new booklet "A Gallery of Plants" which described the Gardens in terms of plant collections rather than in terms of landscape features and views which the earlier guide books had done. This modest publication is "desktopped" and is in a comparatively cheap format to allow easy updating. As well we desktop Seasonal Leaflets and Garden Notes both of which are distributed freely on site. We are looking now at a more colourful brochure for the tourist market; this will be widely distributed through tourism organisations. In all publications we want to stress the concept that the Gardens is an ever changing museum of living plants.
2. We are in the process of reviewing our entire signage system and are looking to introduce an integrated hierarchical system of signs. This will mean that service /amenity type information will clearly visible but will be differentiated and subservient to plant name and interpretation information. Emphasis is being placed on the "tone" of the signs for we believe that how you convey a message is as important as the messa-

ge itself. For the first time we are also erecting "prime" signs and banners around the perimeter of the Gardens, to announce the site.

3. Although we do not have a permanent Media Liaison Officer, we recently hired a professional journalist to place those stories we wanted to get across to specific audiences. One of our biggest problems in the past has been getting the right sort of media coverage when we wanted it. Inevitably it has been our ubiquitous black swans and groups of milling school children that have been photographed, not the plants! So far we have had limited success but we are working on it.
4. With the new board came the opportunity to develop our own Corporate Identity. Again we used a consultant. Although the application to stationery, uniforms, vehicles, etc., is being phased in gradually because of budget constraints, the new corporate identity has given us a much higher public profile and has helped lift staff moral at a time of severe economic conditions.
5. The Visitor Centre, at present located in the Herbarium building and only accessible from the street, not from inside the Gardens, is to be moved to a cottage at one of the main entrances. This will allow us to expand the exhibition space and bookshop area and to strengthen the Gardens' image as a centre for information about plants. We are also considering housing some of the Gardens' associated groups, such as the Friends of the Gardens, the Australian Garden History Society in the cottage along with our own horticulture extension service. Again we are trying to build up our public profile as the provider of reliable, diverse information about plants for both professionals and the home-gardener.
6. The Melbourne Botanic Gardens has enjoyed a very successful Voluntary Guides Service for the past 12 years. We currently have some 40 volunteers who provide daily walks for the general public as well as for special interest groups. Through on-going training programs run by the Gardens' staff, the Guides are now offering walks with plant collection themes and concentrating far more on the roles and functions of the Gardens and Herbarium than they did in earlier years. They are also taking our message out into the community with a lecture and seminar series. This frees up staff considerably. I can't speak highly enough of our volunteers and if any of you would like to know more about our particular program, I'd be pleased to talk with you later.
7. One of our biggest challenges comes with the need to find sponsors and "market" the Gardens - the site,

the facilities, the services, in ways that do not compromise the Gardens' objectives, but project a positive image. Traditionally the Gardens has not sought any corporate sponsorship so at present we are perceived as being "environmentally pure" in more ways than one! We are slowly working our way through the contentious issues of "naming rights", "sponsorship guide-lines" and "product endorsement" and if any of you experience in the areas, I'd love to meet with you later on.

8. As part of our strategy to lift the Gardens' profile, we are planning an annual exhibition program. In the past we have held a number of "blockbuster" events which have been highly successful and given us excellent media coverage for a limited time only. The "wear and tear" on staff as a result of these exhibitions, fine botanical art shows etc has been considerable. Now we are devising a program, backed up by exhibition staff, that will raise the profile of the Gardens consistently and hopefully establish the Gardens in the mind of the general public as a lively museum with an exciting and diverse program. Our first exhibition, timed for 1994, will probably have a "Plants in Medicine" theme and the exhibition itself will be accompanied by temporary trails out in the Gardens to look at Victorian Aboriginal (Koori) traditional uses of native plants, Chinese herbal medicine plants, as well as some of the plants which form the basis of the modern pharmaceutical industry. There will be a strong conservation message in all of this. The exhibition will be promoted in the wider community and also in the primary and lower secondary schools with Teacher In-services and Curriculum Materials being developed by the Education Officer.
9. Our final strategy involves the Education Service. The first Education Officer built up a very strong environmental education program through the production of Curriculum Materials and Teacher In-services. With the appointment of a new Education Officer with a horticulture background, we are looking to expand the program across the curriculum - art, craft, history, geography, maths, as well as the more usual horticulture, biology, environmental and general sciences. We are also strengthening our ties with the nearby kindred institutes - the Museum, the National Gallery and the Zoo, and will be offering joint programs.

ARE WE DOING IT FOR THE ENVIRONMENT?

Andrew SMITH

During this paper I wish to take you on a journey to look at the need for conservation education, and for conservation education programs to aim to change attitudes to create a conservation ethic in the community.

So.... everyone, get comfortable, close your eyes, because you are about to leave on an adventure into space.

Imagine you are seated in a space shuttle ready to launch into space and travel to the outer edge of our solar system.

From the window of the shuttle you can see tall mountains clothed in forests, a river flows down a steep valley past the launch site.

Hold on, its time for lift off.....5.....
4.....3.....2.....1..... Blast off
..... As your shuttle lifts into the sky the river becomes a thin silver line snaking through the rough green carpet of forest.....

the mountains become small bumps on the landscape.....

higher and higher the shuttle travels and as you pass the moon you can

look back at the planet you have left...
.....

its a large round blue ball with patches of green..... white clouds scud across the surface..... a blue ball floating in the blackness of space...
.....

now your shuttle accelerates out past Venus, Mars, Saturn, Jupiter, Uranus, Neptune and Pluto until you have reached the very edge of the solar system.

Beyond here is black...cold.....
and lonely emptiness.

Turn your ship to look back along the line of planets we have passed. Of all those planets, only the distant blue Earth has life, only Earth can support life, it is the only planet that we can return to and survive on at the end of this journey. Somewhere between 30 million and 100 million species depend on that planet for their existence. Life exists on that planet alone in this solar system, probably this galaxy, and possibly in many galaxies.

So let's head back down to our planet and consider what is happening on it...
..... down past the other planets,
past the moon, down through the
clouds and back here into this hall.

Well what is happening on this **unique planet?**

At the moment, **1 in 10 of the known plant species** in the world are considered to be threatened.

"Nearly half the worlds species of... animals and microorganisms will be destroyed or severely threatened over the next 25 years". (Peter Raven in *Our Diminishing Tropical Forests*).

A section of rainforest the size of ten city blocks disappears every minute (The Smithsonian Institute).

77 billion tonnes of topsoil are washed or blown away around the world each year resulting in the **irreversible loss of some 6 million hectares of farmland** (United Nations Environment Program estimates).

The greenhouse effect is set to change the entire world climate in a way that will **significantly alter the lifestyle of most organisms on the planet.**

Australians have one of the **worst records for species destruction.** We have wiped out at least 18 mammal species and 100 plant species.

Soil erosion is presently occurring

across Australia at **10 to 50 times the natural rate.**

The organisation Greening Australia believes as much as **60% of our farmland requires treatment for soil degradation.**

More than **41 million hectares of forest have been destroyed** in Australia, including **75% of the nations rainforests.**

In Tasmania, since white settlement 190 years ago we lost **90% of our grassy woodlands.**

On our tiny island State of 100,000 sq kilometres we have **136 out of 1630 plant species listed as rare or threatened.**

In total Australia has 3 250 plant species listed as rare or threatened. **That's about 1 in 6 of our plant species.**

Botanic gardens might be able to go out collect, propagate and grow some of these threatened species out of endangerment. But those efforts will be largely pointless unless we can reduce the pressure on plant species generally, after all, the attitudes and actions of people are the threatening processes. The importance of personal actions and appropriate choices in shaping our society, in a positive and negative way, is often underestimated. The world is **shaped as a result of an accumulation of the daily decisions of ordi-**

nary people.

The only way to attain a sustainable environment is to increase understanding, increase concern, and encourage appropriate choices and personal action so that the generation after ours thinks hard before it cuts down, uses up and makes extinct.

There is no doubt that we need conservation reserves, ex situ collections, ex situ propagation, and reintroductions, but the success of those programs will depend on the success of our **community education programs in achieving environmentally friendly attitudes and eradicating environmental abuse.**

So how do we go about it? Should we be imparting knowledge and therefore understanding about plants or should we be developing attitudes and emotions to encourage concern and action? It is interesting to observe that those that back the knowledge-is-the-only-way-to-understanding philosophy are also fervently concerned and enthusiastic, sometimes showing great emotion and passion, about their subjects. Similarly, being emotional does not mean you are incapable of retaining information. The two are of course not mutually exclusive.

Education in botanic gardens should not simply be the labelling of plants, or just letting the public know what the botanic gardens are doing. It does not have as its **prime** objective to

"help create the climate that will allow more adequate resources to be allocated to conserving plant diversity" (Heywood *Botanic Gardens - a global conservation network* 1991) although this will be a spinoff of an effective awareness program.

Botanic gardens can play an important social role by encouraging people to treat nature and their surroundings with more respect. (H van Ginkel, Utrecht University, Netherlands).

Some of the aims of environmental education are to instil a sense of care and concern at what is happening to the global environment, develop the concept of stewardship and to suggest what action individuals and the community can take. Education should be seen as an intrinsic and essential part of the mission of most if not all botanic gardens and not just an appendix grafted on. (Vernon Heywood, Botanic Gardens Conservation International).

Environmental education in the context of a botanical gardens can be described as the process of recognising values and clarifying concepts in order to understand and appreciate the inter-relatedness between people and their biophysical surroundings. It entails the formulation of a code of personal behaviour about issues concerning environmental quality. (Environmental Education Policy, Royal Tasmanian Botanical Gardens).

Environmental education requires that people should come to see themselves as being involved in environmental issues and seek to become increasingly responsible for environmental problems which are often regarded as being someone else's domain (Environmental Education, Education Department, South Australia). In brief, it is learning about the environment for the environment.

An important aspect of environmental education is providing an opportunity for action. By working jointly with other conservation orientated organisations we can direct participants to other relevant programs, such as recycling and energy conservation. But Botanic Gardens have an ability to provide opportunities for action too, through horticulture. For instance by growing and replanting endangered species. As part of our education program we have a Threatened Species in Schools Program, during which children learn about endangered species, adopt a species, collect seed and grow plants for planting in their school grounds. This endangered species collection then becomes part of the environmental program of the school for the many years of the plants life. These endangered species plantings are also recorded on a School Collections data base at the botanical garden. In Las Palmas The Club del Arbol and the Dragon Tree replanting project is an excellent example of a program that encourages children to do

something positive for their environment. In this way children are not left feeling helpless about the problems that face their planet.

So let's imagine that we have just enthused and amazed students with a session on plant physiology - How does it relate to conservation of species? Has it inspired care and concern? Helped to develop the concept of stewardship? Inspired individual and community action for the environment? Helped to reduce the number of species which will in future require intervention against extinction? So the important thing is that we ask the questions "Have I encouraged people to treat nature with more respect? Is what I am doing to the advantage of plant species?" If it isn't then the program is more accurately described as, hopefully, an imaginative lesson on plant physiology - but not environmental education

An example I use during teacher seminars to illustrate the difference between accumulation of knowledge and environmental education uses frogs as an example. As a Science student I was required to dissect frogs that had been stored in alcohol. I pinned bits and pieces of the frog to card and measured this and named that, made records and so on. The only recollection of facts I retain from that exercise is that the frog smelled terrible. And, if it wasn't for the aversion therapy aspects of the exercise, there was a subliminal message that it was OK to kill and cut up

frogs.

If an environmental educator set about teaching about frogs it would involve conceptually placing frogs in their place in the environment. Where do they live? Why do they live there? How do they manage to counteract the wet and dark conditions of bogs and lagoons? What adaptations do they display? What do they eat? What eats them? The best place to do that study is in the swamp, not in a laboratory. Hopefully at the end of the study students will understand the importance of frogs and their suitability to place, the importance of their habitat, and the last thing they would want to do would be to cut one up and pin its bits to a board.

Similar questions need to be asked when using the utilitarian argument for endangered plant species conservation - that is we need to save species because they may be useful to people. This may be particularly relevant in countries where traditional medicinal plants are now on threatened species lists, such as Sri Lanka or Haiti. And of course many of our modern medicines are derived from plants. But what happens if an endangered species isn't useful? Is it OK to let it become extinct? Of course not, but to know why that is not acceptable it is necessary to feel the intrinsic worth of life. Valuing intrinsic worth is a very emotive concept, but I contend it is necessary if a conservation ethic is to be adopted for life. This same question can even be raised if we

use the aesthetic qualities of nature as a reason for its conservation - an argument often used by conservationists to illustrate the value of the wilderness - majestic grandeur, spectacular beauty, minute splendour. What about the ugly places and plants - is it OK to let them disappear? So why are plants important? They produce the oxygen we breathe, they ensure clean water, they maintain familiar weather patterns, they hold the soil together, they regulate water tables, they are at the base of all food chains because they are the only organisms capable of converting the sun's rays to useable energy, they provide habitat for animals, birds and insects, they process carbon dioxide and store carbon, and they shelter us from increasingly harmful UV light. They are necessary for life itself to exist on the planet.

There are many pathways to environmental enlightenment. Early in the journey we need to learn the appropriate navigation skills to find the goal. Those navigation skills are an understanding of the big picture. How things work. How we fit into the system. How we can destroy the delicate web of life. How we can correct our disasters. How we can avoid making the wrong decisions. If we are going to change habits and lifestyle for the sake of plant species it is not enough to know about plants, we must feel for them too and, as educators, this is one of the educational outcomes we need to plan to achieve. We need to closely evaluate

what we are doing to ensure that we
are in fact out saving the planet.

To finish up, a poem from a song
book produced by the Department of
Conservation and Land Management in
Western Australia, for *Landcare for
Kids*,-

" Universes Daughter "

In the silent world of space
Like a jewel of priceless worth
Glowing green and shining blue
Slowly turns the planet earth
In her swirling cloak of cloud
Miracle of land and water
Born of fire and of time
To the universe - a daughter

Long the years and vast the time
Day to night to day returning
Slowly slowly life arrives
So begins the planets birthing
Flowers, creatures, birds and trees
Rich variety delights her
In the space beyond the stars
Can there by another like her?

People living on the earth
Have forgotten how to wonder
Lost in speed and blind despair
Hopelessly pollute and plunder
But there comes a sound of hope
Can you hear the childrens voices
We will keep the earth alive
By our love and by our choices

TALLERES

WORKSHOPS

"JBN": UN MARAVILLOSO VIAJE A TRAVÉS DEL IMPRESIONANTE MUNDO DE LAS PLANTAS

María del Carmen BELTRÁN CAPOTE

ABSTRACT

"JBN" a wonderful travel through the world of the plants is a didactic game designed for childrens from 7-14 years old. With this game can teach the plant kingdom by the use of different areas of the National Botanical Garden of Cuba.

RESUMEN

"JBN" un maravilloso viaje a través del impresionante mundo de las plantas es un juego didáctico diseñado para niños entre 7 y 14 años de edad. Con este juego pueden aprender sobre el reino de las plantas a través del uso de las diferentes áreas del Jardín Botánico Nacional de Cuba.

El Jardín Botánico Nacional de Cuba en su Programa Educativo brinda especial atención a niños y jóvenes a través de una línea de trabajo vinculada a centros de enseñanza primaria y media. En este sentido se está trabajando en proyectos educativos dentro de los cuales hemos incluido juegos didácticos que ejercen una fuerte influencia en el desarrollo infantil, pues constituyen un excelente instrumento de conocimiento y aprendizaje así como un medio pedagógico de grandes posibili-

dades donde se desarrollan determinados hábitos y habilidades.

"JBN": un maravilloso viaje a través del impresionante mundo de las plantas, tiene como objeto de trabajo las áreas del Jardín Botánico Nacional de Cuba agrupadas en diferentes zonas:

- la zona fitogeográfica cubana que responde a criterios fitocenológicos,
- la zona fitogeográfica mundial que tiene un carácter florístico, y

- las colecciones especiales que responden a diferentes criterios como ecológico, sistemático, evolutivo, etc.

Con este juego se han trazado los siguientes objetivos:

1. Lograr que el visitante se familiarice con el Jardín Botánico Nacional de Cuba e incentivar su visita.
2. Propiciar de forma amena la adquisición de conocimientos sobre las plantas que se muestran.
3. Desarrollar habilidades como la observación y la comparación de las diferentes especies de plantas y su importancia.
4. Desarrollar hábitos relacionados con la protección del Medio Ambiente, enfatizando en el mundo vegetal.

Este juego es de mesa dirigido a niños de 7-14 años de edad. Consta de un tablero donde se representa un trayecto a seguir por el jugador para recorrer las diferentes zonas del Jardín. Para efectuar el recorrido el jugador se auxilia de fichas y dados transitando por 88 casillas, 63 de las cuales aparecen ilustradas e identificadas con plantas representativas de cada área con

su nombre vulgar. Se encontrará con casillas que representan otros elementos del Jardín como las cafeterías, parque de diversiones y tienda de plantas. Nueve espacios identificados como INTERESANTE e ilustrados con la mascota del Jardín imponen al jugador tomar una de las tarjetas que tienen orden de adelantar o atrasar en el recorrido a través del conocimiento de datos de plantas ilustradas, su uso, importancia y protección. Resultará ganador el jugador que primero finalice el recorrido.

Este juego de forma experimental se ha puesto en práctica con grupos de escolares y los resultados fueron evaluados a través de encuestas. Los resultados de las encuestas fueron:

- El juego resulta entretenido, dinámico y divertido.
- Pudieron establecer comparaciones de diferentes plantas.
- Se facilitó la familiarización con áreas del Jardín.
- El mensaje más importante fue el de la protección de las plantas.



WE WANT TO CREATE A 'BOTANIC GARDEN' IN OUR SCHOOLGROUNDS. CAN YOU HELP?

Malcolm Cox

Botanic Garden educators can readily include themselves in the range of qualified advisors on schoolground change, and can readily justify providing such advice within their services for schools.

Botanic gardens (BG's) are arguably in the best position to offer school communities ideas and information about diverse types and uses of plants. Botanic garden educators can help improve the understanding and use of plants in schools through services which extend the value of BG visits by teachers and students. In doing so, they can influence changes in one of the world's most impoverished environments - schoolgrounds. Worldwide, the quest to improve schoolgrounds is creating a growing demand for support of a kind that can best come from botanic gardens.

Some schools even see themselves as setting up their own 'botanic gardens'. Should BG educators encourage them to lower their ideal, arguing that botanic gardens are something much more grand? They might simply turn

elsewhere for help and never really understand our message. Should we help them to undertake their projects and model salient aspects of botanic garden work? If they can see and do enough in their own grounds, they might not need to visit their local botanic garden again. BG educators need to be aware of this potential dilemma, and treat it as an underlying challenge to keep their own ideas and activity from becoming too static.

The purpose of this paper is firstly, to discuss connections between botanic garden educators and schoolground change, including some practical suggestions for action, and secondly, to propose a 'Learnsourcing' framework for thinking about schoolground change.

LINKING THE INTERESTS OF SCHOOLS AND BOTANIC GARDENS

Here are five salient points of contact between schoolgrounds and botanic gardens.

1. Schoolgrounds are often large enough to grow a diversity of plants, and BG educators are experts on plant diversity.

Schoolgrounds can grow larger tree species than are suited to smaller domestic gardens. BG's can advise on a wide range of plants as well as their culture and uses, and sometimes help schools obtain plants not commercially available. Even on a small school site, small scale but intensive gardens are possible. It is not uncommon for botanic garden educators to be asked by schools to advise on planting and care of a large number of plants that they have acquired. For BG educators not familiar with school needs and politics, this can be a good starting point for an intensive 'dialogue' with one school, working with a small committee over a mutually suitable period to achieve even a small but positive change.

2. Schoolground plantings can be designed around specifically educational themes.

BG's enjoy the challenge of organising plants in new ways, e.g. garden in a box, fibre plants garden, taxonomic groupings, medicinal herbs, locally natural vegetation, climbing trees, crops. It is important to encourage schools to aim high in their landscape planning ideas, and equally important to promote a parallel range of practical and short-term outcomes for schools to try out.

3. There are competing interests in schoolgrounds: amenity and ornamental layout can conflict with educational plant layout.

BG educators understand this too well from their own work settings, and can provide advocacy for educational ideas that can be integrated with other needs in schoolgrounds. For a start, adult and childhood agendas can easily follow different paths. Children need to be among trees and will climb them if necessary. This 'issue' may be solved by planting groves of small species, or deliberately shaping larger species to allow children to 'get into them' without creating a safety problem. Allowing potentially damaging interaction with gardens and plants is not in adults' interests (particularly those wanting aesthetic appeal), but some amount is essential for children.

4. Environmental education is becoming more active and more urgent.

Both schools and BG's reflect community support for environmental action. Schools need BG visits that relate to an active conservation project, in their grounds or in the community. Some schools and school systems need BG educators to initiate projects to demonstrate good environmental education practice. Some botanic gardens are already helping schools to help 'rescue' threatened species through comprehensive programmes of seed collection, plant growth and care, site analysis and eventual land rehabilitation. It

may be hard to convince teachers, but a seemingly small problem can be built into an integrated curriculum project spanning several months and forming a complete 'story' of the mathematics, politics, science, literature, history, communications, drama, etc. behind an actual environmental achievement.

5. Teachers need skills, ideas and activities, and someone to 'show them the way'.

It is easy to assume that any teacher is also a gardener, but not many adults feel confident about sowing seeds and planting trees with children, let alone take on extensive garden design and development. Apart from working with select schools or teachers, BG educators can organise meetings and courses to help teachers practise what they would like children to do.

A basic course could comprise sessions something like this: a. essential nursery design and equipment; b. propagation - seeds and cuttings; c. planting and care of trees and shrubs; d. planting and care of herbaceous plants, baskets, etc.; e. plants for special places and purposes; f. 'cook, colour and craft' things to do with plants; g. plant records, labels and a school herbarium; h. managing change in school landscapes. BG educators have even arranged courses for grounds staff, conducted by horticulturists. Such events, particularly if offered free and undertaken in the pleasant atmosphere of a botanic garden, can help increase practical

support in schools for ideas and gardens that would otherwise be met with antagonism.

Another successful idea has been that of conducting sharing sessions or 'network meetings' in which school staff and representatives come together quite informally at a botanic garden and talk about their problems and achievements. It is reassuring for them to realise that others have similar problems, or to give someone else an answer from their experience, and a relief to find a ready answer to a plant question. In this case the BG educator should endeavour to initiate, then facilitate, then slowly 'push' meetings out into the school community to evolve further if necessary.

'LEARNSCAPING' - A FRAMEWORK HELPFUL TO BOTANIC GARDEN EDUCATORS INFLUENCING CHANGE IN SCHOOL GROUND.

'Learnscapeing' (learning-oriented landscaping) describes a framework for thinking about schoolgrounds. It can help anyone including BG educators who may be trying to help schools change their grounds for environmental education. The framework outlines why and how to think, plan and act, rather than what to do.

The purpose of adopting a learnscapeing approach is to change the way

we think about schoolgrounds. It will help BG educators to apply a learnscaping framework in their attempts to influence schoolground change, if and when such opportunities arise. The following ideas are summarised from the author's views on the integration of landscape and curriculum work (Cox, 1991), which draw upon landscape perception, architecture, curriculum change and environmental education. Given this *summary form*, explanations of terms and ideas included here. However most terms should be familiar to BG educators in some form.

Learnscape aims to consider change at four levels - values, planning, design and development. Change can be stimulated at any level, but it is ultimately underlying values changes that produce new approaches to planning, design and development. The underlying concepts of worthwhileness, problem solving and diversity are three key concepts that influence values change, and influence what happens at the other levels in turn. An example of each is given in Fig. 1.

Similarly, planning can consist of various approaches which must take account of the issue, the team solving it and the method used, as simplified in Fig. 2.

Design, i.e. determining 'on paper' the nature and purpose of the finished product, must reconcile three concepts - education, pleasure and sustainability. These often conflict with each other in

the same way as education, amenity and science/conservation design interact in botanic gardens (Cox, 1988). The differences among possible design principles derived from these concepts are indicated in Table 1.

Finally development is what actually happens or changes in the curriculum and schoolgrounds. It must be relevant to the learners (especially the children, whose real needs may be the opposite of what adults try to impose). It must be evaluated critically by research on action as it happens and by those involved (action research), and it must embrace diversity by integrating as many different elements (people, plants, knowledge, etc.) as possible.

This is all summarised in Table 2. The learnscaping framework itself is a synthesis of these and related ideas, as outlined in Table 3.

There cannot be a single formula for schoolground change, or for the role of BG educators in such change. Any attempts at creating such a formula would, for a start, be an attempt to limit diversity. Even the framework in Table 3 needs competing frameworks to stimulate ideas and discussion about the topic, and BG's need to refine from these frameworks of their own.

This broad outline bypasses many essential examples of achievement, experience and insight that help to clarify that many of the starting points to solving schoolground issues are very

simple, integrating ideas and actions, and it is in these starting points that most BG educators will find opportunities to accumulate their own ideas and insights (and relate them in Roots). Table 1 offers some challenging kinds of starting points, some of which can form simple extensions of work done in botanic garden education programmes.

However, just as it is limiting to focus only on the plant content of schoolgrounds (diversity of soil, rocks, animals, construction, play spaces and artworks is also important), it is also limiting to focus on design alone. Some

schools may do this, and wonder over time why nothing has changed or no development taken place. Awareness of the nature and interplay of values, planning and development, as well as design, and their roles in school administration and curriculum development, can provide BG educators with the background required to give schools more than they think they want when they start asking BG's for help. The ultimate challenge is to change the way school communities think about their own schoolgrounds.

REFERENCES

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Fig. 1

A set of continua of select values impacts in schoolgrounds

< [Implications of the traditional paradigm: minimal scope for change]

[Implications of an ecological > approach: maximum scope for change]

1. A view of worthwhile content: place learning and behaviour.

Schoolgrounds already contain all the places and feelings that children need; order is maintained by rules and authority.

<-----> Schoolgrounds can never have enough different places and feelings for children; order maintained by negotiation and consensus.

2. A view of problem solving: 'adventure' playgrounds.

Designed structures can be made which meet physical and all needs of play; problems are designed into equipment for children to solve, usually as individuals.

<-----> Both designed structures and unstructured materials are other necessary to satisfy play needs; problems are often created as part of the play process, and require collaborative solutions.

3. A view of diversity: climbing trees and plants for handling.

Trees and plants should not be climbed, damaged or handled because of risks to children and plants; risks are minimised.

<-----> Ways of providing trees for climbing, and plants for playing with, should be designed into the school landscape to increase potential for learning; risks are managed.

Fig. 2

A set of continua of approaches to schoolground planning

<[Implications of planning that is restricted and informal]:

[Implications of a comprehensive, > formal planning process]:

1. Approach to the issue.

Development is limited to the ideas and actions of those who have personal commitment. Separation of landscape and curriculum is taken for granted.

<-----> Development is extended to the discovery and consideration of the views of as many people as possible. Landscape and curriculum are integrated wherever possible.

2. Approach to the planning unit or team.

Narrow representation of the school community. Principles decided by a landscape architect commissioned to do planning. (Experts 'on top'.)

<-----> Broad representation of the school community. Specialists responsive to principles set by the team. (Experts 'on tap'.)

3. Approach to the planning methodology.

Individual or ad hoc group works at own pace in isolation to plan projects based on one-off responses to assumed values.

<-----> A team works formally and accountably, sets policy, priorities and explicit principles based on stated values and action science.

Table 1.- **Select design principles and features derived from them.**

Principles.	Examples of features to be developed.
Pleasure:	
- design for social development	- secluded spaces for group play or discussion
- design for comfort	- shade trees, shade structures, windbreaks
- design for creative and manipulative play	- security fencing for 'loose parts' playground, digging patches, garden beds, dirt mounds, climbing trees and shrubberies
Education:	
- design for understanding diverse uses of plants	- beds of food plants, fibre and dye plants, herbs and medicinal plants, timber trees
- design for scientific understanding of plants	- taxonomic groupings (e.g. by genera, families or broader groups)
- design for habitat protection and ecological understanding	- areas of protected or regenerating local vegetation; recycling depot
Sustainability:	
- design for both education and pleasure	- combine taxonomic planting with play or lunch areas; build a shadehouse that is accessible for play and instruction
- design for security, safety and supervision	- security fencing of manipulative play areas; plant so that play supervisors can see most children from the fewest vantage points
- design for sustainable harvest	- provide quantities of useful plants (e.g. for paper, weaving) sufficient to meet demand from classes through easy regrowth or replanting

Table 2.

A matrix of concepts critical to change at each level of schoolground change.

LEVEL:	values	planning	design	development
CONCEPTS:	worthwhileness	mutual adaptation	education	relevance
	problem solving	collaboration	sustainability	action research
	diversity	representation (of school community)	pleasure	integration

Table 3. **Characteristics of the learnscaping process:**
A framework for implementation of schoolground change.

Values change:

Issue - adopting schoolgrounds as a significant curriculum setting for environmental education

Team - system- and school-level decision makers responsible for all facilities and curriculum

Methodology - critical review of the nature and role of schoolgrounds and environmental education

Planning change:

Issue - the integration of landscape and curriculum planning for schoolgrounds

Team - a decision-making group representative of all sectors of the school community

Methodology - policy-making, idea management and formulation of an explicit planning process

Design change:

Issue - the integration and sustainable use of features designed for education and for pleasure

Team - the planning team in collaboration with consultants and interested stakeholders

Methodology - masterplanning, setting design principles, frameworks for implementation

Development change:

Issue - changing curriculum in terms of schoolground content that is more diverse and worthwhile

Team - teachers, consultants and others who can attempt solutions for schoolground problems

Methodology - action research in integrated environmental education

PROYECTO DE HABILITACIÓN DIDÁCTICA (P.H.D.) DEL REAL JARDÍN BOTÁNICO DE MADRID

Ana PALACIOS, María José GÓMEZ DÍAZ y José Manuel LÓPEZ ÁLVAREZ

RESUMEN

La propuesta de actuación en el Proyecto de Habilitación Didáctica del Real Jardín Botánico de Madrid, se dirige a una optimización de los recursos que el R.J.B. pueda ofrecer a las instituciones educativas de sus importantes fondos científicos y culturales, conseguidos durante sus dos siglos de historia.

Se presenta en este congreso la elaboración de material didáctico que se facilitará a los centros educativos, con vistas al refuerzo e interiorización de conceptos y fomento de actitudes positivas respecto a la Naturaleza, tras la visita al Jardín.

Se pretende explicar el contenido y método de este material, así como, llevar a cabo la formación de un taller que permita la elaboración de nuevas propuestas relacionadas con la educación infantil respecto a los jardines botánicos.

También se hablará de la propuesta de un centro de acogida que permita dar a conocer a alumnos y visitantes en general, el funcionamiento de la vida en la Tierra, teniendo en cuenta, en las diferentes exposiciones que se realicen, que las plantas son el «motor de la vida en el planeta».

ABSTRACT

In this meeting we hope to present the elaboration of didactic material which should help educational centers with the proposal of reinforcing and interiorization of concepts and the promotion of positive attitudes in regards to nature after having visited the Garden.

In this meeting we intend to explain both content and method along with the formulation of a workshop which would allow the elaboration of new proposals related to nursery teaching pertinent to the Botanical Garden.

Also we will talk about the proposal of a center to acomodate students and

visitors in general. This center would instruct both the function of life on the Earth, taking into account, in the different expositions, that plants are the "motor of life on the Earth".

SUMARIO

- 1/ Situación educativa del Jardín antes de la aprobación del proyecto.
- 2/ P.H.D. del Real Jardín Botánico de Madrid.
- 3/ Material Didáctico para el 2º ciclo de Educación Infantil (4-6 años)
- 4/ Elaboración de una programación de objetivos y actividades para alumnos de Educación Infantil, partiendo de un Centro de Interés (Motivación)

1/ SITUACIÓN EDUCATIVA DEL JARDÍN ANTES DE LA APROBACIÓN DEL PROYECTO: (a cargo de Ana PALACIOS)

El Real Jardín Botánico de Madrid se inauguró en 1781, en su actual emplazamiento, auspiciado por Carlos III, y proyectado por Sabatini y Juan de Villanueva. Se organizó en tres terrazas, y las plantas fueron ordenadas según el método de Linneo.

Desde su creación, en el Jardín se desarrolló la enseñanza de la Botánica, se auspiciaron expediciones a América y al Pacífico, se encargaron los dibujos

de láminas de grandes colecciones de plantas y se hizo acopio de importantes herbarios que sirvieron de base para describir nuevas especies para la Ciencia.

En el primer tercio de nuestro siglo se inician con seriedad las investigaciones en el campo de la micología, y adquieren un elevado nivel las desarrolladas en el de la micromicetología.

En 1939 el R.J.B. pasa a depender del Consejo Superior de Investigaciones Científicas, y en 1942 es declarado Jardín Artístico. En 1974 tras décadas de penuria de penuria y abandono, fue cerrado al público para abordar las profundas obras de restauración necesarias para devolverle su estilo original. En 1981 fueron inauguradas las reformas por SS. MM. los Reyes de España, y abierto al público de nuevo.

En la actualidad las actividades desarrolladas en el Jardín, al margen de las propias de un centro de investigación botánica, se pueden agrupar en cuatro líneas:

♦ **Exposiciones:** sobre temas del mundo vegetal o relacionados con él (fotografía, pintura, artes industriales, bonsais, etnobotánica, etc.). Se realizan en el conocido por Pabellón Vi-

llanueva (antiguo invernáculo de la época de la creación del Jardín), y en la que fue la Cátedra donde impartió clases D. Antonio José Cavanilles.

♦ **Visitas:** Se producen en un alto número, potenciado por el hecho de estar en una arteria cultural de Madrid, junto al Museo del Prado, Palacio de Villahermosa (Galería Thisсен), Centro de Arte- Museo Nacional Reina Sofía, etc.

♦ **Educativa:** Los centros escolares conciertan previamente la visita y se les adjudica día y hora para realizarla; la elección de un guía es voluntaria. El mayor número de alumnos es el comprendido entre los 12 y 16 años.

♦ **Publicaciones:** Muy variadas. Revistas (Anales del R.J.B. de Madrid, Boletín de la Sociedad Micológica de Madrid, Cuadernos de trabajo de flora micológica ibérica, Archivos de flora ibérica), Monografías (Ruizia), Floras (Ibérica, Ilustrada, Huayaquilensis, Peruviana et Chilensis, Real Expedición Botánica del Nuevo Reino de Granada), Catálogos de exposiciones, Guías y planos, Material Didáctico (Educación Infantil).

2/ P.H.D. DEL REAL JARDÍN BOTÁNICO DE MADRID (a cargo de José M. LÓPEZ ÁLVAREZ).

Ante la elevada demanda de visitas por parte de los centros escolares, la dirección del R.J.B. decidió reestructurar la oferta del Jardín en materia educativa. Para ello se realizó un acuerdo con la Unidad de Ediciones didácticas del Servicio de Publicaciones, perteneciente como el R.J.B. al C.S.I.C., para la elaboración de un Proyecto Educativo.

Este proyecto se asienta en tres premisas fundamentales:

a/ Puesta a disposición de las Instituciones Docentes de toda la información, de carácter educativo, que contiene el R.J.B. sobre la realidad botánica, tanto en el segmento disciplinar, como en el interaccional.

b/ Las actividades que se proponen para canalizar la información estarán en función de los diferentes Niveles de Aplicación del actual Sistema Educativo Español: Ed. Infantil, Primaria, Secundaria, Bachillerato, y adecuadas a las necesidades e intereses formativos de los alumnos.

c/ Para optimizar la consecución de los objetivos educativos, las actividades tendrán un carácter lúdico-motivador, con el fin de favorecer el proceso de aprendizaje, pero que, en ningún caso, dificultará, o podrá suponer un menoscabo al rigor adquisiti-

vo de conocimientos.

En el proyecto se contempla la creación de una **documentación informativa** que se enviará a los colegios que soliciten visita docente, en la que se incluirá: horarios, número de alumnos por visita, cita previa con profesores, folletos y guía del Jardín, cinta de video informativa. Además, contará con una orientación hacia la realidad medioambiental y botánica del lugar donde se ubique el centro escolar solicitante de visita (cultivos agrícolas, flora y fauna de la zona, hábitats, etc.). Esta documentación será devuelta al Jardín.

Asimismo se establecen cuatro **rutras didácticas**, cada una de las cuales estará en función de la edad escolar de los alumnos (Infantil, Primaria, Secundaria, Bachillerato); las rutras estarán definidas por un color característico, y su información será canalizada por carteles adecuados a la edad de los alumnos.

Por otra parte, en el proyecto se contempla la creación de un espacio donde se desarrollen una serie de actividades que complementen la información recogida en las rutras. Este espacio será la llamada «**Casas de las Plantas**», centro de acogida en el que se realizarán espectáculos didácticos partiendo de Centros de Interés (temas motivadores del mundo vegetal), y que concluirán en actividades de los alumnos.

Al terminar los colegios la visita, recibirán un **materiel didáctico** para trabajarlo en el aula, con el fin de profundizar e interiorizar la información recogida en el Jardín.

Este proyecto pretende conseguir los siguientes objetivos educativos:

- ◆ **Dar a conocer** al alumno y al profesor la importancia de la existencia del R. J.B. como centro investigador, conservador, difusor y educativo.
- ◆ **Informar** sobre la razón de ser del R. J.B. como una Institución que fue creada y diseñada en el s. XVIII, atendiendo a unas motivaciones concretas, y la labor científica desarrollada hasta el día de hoy.
- ◆ **Informar** al alumno de la importancia del Reino Vegetal en el mantenimiento de la vida del hombre en la Tierra.
- ◆ **Despertar y estimular** el espíritu descubridor y de investigación del alumno respecto del Mundo de las Plantas, en particular, y de la Naturaleza, en general.
- ◆ **Valorar y resaltar** la relación existente entre la investigación científica botánica y el bienestar y la salud del hombre.
- ◆ **Imbuir** al alumno de la idea del jardín como lugar de reflexión, armonía y contemplación de la Naturaleza.

3/ MATERIAL DIDÁCTICO PARA EL 2º CICLO DE EDUCACIÓN INFANTIL: (a cargo de María J. GÓMEZ DÍAZ)

Para complementar la vista al Jardín, los alumnos reciben un material didáctico para trabajarlo en el aula. Está previsto elaborar un material determinado para cada segmento del Sistema Educativo. El que presentamos corresponde al del 2º ciclo de Educación Infantil, es decir para niños de 4-6 años.

Creemos necesario y conveniente ofertar a los escolares y profesionales de la Educación Infantil, un espacio dentro de nuestro proyecto de actuación en el R.J.B.. Consideramos que es en las edades más tempranas, donde se pueden obtener mejores resultados en cuanto a la actitud y conocimientos en los alumnos, susceptibles de mantenerse a largo plazo. La franja de edad que va de los 3 a los 6 años es, al mismo tiempo, la de explosión del lenguaje y puesta en marcha de la mayor parte de las estructuras cognitivas. Es una edad privilegiada, caracterizada por una máxima aceleración de los procesos mentales ligados al conocimiento del mundo¹.

Sabemos que el niño puede comprender cosas y hablar acerca de la luz, el calor, el agua, los alimentos, los árboles, los perfumes, etc. El niño de

Educación Infantil es el mejor candidato para eliminar la imagen negativa del hombre en su contacto con la Naturaleza. Los profesionales de la educación tratarán, pues, que, tanto a nivel cognitivo como de comportamiento, la evolución del alumno sea la adecuada, aprovechando sus ansias y afanes de investigación y descubrimiento, y ofreciéndole situaciones y posibilidades múltiples para su desarrollo.

La pretensión última del material que se presenta, es la de motivar «una progresión de triple vía» en los alumnos: de una parte conceptual respecto a contenidos del Área de la Naturaleza, estipulados en el Diseño Curricular Base, para los distintos niveles educativos; de otra procedimental, mediante la cual el alumno pueda desarrollar las capacidades de observación, relación, y demás destrezas; y de otra, de comportamiento, en actitudes y valores que fomenten la preservación y conservación del medio, dando al perfil humano factores de armonía natural, en contraposición con las consecuencias distorsionadoras que su presencia y actividades incontroladas provocan en el medio.

El alumno de esta edad inicia su aproximación al mundo interactuando con el medio, configurándose el desarrollo de sus capacidades físicas, afectivas, intelectivas y sociales.

En base a estos principios se han desarrollado las actividades sugeridas, y reflejadas en el cuadernillo del alum-

¹ MAZZOLI, Paolo. "El click científico" Seminario de didáctica de la ciencia, Barcelona, marzo 1990.

no, canalizándose la actuación de este último a través de ejercicios relacionados con la observación, la asociación, la relación, y la interiorización de conceptos, además de la expresión creativa y de la destreza manual. Se pretende motivar al alumno facilitándole un conocimiento de la realidad, a partir de su propia experiencia, así como despertar su interés, propiciando una actitud positiva respecto a la Naturaleza. Por otra parte, se espera que este material genere en el profesor un rico abanico de posibilidades de actuación.

En este orden, se podría concretar el siguiente objetivo: «Conseguir que los niños, desde las edades más tempranas, tomen conciencia de la importancia del mundo vegetal, para el resto de los seres vivos, fomentando un espíritu crítico, así como un buen uso y cuidado de la Naturaleza en general.

A partir de la visita al Real Jardín Botánico el niño se sitúa, mediante la observación directa del entorno, en el conocimiento de que el Jardín es un lugar diferente a otros que ya conoce. De esta forma la visita se convierte en un centro de interés útil para introducir a los alumnos en el conocimiento del mundo vegetal.

El material que presentamos está segmentado en unidades didácticas abiertas; este hecho permite el engarce de unas en otras, evitando un desglose en compartimentos estancos, lo que por otra parte es totalmente ajeno al

proceso madurativo del niño de esta edad. Las unidades didácticas están desarrolladas atendiendo a las diferentes áreas del desarrollo infantil, como son las de Identidad y autonomía, Descubrimiento del Medio físico y social y Comunicación y Representación.

Convendría comentar cómo se consigue acercar al niño a temas «tan poco infantiles» como la Botánica. La forma se consiguió gracias a la creación de un personaje: Rufo.

Rufo es el encargado de introducir al niño el Centro de Interés del Jardín Botánico, en la visita docente al mismo. Va a conducir a los niños, a través de su propia vivencia, por los distintos aspectos que se desarrollan en el Jardín: Así contará lo que hacen los jardineros, los botánicos, sus expediciones; la historia del Jardín y de su familia; la importancia de las plantas; los elementos necesarios para su existencia; y muchas cosas que irá contando en sucesivas apariciones.

Se recomienda a los maestros que introduzcan el personaje en el aula, para que se familiarizaran los niños con él, con el fin de obtener mejores resultados. Debido a la amplitud y cierta complejidad de contenidos, convendría dedicar en los currículos escolares un plazo de tiempo largo al tema del Jardín Botánico, o bien, adaptar los contenidos que se proponen en este material a los presupuestos curriculares.

En cualquier caso, el personaje de

Rufo es el hilo conductor por el que el niño de Educación Infantil podrá introducirse en aspectos del mundo vegetal, hasta hoy vedados para él. Pensamos que muchos conceptos pueden ser comprendidos por los niños, todo depende de cómo se los presentemos. Pero esta presentación no puede ser, en ningún caso, algo ajeno al alumno. Los maestros deberíamos tener la capacidad de reconvertirnos en niños, para redescubrir la maravilla del aprendizaje directo, a través de nuestros propios descubrimientos, producto de nuestras investigaciones en la observación y en la manipulación del entorno.

A continuación, pasaremos a sintetizar las cuatro unidades que se desarrollan:

- ◆ **Bienvenidos al Jardín:** donde nuestro diente de león, Rufo, introduce al niño en el concepto de jardín botánico, y le cuenta la historia del R.J.B. de Madrid.
- ◆ **El sol, el agua y la tierra:** las plantas: en esta unidad se presentan al niño los elementos que necesita la planta para vivir, haciendo especial hincapié en la energía solar.
- ◆ **Los seres vivos se relacionan:** Las plantas son el único laboratorio vivo capaz de transformar la energía radiante que reciben en productos asimilables por el resto de los seres vivos. Determinados tipos de plantas viven en determinados medios fisi-

cos, donde se da una determinada fauna: los tres elementos (flora, espacio físico y fauna) viven relacionándose entre sí en un equilibrio armónico, necesario para el mantenimiento de la vida.

- ◆ **Las plantas nos dan:** En esta unidad entramos en el tema de los recursos de origen vegetal, y en la necesidad de hacer de ellos un uso racional que no altere el equilibrio al que hacíamos referencia en la unidad anterior.

Cada unidad didáctica cuenta con sus objetivos específicos de cada área del desarrollo infantil, así como actividades expresas y orientaciones para el profesor.

4/ ELABORACIÓN DE UNA PROGRAMACIÓN DE OBJETIVOS Y ACTIVIDADES PARA ALUMNOS DE EDUCACIÓN INFANTIL, PARTIENDO DE UN CENTRO DE INTERÉS: (a cargo del Equipo Didáctico del R.J.B.)

El taller consiste en:

- ◆ Agrupamiento de los asistentes en equipos didácticos.
- ◆ Selección de un tema propio de su jardín
- ◆ Relación de objetivos pretendidos
- ◆ Desarrollo de un Centro de Interés (cuento, canción, poema, objeto o

ser vivo determinado, etc)

- ◆ Elaboración de actividades (los materiales que se precisen serán de desecho).

- ◆ Los asistentes se convierten en sus propios alumnos y realizan algunas de las actividades programadas.

CÓMO ELABORAR UN ESTUCHE EDUCATIVO DE FLORES

C. C. HERNÁNDEZ, E. LINARES, T. BALCÁZAR

RESUMEN

Durante el II Congreso Internacional de Educación en Jardines Botánicos llevado a cabo en las Islas Canarias, se presentó mediante un taller, la forma de como se trabaja con los grupos escolares utilizando el estuche educativo «Las Flores de México». Se demostraron los principales puntos y materiales que se deben tomar en cuenta para la elaboración de un estuche educativo similar. Los temas contenidos en el estuche, complementan los programas de Ciencias Naturales de la enseñanza primaria y secundaria de México, proporcionando todos los elementos necesarios, tanto de información como didácticos para que sea el propio maestro quien lo presente.

ABSTRACT

During the II International Congress on Education in Botanic Gardens in the Canary Islands, we presented a workshop which showed how we work with the school groups using an Educational Case «The Flowers of Mexico». We showed the principal points and the material that you must consider for an educational case. The themes of these cases, complement the programs of Science in the elementary and secondary schools in Mexico. These cases also contain all the information and materials for the teacher to work with the case on his own.

RÉSUMÉ

Dans le 2e Congrès International de l'Education dans les Jardins Botaniques, effectué aux Iles Canaries, on a présenté dans la modalité d'atelier, la manière dont on travaille l'étui éducatif «Les fleurs du Mexique» avec les groupes scolaires. On a montré aussi les points principaux et matériaux dont on doit tenir compte dans

l'élaboration d'un étui éducatif similaire. Les thèmes traités dans cet étui complètent les programmes de la matière de Sciences Naturelles enseignées à l'école Primaire et Secondaire au Mexique, en donnant tous les éléments nécessaires au niveau de l'information ainsi que de la didactique aux professeurs afin qu'ils puissent le présenter aux élèves.

ANTECEDENTES

En el Jardín Botánico del Instituto de Biología de la Universidad Nacional Autónoma de México, se ha promovido la creación de materiales educativos que traten sobre aspectos botánicos que puedan ser llevados a las escuelas o centros educativos. Para lograr este objetivo, se han realizado Estuches Educativos que tienen el propósito de complementar los programas educativos de la enseñanza primaria y secundaria en México, abarcando temas botánicos, que involucren fundamentalmente aspectos culturales, históricos, sociales y ecológicos de México (LINARES E., C. HERNÁNDEZ, T. BALCÁZAR, 1993).

Entre los estuches educativos que se han realizado se encuentran temas como: plantas medicinales, semillas, flores, frutos y agaves entre otros (HERNÁNDEZ *et al.*, 1993). En un inicio, los estuches se elaboraron con madera, pero al ser llevados a diferentes escuelas, nos dimos cuenta que eran muy pesados para su traslado y manejo. Por lo anterior se rediseñaron usando un portafolio de estireno termoformado

de marca comercial, el cual fue adaptado para contener los materiales que apoyan al tema.

ESTRUCTURA DEL TALLER

Con la finalidad de compartir nuestra experiencia y de dar a conocer nuestros resultados, se diseñó un taller, el cual se dividió en dos partes. La primera parte consistió en dar a conocer más de cerca uno de los estuches educativos y la forma en que es presentado ante un grupo escolar. La segunda parte consistió en que cada uno de los delegados realizara un modelo sencillo de un estuche sobre el tema de las flores.

DESARROLLO DEL TALLER

El estuche educativo presentado fue Las Flores de México (Fig. 1a). Al igual que la mayoría de los estuches, éste incluye material botánico de acuerdo al tema y, siendo las flores el tema del estuche, se incluyeron las siguientes: *Euphorbia pulcherrima*, *Tagetes erecta*, *Laelia autumnalis*, *Dahlia coc-*

cinea, *Plumeria acutifolia* y *Polianthes tuberosa*, todas ellas de origen mexicano, las cuales son usadas hoy en día como ornamentales en todo el mundo. Las flores representadas en el estuche, están hechas de tela y de migajón, tratando de que sean lo más parecidas a las que existen en la naturaleza. Acompañando al estuche, se cuenta con un rotafolio que contiene información concreta de cada una de las flores (Fig. 1a), por ejemplo su morfología, polinización, ejemplos de algunas flores modificadas, así como las características más sobresalientes de cada una de las mismas, que a continuación se describen:

La dalia, (*Dahlia coccinea*) flor compuesta, es la Flor Nacional de México. En la actualidad se han desarrollado hermosas variedades a partir de esta especie.

La flor de nochebuena, poinsetia (*Euphorbia pulcherrima*) es en realidad un conjunto de brácteas coloreadas y las flores son muy reducidas. Considerada como uno de los símbolos de la época navideña a nivel mundial.

La flor de muerto (*Tagetes erecta*) flor compuesta usada desde la época prehispánica en la adoración de sus dioses, actualmente forma parte esencial de las festividades del Día de Muertos en todo México, además a nivel industrial es muy importante como fuente de colorantes naturales.

La flor de nardo (*Polianthes tubero-*

sa) utilizada para la obtención de perfumes, existen grandes extensiones de su cultivo, pues es de amplio uso ornamental.

La orquídea (*Laelia autumnalis*), posee una morfología floral muy especializada, al igual que muchas orquídeas tienen gran importancia ornamental, el uso de sus pseudobulbos como pegamento era antiguamente utilizado en el arte plumario y actualmente se emplea a nivel regional en la elaboración de dulces como uno de sus ingredientes.

La flor de mayo (*Plumeria acutifolia*), flor ornamental silvestre de gran distribución en las zonas tropicales y semiáridas del país, como su nombre lo indica su floración se presenta principalmente en el mes de mayo. En la época prehispánica, esta flor estaba reservada únicamente a los nobles aztecas, nadie más podía usarlas o de lo contrario había severos castigos a quienes las utilizaban.

El estuche también contiene materiales procesados industrialmente derivados de flores, así se incluyen productos como jabones con aromas florales, flores comestibles enlatadas (flor de *Cucurbita pepo*), cajas de té de flor de Jamaica (*Hibiscus sabdariffa*), manzanilla (*Matricaria recutita*) y de flor de azahar (*Citrus* spp.).

La razón principal por la cual son mostrados estos productos, es debida a que estos estuches son presentados

a niños de zonas urbanas y si consideramos que la ciudad de México es la más grande del mundo, una de sus tristes consecuencias es que su población está muy alejada de la naturaleza. Muchas de las bondades que nos ofrecen las plantas, que antaño eran ampliamente conocidas, en el presente se vuelven raras y mágicas, al grado que causa asombro conocer que varios objetos, productos alimenticios y medicinales, entre otros, son derivados de vegetales.

Se ha diseñado una práctica que contiene el tema en cuestión de manera resumida, incluye algunos juegos sencillos, en muchos casos son complementados con materiales educativos que sirven para apoyar y reafirmar los conocimientos adquiridos, como es el uso (para el caso de las Flores de México) de un juego conocido popularmente como memorama. Consiste en una serie de tarjetas dobles con las flores mostradas en el rotafolio. El juego estriba en poner las 12 tarjetas boca abajo para localizar las flores por parejas haciendo un total de 6 pares de tarjetas. Quien obtenga el mayor número de parejas será el ganador (el juego se realiza entre dos niños), el tiempo de duración del juego es aproximadamente de cinco a diez minutos.

Un aspecto fundamental es que durante el diseño de cada uno de los estuches, se debe considerar el uso de los sentidos, incluyendo actividades donde el alumno tenga que probar, oler

y tocar. En el estuche de flores, se han adicionado envases de plástico que contienen tiras delgadas de papel filtro, las cuales están impregnadas de esencias florales, para que cada uno de los alumnos participantes pueda guardarlas como recuerdo. El estuche también contiene diapositivas con las mismas imágenes del rotafolio, para ser utilizadas en lugar del rotafolio, si así se desea.

Por último está el instructivo para el profesor, cuyo principal objetivo es dar al maestro toda las indicaciones sobre el manejo del estuche. De forma general esta constituido por: introducción, descripción del contenido, como manejar el estuche, información incluida en el rotafolio, práctica contestada, glosario de términos científicos, sugerencias para la adquisición de materiales que se proponen en la práctica y por último la bibliografía utilizada.

PRESENTACIÓN DEL ESTUCHE

Se describió el contenido del estuche y con esto se inició la presentación del taller de la siguiente manera: se colocó el estuche en un lugar visible y, se fue mostrando cada una de las partes mencionadas con anterioridad, se leyó la información del rotafolio incluyendo las sugerencias hacia el maestro, se mostraron las flores artificiales, el memorama y se repartieron la práctica y los productos.

La segunda parte del taller consistió

en que cada uno de los participantes elaborara un estuche similar con el tema de flores. Los materiales que se proporcionaron fueron los siguientes: una caja de cartón previamente preparado para ser armada en el taller, una tira de cartón, broches de latón, flores artificiales de tela de 4 especies distintas, cinta adhesiva de doble cara, un envase pequeño con tiras de papel con esencias florales, una goma de mascar de sabor violeta, una pieza pequeña de jabón de manzanilla, un juego de fotocopias con las descripciones de las flores con la siguiente información: familia, género, origen, descripción de la flor, época de floración, usos y formas de propagación entre otros. Por último, se repartieron algunas fotocopias del artículo «Los Estuches Educativos, un Complemento a los Programas Educativos de México», (HERNÁNDEZ *et al.*, 1993).

Se les explicó a cada uno de los participantes como armar la caja, colocando la tira de cartón a manera de repisa. En una de las tapas de la caja se pegaron con pedazos de cinta de doble cara, las diferentes flores proporcionadas (Fig. 1b y 1c); por ser un Congreso de índole Internacional, se proporcionaron flores ampliamente conocidas, las flores seleccionadas fueron:

Clavel (*Dianthus* sp.) flor de uso popular, ornamental, una característica es que los pétalos son muy dentados en el margen lo que le confiere una

corola muy peculiar.

Violeta pensamiento (*Viola* sp.) planta herbácea, sus flores de colores que van del blanco al amarillo y del azul al violeta. Esta flor es utilizada como ornamental y se caracteriza por tener cinco pétalos.

Narciso (*Narcissus* sp.) planta herbácea, muy utilizada para la extracción de esencias, así como de gran importancia ornamental.

Rosa (*Rosa* spp.), flor con amplia distribución, sus hojas son de forma oval y aserradas en los márgenes, los pétalos son aterciopelados y desprenden un aroma muy característico, las flores tienen una gran gama de colores, se han obtenido hermosas variedades, las cuales son muy codiciadas por los horticultores. Son utilizadas como ornamentales y en la industria de la perfumería, así como en el arte culinario.

En cuanto a los productos elaborados a partir de las flores, se les pidió que colocaran las piezas de jabón, el envase con las tiras de papel y la goma de mascar sobre la repisa para dar la idea general de los diferentes productos de uso cotidiano.

Por contar el taller con un tiempo limitado, se les proporcionaron las descripciones de las flores, con la idea de que cada quien pudiese obtener una información concreta o inclusive adicionar información, de sus respectivos países en caso de que tuvieran

algún uso más y así poder elaborar un rotafolio sencillo. También se les solicitó que pensarán en la elaboración de alguna práctica que incluyera el resumen y un juego didáctico. Al final del taller se les pidió una opinión sobre el estuche presentado.

CONCLUSIÓN

El uso alternativo de los estuches educativos son una excelente opción para dar a conocer temas que tradicionalmente son presentados en los jardines botánicos. Es una forma de acercar tanto a los alumnos como a los maestros a los aspectos que pueden incidir en el conocimiento y protección

de los recursos vegetales. Por otro lado la utilización de materiales sencillos, para la elaboración de los estuches educativos, como son cartulinas, cajas de cartón de uso comercial (por ej, caja de galletas), así como productos de origen vegetal de uso cotidiano se convierten en una eficaz herramienta didáctica y de esta forma se pueden abordar los más diversos temas de importancia botánica o relacionados con el ambiente. Agradecemos el apoyo de Elsa Villalobos y de Circe Acosta por la preparación de los materiales del taller así como a Elia Herrera y al personal del Jardín Botánico Canario para la realización de este taller.

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Figura 1a. Vista general del Estuche Educativo de Las Flores de México.



Figura 1b. Estuches Educativos elaborados durante el Taller.



Figura 1c. Vista general de los participantes mostrando el estuche educativo terminado.

JARDINES BOTÁNICOS: EDUCADORES EN EL JARDÍN

Ezequiel GUERRA DE LA TORRE

RESUMEN

Los Jardines Botánicos están asumiendo un importante papel en el desarrollo de programas de educación ambiental hacia los escolares, hasta el punto que hoy esta función constituye uno de sus elementos de mayor proyección social. Sin embargo para que la visita a éstos sea positiva, desde el punto de vista educativo, es necesario que los profesores aprendan a utilizar la metodología propia del trabajo de campo, y que los jardines botánicos asuman su función docente, incorporando equipos de profesores entre su personal laboral.

ABSTRACT

Botanical Gardens are assuming an important role in the development of schoolchildren course schedules in Environmental Education, being this activity one of the most important ones in the their social implications. However, in order that these visits are profitable from an educational point of view, it is necessary that teachers learn how to use the appropriate methodology of field work, so that Botanical Gardens assume their teachin función including teacher teams among their staff.

PROBLEMAS AMBIENTALES Y EDUCACIÓN AMBIENTAL

Pocos son los jóvenes que hoy no han oído hablar alguna vez de los problemas ambientales más relevantes que afectan al planeta Tierra: la contaminación de la atmósfera, la pérdida de los suelos, los residuos nuclea-

res, los vertidos contaminantes, el agujero de ozono, etc.; son temas constantemente tratados en los diversos medios de comunicación. Su conocimiento ha dado lugar a que muchos de ellos hayan tomado conciencia de la gravedad de los problemas que nos afectan, pero aún así ¿es suficiente esta toma de conciencia?

Es muy probable que en los próximos años no baste con conocer las características de los fenómenos de degradación ambiental que nos atañen, sino que además, será necesaria la actuación decidida en su resolución, una actuación que probablemente implicará profundos cambios en el comportamiento social, hoy arraigados. Esta actuación deberá ser llevada a cabo, principalmente, por las jóvenes generaciones actuales antes de que el agravamiento de la situación lleve a este Planeta a un estado de degradación medioambiental de tal magnitud que las decisiones hayan de ser tomadas más por necesidad que por convicción. Para ello deberán tener una concepción del Planeta diferente a la de las actuales generaciones adultas, una concepción que no sólo afecte al grado de conocimiento que de él tengan, sino también a la ética con que se le valora.

Sin lugar a dudas el mayor recurso del que hoy disponemos para gestar estos cambios es la Educación. La cual deberá inculcar modelos de relación con el entorno diferentes a los actuales, que faciliten una toma de postura decidida de cara a los cambios necesarios para el futuro. Sin embargo, existen algunos importantes problemas que dificultan la tarea educativa que tenemos por delante:

◆ Los profesores deben poseer unos conocimientos renovados a la velocidad de los cambios que se producen en la ciencia actual, y además

deben conocer tanto las nuevas formulaciones de los problemas ambientales como la aparición de nuevos conflictos entre nuestra especie y el medioambiente. Es ilustrativo de este problema de renovación de conocimientos, el que teorías como "Gaia", de J. Lovelock, sean aún muy poco conocidas entre los profesores de enseñanza Primaria y Secundaria. Esta difícil tarea se torna aún en un reto mayor si tenemos en cuenta que la edad media de los docentes actuales hará que sean ellos quienes impartan la docencia a las generaciones que se sucedan hasta el primer cuarto del siglo XXI, pues no se jubilarán hasta entonces.

◆ No es posible hacer Educación Ambiental desde las pautas de una enseñanza tradicional en la que el profesor es el transmisor de los conocimientos y el alumno un mero receptor. Desde este modelo educativo sólo se consigue un bajo nivel de comprensión y asimilación de los conceptos, y además difícilmente se inculcan valores como el respeto o actitudes como una sensibilidad diferente hacia el medio.

ALGUNOS ASPECTOS A CONSIDERAR EN EL TRABAJO DE LA EDUCACIÓN AMBIENTAL.

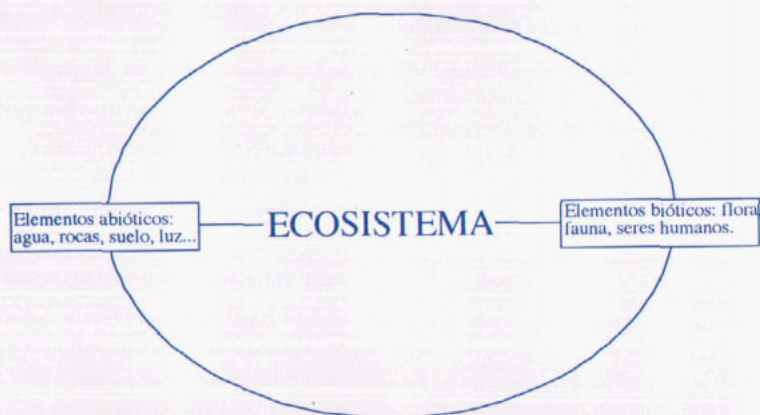
Por parte de los profesores

Cuando abordamos en las aulas te-

mas de Educación Ambiental a menudo nos centramos en los problemas más relevantes que están aconteciendo: la contaminación, la deforestación, etc. Es posible que en muchos casos «los árboles no nos estén permitiendo ver el bosque» y nuestros alumnos no lleguen a captar que tras todos ellos está una concepción determinada del medioambiente, muy arraigada en la especie humana. En este sentido, entre las tareas que tenemos los profesores es importante la de **romper la idea del «homocentrismo»**, tan arraigada en la cultura occidental. En ella "el hombre" (hombres y mujeres) aparece como "Rey de la Creación", idea que asumida como tal ha dado lugar al ejercicio de una monarquía despótica. A ella ,además, se une inseparablemente una mentalidad de conquista y dominio del medio que, si bien en épocas pasadas pudo tener algún sentido, hoy aparece claramente fuera de contexto y es tremendamente peligrosa, pues la capacidad transformadora de los medios técnicos y materiales que hoy tenemos ha comenzado a mostrarnos la fragilidad no de nuestra especie sino de nuestro entorno. Esta forma de ver a la especie humana nos ha llevado a considerarla como elemento independiente al funcionamiento de los ecosistemas, como si no se hallara implicada dentro de ellos (de hecho es muy raro observarla incluida en los típicos esquemas que ilustran los libros de texto de los estudiantes), por lo que el deterioro de éstos parece afectar tan sólo a otras es-

pecies animales o vegetales, pero no a la especie humana. Por otro lado, esta consideración de la especie humana como centro del Universo lleva a justificar cualquier actuación sobre el medioambiente que tenga como fin la obtención de algún beneficio, parece que todo está disponible para nuestro uso y disfrute de forma ilimitada, ejemplo claro de ello es la explotación de los recursos como si fueran inacabables, derrochando de esta manera el futuro de las próximas generaciones.

Un aspecto importante del trabajo en Educación Ambiental lo constituye el Trabajo de Campo, por ello, en segundo lugar, tras el objetivo general que anteriormente hemos planteado, los profesores habrán de preocuparse de **integrar los trabajos de campo que realizan en sus programaciones** anuales. En muchos casos éstos se convierten en un extraño apéndice del desarrollo del curso, en una excursión en la que no se tienen muy claros los objetivos que se pretenden cubrir y cuya relación con la actividad desarrollada en el aula, previa o posterior a la salida, suele ser escasa o nula. Para evitar esta bajísima rentabilidad del esfuerzo de realizar trabajo de campo con los alumnos, éste deberá estar incluido en las programaciones, para que se halle relacionado con una temática que se desarrolla en el propio centro educativo antes y después de la visita, sirviendo esta última como apoyo de aquélla y estando por lo tanto contex-



Figs. 1 y 2. Tras la degradación ambiental subyace una determinada ética ambiental. Es necesario cambiar el «homocentrismo» por una concepción ecosistémica del medioambiente.

tualizada en el proceso educativo.

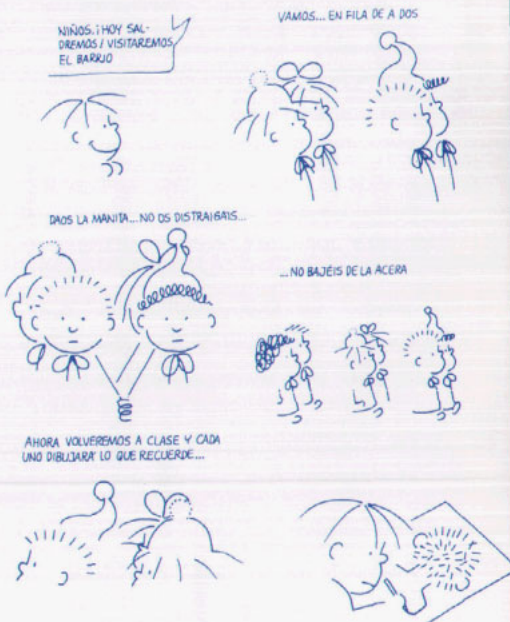
Por otro lado, los profesores, en sus programaciones, habrán de trazar el objetivo concreto del trabajo. En muchos casos se aprovechan las escasas salidas al exterior para intentar abarcar las temáticas más dispersas: la geolo-

gía, las formas de relieve, la vegetación, la fauna, el clima, la estructura de la propiedad de la tierra, la dinámica de la población..., en la mayoría de los casos sin establecer vínculo alguno entre los diferentes temas tratados. Los alumnos por lo tanto se ven "bombardeados" por numerosos conceptos que no con-

siguen entrelazar ni en la mayoría de los casos retener de forma significativa para su aprendizaje. Es por ello que el profesor ha de delimitar claramente el objetivo a cubrir integrando las diversas áreas en el análisis del hecho objeto de estudio, evitando así convertir el trabajo de campo en una excursión enciclopédica donde la dispersión de los contenidos dé lugar a unos escasos resulta-

dos.

Por último, es también una tarea importante de los profesores **aprender la dinámica específica del trabajo de campo** e introducir en ella a sus alumnos. La metodología didáctica usada en el interior del aula no coincide con la que se debe emplear en el trabajo de campo y sin embargo muchos



Figs. 3 y 4. El trabajo de campo conlleva una metodología y una dinámica propia.
(Ilustraciones: FRATO, en «Con ojos de niño» y «Niño se nace», ed. por Barcanova 1988 y 1989.

profesores al no tenerlo en cuenta, convierten a éste último en una copia «sin paredes» de su trabajo en el colegio, con lo que la utilización del medio con lo que conlleva de investigación, experimentación etc., queda en una simple caricatura. Por otro lado para introducir a los alumnos en ésta dinámica no es posible esperar al día en que vamos a realizar esa visita especial (a un Jardín Botánico, un Aula de Naturaleza...), sino que ya previamente nuestros alumnos deben ir entrenados en esa dinámica o estilo de trabajo, con el fin de obtener la máxima rentabilidad a la salida. El trabajo de campo tiene unas características bien diferentes del que podemos realizar en el colegio dentro del aula, por ello es necesario utilizar los entornos cercanos al propio centro docente (calles del barrio, parques...) para desarrollar en ellos el aprendizaje de la dinámica del trabajo en el exterior. Si no lo hacemos así es muy probable que el día que salgamos con nuestros alumnos lejos del centro, éstos únicamente vean el aspecto lúdico de la salida.

Por parte de los Jardines Botánicos

La mayoría de los Jardines Botánicos han sido creados con el fin de salvaguardar la flora mundial e investigar sobre ella. Ha sido en tiempos recientes cuando su dimensión educativa ha comenzado a hacerse más patente,

la preocupación por la conservación del medioambiente se ha ido extendiendo más allá de reducidos grupos científicos y ha llegado a gran parte de la sociedad. Es entonces cuando gran número de profesores empiezan a utilizarlos como lugar de visita para destacar la importancia y el papel que juega la flora en el planeta Tierra, de esta manera cientos de niños comienzan a visitarlos.

Quizás lo reciente de su dimensión educativa ha hecho que ésta aún no se halla asumido totalmente, cuando en realidad se está convirtiendo en uno de sus aspectos de mayor proyección y utilidad social. Es por ello que los jardines botánicos deben de asumir ésta rentable función social para lo que han de tener en cuenta algunos aspectos:

- ◆ Considerar dentro de sus presupuestos un capítulo relevante dedicado a educación, en el que se consideren las necesidades de espacio, materiales y los recursos humanos necesarios para que ésta pueda llevarse a cabo con la eficiencia y calidad que a la propia institución le interesa.
- ◆ Comenzar a tener en cuenta en el diseño de sus espacios ajardinados la función educativa que deben cubrir, preparando lugares adecuados para ello donde no se interfiera con la labor investigadora del personal no docente y donde la distribución

de las especies vegetales tenga un marcado fin educativo.

- ◆ Formar el necesario equipo educativo con profesionales de la educación, pues son ellos los que saben de psicología evolutiva, dinámica de grupos, desarrollo de contenidos conceptuales, procedimientos y actitudes para cada grupo de edad, etc. No se trata de meros guías que recorran los senderos del Jardín sino de docentes cualificados que motiven, dinamicen y otorguen un sentido significativo a la visita.

Es de tal importancia este último aspecto que nos gustaría destacar algunas de las funciones que los equipos docentes desarrollarían en los Jardines Botánicos:

- ◆ Asesoramiento, anterior a la visita, a los profesores, analizando con ellos los posibles temas que se van a tratar, el necesario trabajo previo en el aula y suministrándole o indicándole materiales posibles para generar la motivación necesaria de los alumnos que van a visitar el Jardín Botánico.
- ◆ Asistencia a los grupos escolares, realizando con ellos el trabajo que en función de su nivel, motivación, etc. pueda plantearse.
- ◆ Diseño de los espacios interiores, tales como talleres (donde llevar a cabo actividades como confección de murales, reciclado de papel, etc.), laboratorios escolares (en los que poder trabajar aspectos propios de la biología vegetal).
- ◆ Colaboración en el diseño de los espacios exteriores que se planifican más expresamente para uso educativo.
- ◆ Realización de investigaciones sobre los métodos y las dinámicas de grupo más apropiadas para obtener la mayor rentabilidad educativa con los diferentes niveles de alumnos que visitan el Jardín Botánico.
- ◆ Confección de materiales como cuadernos de campo, fichas de trabajo, etc., adaptados a los distintos niveles, que permitan a los grupos cierta independencia del monitor.
- ◆ Evaluación de los resultados de aprendizaje de los grupos de visita.

El trabajo de estos equipos es, pues, muy específico en torno al tema docente, por lo que requiere la cualificación pedagógica y didáctica adecuada y su plena integración dentro del equipo laboral del Jardín Botánico.

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CLASSIFICATION BY SENSES

Andrew SMITH

Some of the following games have been adapted from the Earth Education publication *Sunship Earth* by Steve Van Matre, and *Sharing Nature with Children* by Joseph Bharat Cornell. Others can be found in the Royal Tasmanian Botanical Gardens/Australian Early Childhood Association publication *From Small Seeds... a green world grows* by Andrew Smith. The latter publication contains a complete program from environmental awareness to tree planting.

Classification of plants can be a daunting prospect for students and their teachers, but in its most simple form is merely the identification of differences. Objects can be classified according to their shape, size, colour, smell, age, location and so on. Of course many of these categories are in fact used in the scientific classification of plants into genus and species. The classification games described here begin at the beginning. They are appropriate for a range of groups, because they relate to the stage of environmental awareness rather than age or year of schooling. Thus a year 7 student may have less understanding than a year 3

student. They also are a good means of extending observation skills in a general sense, encouraging students to look more carefully at the world around them. The session is therefore best used as an introduction to other activities.

HUG - A - TREE

Aim; that children recognise that trees are different.

Divide into pairs. Each pair has a blindfold. One partner is led blindfolded to a tree which he/she must explore using the senses of touch and smell. Use different parts of the body to feel the tree - hands, cheeks, tongue, toes. To determine the size of the tree, give it a hug. Note where branches emerge. Can you feel the depth of shade? Are there identifying lumps, bumps, textures? Return to the beginning point, spin the player and then remove the blindfold. The player must then find the tree.

Why were you able to tell the difference? Why are trees different? Age, location, competition, and type (species) all contribute to making every tree different.

RAINBOW SPLATS

Aim; that children look carefully at minor differences.

First some questions... *Close your eyes. What colour is bark?* (many children will answer brown). *What colour are leaves?* (Most will answer green).

Then a story... *Yesterday there was a fantastic storm over the Las Palmas Garden. While I stood and watched, a beautiful brilliant rainbow formed over the Garden. But then one last gust of wind blew the rainbow to pieces. The rainbow drifted to the ground and soaked into all the trees plants, grass and soil. I managed to capture some of the colours on these cards. Reveal the "rainbow splats" (Cards with colourful splats of colour on them). Give each child a card and ask them to find something which matches the colour exactly. Lets see where the rainbow's colours soaked in.* When students have returned with their matched objects, spend some time congratulating their detective skills. *Now what colour is bark? Answers Brown, grey, green, yellow, orange, black... What colour are leaves? Answers Light green, dark green, black, brown, red...* Possible follow up discussions might include why leaves are usually green, why flowers have different colouring and so on.

GARDEN SYMPHONY

Aim; to increase listening skills and highlight other lifeforms in the forest/garden.

Give each child a sheet of paper and pencil. Ask them to find a quiet place. With eyes closed children listen to the sounds around them, tracing a line on their paper to record the sounds. Loud birdcalls may be a sharp edged scribble, water a wavy line, wind a graceful swirl. Compare records, and describe the sounds to each other. Possible follow up activities might include bird watching to find out why birds are attracted to the area. Identify the source of each sound.

TREE ID

Aim; to introduce the concept of species names.

Label 3 trees with name tags. Use ordinary people names, or colours (eg Rowena, Nieves, Fergus, Red, Yellow). Collect a sample leaf from each tree. This is a race. Call out one of the names. Players must find the tree labelled with that name, check its leaf

shape, return to you and identify the correct leaf sample. Now hold up one of the leaf samples. Ask players to study the leaf closely. Ask someone to describe it. When you say go, players must find the tree with that type of leaf, read it's name, return to you and tell

you its name. Explain that the tags are not the real names of the trees. If you are in a botanic garden, point out the plant labels and explain the difference between Scientific and common names.

The skills practised in this session reflect those used by botanists when identifying plants. How often have you seen botanists *look* at shape, size and

colour, *feel* textures, *smell* and sometimes *taste* a plant before they confidently identify it? Senses such as smell and touch are powerful memory joggers. To properly appreciate the Garden environment children should look closely, touch carefully, smell and listen as they walk through the amazingly vibrant, lively and fragrant world around them.

WHY DO WE NEED TREES?

Andrew SMITH

(Note; Time allowed only for the demonstration of the game "Living Tree" from this workshop, at the end of the Paper *Environmental Education Developing Attitudes and Understanding for the Environment*).

The games demonstrated in this workshop attempt to explain the importance of plants. This does not involve discussion about uses of plants but rather, why they are essential to all life on earth. At the end of the session, time is usually spent discussing how we can all adjust our usage of plants for the sake of the health of the planet. The session also leads onto direct personal action, in the form of growing trees.

SETTING THE SCENE

Lay everyone on the grass, with eyes closed. *Hold on tight, because the planet we are on is presently speeding through space at about 110,000 kph. It is also spinning like a top and the whole solar system we are in is turning slowly over and over. Every inch of space we travel through is a new one, we have never been there*

before. Luckily for us we take along a special supply of energy. The Sun. Sunlight powers all life on earth. But can you eat sunlight? Have a go - open your mouth and see if you can catch enough sunlight to chew. So how does the sun power us? How do we get hold of the sun's energy? Well there is only one group of living things that can turn the sun into energy. The plants. Imagine you are a leaf on a tree. Just under your skin there are small green dots called chloroplasts. They are what makes you green. Those green dots are able to catch the sun, mix it with water and carbon dioxide and hey presto energy! So soak up that sunlight and make energy for you to grow. But how do other living things, such as people, get hold of that energy? We eat it, we eat the plants. So we depend on plants for our food. Open your eyes.

LUNCH BREAK

Aim; that children understand that they are individually dependent on plants for food.

Is it true? Well, what did you have for lunch/dinner/breakfast? Did any of your food not come from plants? (everything originates from plants because they are at the base of all food-chains).

How does the plant get the water?
How does a tree work?

LIVING TREE

Aim; that children understand that a tree is a living organism and how it works.

We are going to construct a tree using you as the parts. Choose the tallest and strongest person in the class. He/she is the HEARTWOOD of the tree. The Heartwood is the strength of the tree, holding the tree upright but the heartwood of the tree is dead. (that's why a tree can be hollow and survive, although structurally weakened - only the dead heartwood is missing). Around the heartwood is the area of the tree where all the action takes place - the sapwood. This is made up of two sections. The first one is the XYLEM. The xylem is where the water is drawn up the tree to the leaves to be mixed with sunlight. Choose three people to be the xylem by joining hands to make a circle around the heartwood. The second part of the sapwood is called the PHLOEM. The phloem is where the energy made in the leaves (in the form of sugar) flows back down

the tree to feed the roots and branches. (The fact that there is sugar can be seen when a tree is injured and the sap flows. In many trees this actually tastes sweet eg maples, eucalypts). Choose five people to be the phloem by joining hands to make a circle around the xylem. What is on the outside of a tree? The BARK. What does the bark do? It protects the tree from insects and diseases, a bit like a suit of armour. Choose eight people to be the bark by joining hands to make a circle around the phloem. The rest of the children can be the ROOTS (except for two). They need to lay on the ground with arms spread wide (and long hair fanned out as rootlets) to find the water needed to make the whole thing work.

This is how you make the tree live. The roots say sluuuurp! The xylem says sluuuurp and waves their hands in the air. The phloem gasps loudly (taking in carbon dioxide) and aaah, then sags at the knees. This has to be done in a synchronised way so that the tree sounds like this "sluuuurp, sluuuurp, gasp, aaah!" Practise for a short time to make sure the tree is working. The two remaining children are INSECTS. Their job is to get to the heartwood of the tree within 5 seconds. If they manage it, the tree is dead. If the tree stops pumping then it is dead. (choose sensible children to be insects, otherwise rough play will bring the lot crashing down) Ready set go 1... 2... 3... 4... 5 Stop.

Other activities related to this are a) catching evaporated moisture from the tree by placing a plastic bag over some of its leaves. Talk about where the moisture would have ended up if you hadn't captured it. b) Listening to a tree's heartbeat with a stethoscope. This is particularly good with smooth-barked trees.

A PATCH OF OXYGEN

Aim; that children understand that they are individually dependent on plants for oxygen. And that there is something they can do to stop the loss of trees.

One of the by products of the tree's life is oxygen. After they have breathed in carbon dioxide and mixed it with sunlight and water, there is a bit of oxygen left over which is breathed out. What is oxygen good for? How many trees do we need to produce enough oxygen for one person? An area of plants of about 625 square metres is required to supply sufficient oxygen for one person. If the trees continue to breathe so does the person. That is a square 25 big steps by 25 big steps (25 m x 25 m). Step it out at a run, so that everyone is puffed out at the end. Stand in the centre. There is only enough oxygen in this square for one person. So, when I say, everyone has to hold their breath. I will touch one person at a time. When I touch you, you may take two deep breaths but

then must stop breathing again. Continue this until people are obviously no longer able to hold their breath. OK everybody breathe. So how is it that we can all breathe?. There are lots of trees in other places. Discuss the importance of areas like the Amazon forests as oxygen suppliers. But every plant helps. Discuss the rates of deforestation around the world. Discuss how we all can adjust the things we do in every day life to reduce the amount of forests cut down. Ask for suggestions. Recycling, using less, planting trees. Follow up the session, at a later date, with another to grow a personal oxygen supply (ie trees).

WEB OF LIFE

Aim; that children understand that all living things depend on plants for their existence. And that they identify with animals on a personal level.

Sit the group in a large circle. Have one person stand in the centre of the circle. That person represent all plants. Ask the group for examples of animals that eat plants. As each example is given, link that child to the plants with the string. Take the string back wards and forwards to the plant... Now choose one of those animals and ask for examples of animals that eat it. Link those animals into the web of life. Keep going using other animals and their predators until all the children are linked into the web. When you are setting up the web,

be sure to include "people" as one of the links in the web. *What would happen if I decided to poison the plants?* Make sure everyone has a good hold of their string and then tell the plant to tug (not too hard) on the string. Everyone who feels that tug should also tug on the string. Keep going until you run out of tugs. Everybody in the web of life should feel a tug on the string - and therefore would be affected in some way by the demise of plants. Choose various animals from the web and ask how they think they would be affected if the plants were killed.

THE SLISHY SLOSHY SWAMP

Aim; that children understand that animals depend on plants as habitats. And even ugly places are important. And to protect animals we need to protect the places where they live and the other species in those places.

Imagine the following place - the Slishy Slosly Swamp. The Slishy Slosly Swamp is totally unique. There is bright orange mud, one metre deep on the floor of the swamp. It is warm and bubbles slowly. There are giant trees that stretch into the sky for over 100 m and create a canopy which blocks out most of the light. So it is dark in the swamp all the time. The animals in the swamp include giant flies, which come into the swamp to lay their eggs in the mud (the size of hens eggs). The warm mud incubates the

eggs. There are giant mosquitoes too. And poisonous tree snakes, which luckily spend most of their time in the tree tops, because their venom causes instantaneous death. Ask each child to design and draw an animal that is capable of living in the swamp. It can have any feature you wish to give it as long as there is a reason for it. It needs some way to eat (hollow fangs to suck the eggs perhaps), protection from its enemies (a shell or spines or a horrible smell), a means of moving around on the mud (big flat feet) and a way of finding its way around in the dark (big eyes and ears, whiskers, sonar, luminous nose) and so on. Compare imaginary animals. Compare imaginary adaptations with those of real animals. Write a news article about your amazing animal.

Invent a threat eg Someone is going to pump out the orange mud to sell as undercoat paint. What will happen to the swamp if the mud is pumped out? The trees die - so no more shade for the animals, the mud is gone - so no more eggs for the animal to eat. The animal becomes extinct. So, what can you do to save your animal? In this case the best solution is to save the place, that is create a Slishy Slosly Swamp National Park.

What about if someone came in and cut half the trees down? The shelter is gone and half of the swamp is of no use to the animals. How do you repair the damage? By growing more

trees from seeds collected from the trees in the swamp (ie A recovery plan working with your local botanic garden). Is there a Slisly Slosly Swamp near you requiring your help?

(Please note; the Slisly Slosly Swamp story and activities are taken from a publication "The Amazing Slisly Slosly Swamp" by Andrew Smith, presently being prepared for publication.)

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Andrew Smith.

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LA PERCEPCIÓN Y SENSIBILIZACIÓN EN EL PAISAJE: RECURSO DIDÁCTICO EN LOS JARDINES BOTÁNICOS

Ana M^a FERNÁNDEZ PÉREZ

RESUMEN

Los juegos de percepción y sensibilización en el paisaje son uno de los recursos educativos más globales, dentro de la enseñanza Primaria, que ayudan al alumno/a a retomar el contacto, hoy en día muchas veces perdido, la integración física y emocional, y, expansión de conciencia, que le son propias al ser humano en el medio natural.

Una de las carencias educativas detectadas a lo largo de seis años de experiencia didáctica en el Jardín Botánico Canario con grupos de alumnos de muy variada condición social, económica y geográfica, dentro de la Isla de Gran Canaria, es la falta de práctica en una escucha corporal del medio que nos rodea, y más aún de expresar con el lenguaje lo que se percibe y/o se siente en ese instante.

ABSTRACT

Landscape feeling and perception.

One of the educational lacks detected in the groups of students that visit the Jardín Botánico Canario is the little practice in listening and observing the surrounding world. This is why perceptive, simulative and sensitization games are a good educational resource to help students get in touch with the environment: when we simulate we are raindrops, the wind or part of the landscape we can integrate physically and emotionally our understanding of the environment.

INTRODUCCIÓN

El Jardín Botánico Canario «Viera y Clavijo», ha sido animado e interpretado por numerosos educadores, que, a su vez, han exportado la experiencia viva del Jardín a los centros educativos de la isla de Gran Canaria.

Por un lado, la creación en los centros de pequeños jardines escolares de plantas autóctonas, y por otro, el entusiasmo y valoración anímica con que los educadores han emprendido acciones pedagógicas innovadoras en ellos.

Todo ello ha sido posible gracias a la creación de un estilo jardinero profundamente conceptual, armónico y estético, creado por E. Sventenius entre los años 1950 y 1973. La recreación de estas líneas jardineras en el Jardín, que representan paisajes y ecosistemas naturales de Canarias, contienen una fuerza o principio universal capaz de propagarse de manera espontánea si el receptor o visitante «abandona su ánimo y desaliento en el Jardín» (HERNÁNDEZ DÉNIZ, 1986), y se deja conducir a través de su percepción. De tal suerte, nunca se abandona el Jardín sin haberse operado un cambio en el visitante (HERNÁNDEZ DÉNIZ, *op. cit.*). Este tipo de percepción nos interesa como motor para una educación y comprensión del medio ambiente. Y, en este caso la «belleza» natural de los jardines es el recurso primordial.

APRENDIENDO EN EL JARDÍN

El Jardín Botánico representa un extraordinario campo de juego y aprendizaje que ofrece múltiples posibilidades de conocimiento, descubrimiento, observación e investigación.

Puesto que la vida transcurre a través del Jardín, uno de sus atractivos principales es el factor sorpresa, y por tanto la improvisación.

Nuestro sistema perceptivo se halla frecuentemente limitado por una lectura condicionada de la realidad, que en muchas ocasiones ha perdido la capacidad de maravillarse, no detecta matices, o no posee el vocabulario apropiado para la expresión o comunicación. Por esto, las actividades que integren motivaciones de relación y de percepción podrán desarrollar en el alumno capacidades insospechadas para su formación y desarrollo global (ESPIÑO MEILÁN, 1992).



Una de las aportaciones pedagógicas más importantes en este campo ha sido dada por **ESPIÑO MEILÁN** en su cuaderno **Juegos Sensitivos** (en prensa), que propone sencillos juegos visuales, auditivos, olfativos, gustativos y táctiles a desarrollar en los jardines.

Por otra parte, la **expresión literaria** también juega un importante papel como recurso didáctico en la educación ambiental. Una amplia recopilación literaria ha sido expuesta y extensamente investigada en el Jardín Botánico Canario por **HERNÁNDEZ DÉNIZ** y **PERDOMO BETANCOR**, (1985). En este sentido, una breve creación literaria por parte del alumno implica un complejo mundo de percepciones, emociones e interrelaciones que resultan de la sensibilidad a un entorno determinado y que afloran en un «momento medioambiental», (HERNÁNDEZ DÉNIZ, 1985), impulsado por el educador.

Por último, la investigación didáctica enfocada hacia la **percepción e identificación de los movimientos vitales dentro de un paisaje**, cierra un ciclo donde partiendo de la sensación (activación de los sentidos), continuando por la expresión (apoyo literario para la expresión de sentimientos y observaciones descriptivas), llegamos a la integración de la persona en el paisaje a través de la percepción directa de los movimientos que unifican la vida.

Los juegos de simulación no entrarían en este tipo de actividades donde,

lo fundamental, es percibir y hacer visible, «in situ», fenómenos que conforman un paisaje.

Algunos juegos, donde los alumnos participan percibiendo y expresando con su cuerpos, nos han permitido explorar fenómenos como el movimiento del agua sobre la tierra, la fuerza del viento, el fototropismo de las plantas, la circulación de la savia, la erosión del suelo, la cadena alimenticia... Todos estos fenómenos tienen en común el **movimiento**. Y ya que este movimiento habita en el planeta, esto es lo que mejor puede ser percibido y gozado por toda persona en cualquier lugar del mundo.

Este tipo de didáctica ambiental persigue, por tanto, el goce de aprender y existir, a la vez que propone una sensibilidad y conciencia allí donde frecuentemente el sistema educativo actual no incide.



EL DESPERTAR EN EL JARDÍN

La práctica educativa para la percepción de los movimientos en un paisaje, nos lleva primeramente a un entrenamiento en la percepción de los movimientos vitales en nosotros mismos.

El Jardín es un lugar idóneo, por su bonanza ambiental y psicológica, para la percepción de señales o movimientos corporales ante fenómenos como el frío, calor, humedad... Algunos ejercicios para la activación o relajación de la circulación y de los latidos; juegos para la interacción entre alumnos; gestos de enfado, amistad, risa, bostezos, expulsión de gases, dolor, sueño, actividad motriz... es con todo lo que podemos contar para hacer perceptibles nuestros movimientos involuntarios en el paisaje. El alumno debe entender que todos estos movimientos son perfectamente naturales y que nos ayudan a

regularnos frente al paisaje, ya que somos parte integrante de él.

A continuación, los juegos sensitivos entrenan la comunicación entre los alumnos y abren una capacidad frecuentemente olvidada, especialmente la sensibilidad táctil, olfativa y gustativa.

Ahora, ya se puede empezar a percibir movimientos más complejos en el paisaje. Estas experiencias se han de realizar en grupo. Porque es en grupo como más fácilmente se puede hacer visible o detectable lo no visible. Por ejemplo, el movimiento del agua de lluvia sobre una ladera, (su velocidad, el arrastre de tierra, los encharcamientos), no se pueden detectar con una sola gota de lluvia, sino que necesitamos todas las gotas de lluvia, todos los alumnos, para reconstruir y participar de este proceso.



Poco a poco, a través de estas experiencias, se produce un despertar de la sensibilidad. Esta sensibilidad no está representada por la vulnerabilidad del alumno frente al paisaje, sino por su comprensión e integración en el medio ambiente.

Esta podría ser una de las claves para una didáctica ambiental efectiva

en el sentido de conocimiento, respeto y buen uso del entorno inmediato, así como podría ser la **base existencial** para un posterior entendimiento de la necesidad de gestionar, conservar y repartir de manera coherente los recursos naturales que posee nuestro planeta.

CULTIVATING GREEN AWARENESS - SPECIALIST TRAILS, THEATRE AND ACTIVITIES FOR YOUNG CHILDREN

Julie FOSTER

ABSTRACT

The recently opened Centre for Environmental Education at the Australian National Botanic Gardens has greatly expanded the opportunities for students and has lead to increased demand for the Gardens' educational services.

During 1992 almost 20,000 students from all parts of Australia visited the Gardens to take part in educational programs.

This workshop will consider the experiences of the Education Section in establishing specialist children's trails, environmental theatre and holiday activities.

RESUMEN

El Centro de Educación Ambiental del Jardín Botánico Nacional de Australia ha ampliado enormemente su oferta de servicios para los estudiantes y esto ha producido un incremento en la demanda en los servicios educativos del jardín.

Durante 1992 unos 20 000 estudiantes de todos los lugares de Australia visitaron el Jardín para tomar parte en los programas educativos.

Este taller considerará las experiencias de la Sección de Educación en el establecimiento de monitores especiales para niños, teatro ambiental y actividades lúdicas.

INTRODUCTION

Canberra, the Australian Capital, is a modern city with a population of about 300,000 people. The Australian National Botanic Gardens (ANBG), was established 21 years ago and occupies an area of 90 hectares close to the centre of the city. It contains the world's largest collection of Australian native plants with more than 6,000 species represented. Its objectives are to increase knowledge, appreciation and enjoyment of Australia's plant heritage. Approximately 360,000 people visit the ANBG every year and many of these visitors come in groups which include children. The Gardens had offered very little specifically for these children. Recently however craft activities, theatre and temporary trails have been provided. These have also been available to student groups.

TEMPORARY CHILDREN'S TRAILS

Leaftail

This trail was established in the Rainforest Gully. It was based on a children's book, *Leaftail*, the story of a Leaf-tailed Gecko (lizard). It remained in place for three months and this included the summer holidays.

As part of the holiday activities the writer was brought from Queensland to conduct a number of workshops, in which children were involved in creative writing and print making. Funding for

her visit was provided by the Friends of the Gardens.



Part of flyer for *Leaftail*

The success of the Trail was due to the creative work of many of the Visitor Services staff in preparing the signs and making animal models, including 10 Leaftails which were so lifelike they were attacked by kookaburras! Staff from other areas assisted in setting up the trail and maintaining the trail.

At each stop along the trail the story and some artwork from the book were displayed. The story was read to younger children as they searched for Leaf-tail and friends, which included a frog, a pademelon and bower bird - up a tree or under a log.

The trail was very open-ended, parts of it could be visited at any time. Maintenance was required to keep the signs clean and ensure that the model animals had not been attacked by animals or hidden by children.

Snugglepot and Cuddlepie

Another trail for young children titled *Snugglepot, Cuddlepie and their Friends* was also a great success judging from the numbers of people who made return visits with children. This trail took children on a ramble through many areas of the ANBG. Before commencing the trail they collected a story sheet, map and activity booklets. At each of 8 stops the children were read part of the story and they then completed drawings or similar activities in their booklets.

A trail such as this has a limited life because plants finish flowering, their fruit are eaten by the parrots. We replaced disappearing fruit with large beads hanging in the tree and flowers were replaced with cut-out laminated repli-

cas hanging in the bush. The children were happy to accept these. This trail required a considerable amount of maintenance.

The signs and markings for the trail were attached to electric fence posts. The only problem was older children interfering with the signs. Each morning the trail had to be checked and sometimes also during the day. This trail was in place during the final month of the school year and was widely advertised to schools. Many schools took the opportunity to use this trail and most groups also had a picnic lunch in the Gardens, a great way to finish the year. Prior to commencing the trail students were introduced to some of the characters and plants they would encounter.

Stop 1



Draw one of the mountain devils on the bush

Why do you think they are called mountain devils?



The Early Devil Eyes

Blue Wrens told Snugglepot and Cuddlepie about humans they had seen in the city?



Have you seen any blue wrens in the Gardens to-day?

Stop 8

What is Lilli Pilli's skirt made from?



from the activity booklet *Snugglepot, Cuddlepie and Friends*

SPECIALIST TRAILS FOR STUDENTS

Wattle Week Trail

During Wattle Week a trail was in place which took students on a tour of the ANBG past wattles of special significance. Particular emphasis was placed on the Wattle sections of the ANBG where a large number of Australia's approximately 1000 species of wattle are grown. Yellow paint dots placed at intervals indicated the trail and each wattle plant was shown by a small yellow wooden stake with a number. Each number coincided with a number on the teachers' resource notes.

It was left to the teacher to decide how many plants were to be studied and what types of questions or observations were to be made. This idea of *providing the notes and leaving it to the teachers to decide how to use them with students*, will be used more in future. Teachers then have more control over their classes' activities and can fit the excursion to the needs of the students.

Also available in the ANBG were activities which could be done in conjunction with the Trail. These included propagation of wattles, with the emphasis on species which grow naturally in the areas from which the students came and on species which are endangered. Children's notes on how to grow wattles were taken back to school along with packets of seeds. For young-

Celebrate Wattle Week
at the
Australian National Botanic Gardens



1 - 8 September

Learn about Australia's many beautiful wattles by

- walking the Wattle Trail*
- completing the Wattle Activity sheets*
- growing a wattle*
- Wattle seeds available*
- Notes and slide sets available for loan*

*For bookings phone Environmental Education
250 9535 or 250 9547*

part of Wattle Week flyer

ger students we prepared a series of activities in the wattle section of the ANBG. These were very popular. Students learnt about endangered wattles and about Australia's floral emblem - *Acacia pycnantha* - the Golden Wattle.

Bird Month

This was celebrated in the ANBG during September 1992. About 1200 students of all ages participated. The ANBG provides a variety of habitats for a great diversity of birds, with over 160 species being seen here. September was chosen because it is a time when

many birds are becoming active, collecting material for nests or food.

The purpose of Bird Month was to increase awareness of :

◆ the characteristics of birds

◆ the diversity of birds in the ANBG

◆ the role of birds in ecosystems, particularly their relationship with plants.

What

Bird

is

That?



September

is

Bird Month

at the

Australian National Botanic Gardens

Visit the Gardens and discover:

- *how to tell an Eastern Spinbill from a Silvereye or a Noisy Friarbird*
- *which birds like to nest in gum trees*
- *what birds eat for dinner*
- *why birds need plants*
- *how to tell a Willie Wagtail's nest from a White-winged Chough's*
- *how to get birds to visit your school or home garden*

Come on our special tours

- see our slide/tape shows

*For bookings phone 'Environmental Education
250 9535 or 250 9547*

Bird Month flyer

Preparations for Bird Month included production of a package called *Discover the Birds of the Gardens*. This contained information/activity sheets, maps for locating specific bird groups, information on cats and their effects on birds and other wildlife, references and colourful stickers of endan-

gered birds. A photographic display was prepared. Binoculars were available for groups, disused nests were collected for use with students and wooden mobiles and jigsaw puzzles were particularly popular with younger students and those with disabilities. Tapes of bird calls and a slide show were

prepared. An inservice course for teachers was very well attended. The Rangers took many tours. It was an unusual exercise for many children - to be quiet and listen.

THEATRE


Treehouse

This was a play for young children performed by a local theatre group.

The performance took place on World Environment Day, 1992. *Treehouse* sensitively combines mime and movement to explore the magic of the Australian bush and the cycles of life. This play taps into the young child's imagination, a world in which everything is possible. Trees think, talk and become a variety of native animal. At the end of the play the young audience was taken on a discovery ramble through the Gardens.

TREEHOUSE

TRUCKLOADS OF FUN!



BY BRUCE KELLER AND JIGSAW THEATRE COMPANY

A World Environment Day Presentation
for 3 - 6 year olds
at the
Environmental Education Centre
Australian National Botanic Gardens

part of *Treehouse* flyer

The Cat Makes Tracks

This environmental musical for the young was performed in the ANBG during the Australian Science Festival in March 1993. It tells the story of Contes-

sa, a pleasant Manx cat who likes TV and eating tinned cat food much more than roaming in the bush. Her owner lets her wander into the bush in pursuit of what she thinks is a big mouse, but is really a baby pygmy possum. This

experience leads Contessa on an interesting adventure which she shares with the audience. We learn that cats should wear bells and be desexed. That cats and other creatures like crocodiles are not good or bad, that they are just doing what they have to do.

Cats, whether domestic or feral pose a great danger to wildlife in Australia and while this message was presented gently, it was also very clear.

This play was 40 minutes long and was seen by over 1200 children during 22 performances.

Associated with the play was an exhibition of 11 large, colourful cartoon paintings titled *Battle for the Spinifex*. These paintings tell the story of the feral animal problem in Australian deserts. A booklet of children's activities relevant to the paintings (including the script for a play) accompanied this exhibition.

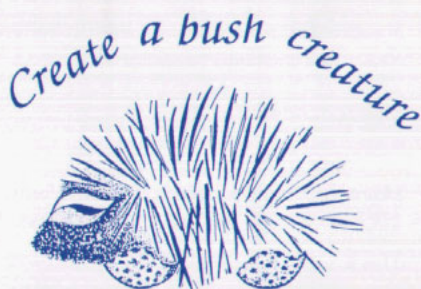


a character from *Battle for the Spinifex*

OTHER HOLIDAY ACTIVITIES

Create a Bush Creature

Activities for children in which they learn about native plants and make bush creature using their woody fruits and nuts are very popular holiday activities. Four sessions were held in January 1993. Volunteers were recruited to assist with this program. Advertising was placed in the local media and a charge of \$4.00 covered costs.



*A holiday program for children
at the*

Australian National Botanic Gardens

a bush creature

PREPARATION FOR TRAILS / THEATRE / ACTIVITIES

ANBG based

Establishment of a trail - it is important to have discussions with the gardens' staff responsible for the area through which the trail will pass. Some-

times a path will need to be changed slightly, the area may need upgrading, extra plants may need to be included. Discussions with staff at this stage will ensure problems are identified and if necessary resolved. For many good reasons staff are often apprehensive about the idea of large groups of students moving through the areas for which they are responsible.

Prior to final installation and publication of the trail it is useful to ask some people unfamiliar with the gardens to walk the trail. They will be able to identify problems related to instructions, directions and interpretation.

Maintenance of a trail

A trail must be suitably maintained. Maintenance must take place daily and any problems rectified immediately. This is best done by the staff who have installed the trail. Some trails can be very time consuming to maintain - a semi-permanent low maintenance trail would be very popular with visitors and staff. Trails must be marked clearly, it is extremely frustrating to be lost with 20 - 30 children! Maps must have landmarks such as bridges or seats shown clearly to assist people with orientation.

Curriculum based

When preparing trails/activities for use by student groups consideration must be given to ways in which a trail or activity meets certain requirements of the curriculum. What are the objectives of the trail/activity? These must be clear when the proposal is prepared. Clear objectives also make evaluation of the trail or performance easier and more worthwhile.

Advertising should include a description which will help teachers decide on the value of the activity to their students. In the case of theatre, performing arts consultants from the Education Department assess the plays for their relevance to the curriculum and then recommend them to schools.

The experience of the ANBG's Education Service with special trails, theatre and craft activities has been very positive. With improved co-ordination with other ANBG staff and assistance from volunteers they will continue. Of concern is the large numbers of local students (and relatively few from distant areas) having access to them. Forward planning and advertising to schools beyond the local area is one way of rectifying this.

PLANTS AND MATHEMATICS

G. BROMLEY

ABSTRACT

Botanic Gardens provide a rich and unique resource for education, and can play a much needed role in aiding teachers develop exciting and innovative curriculum work for schoolchildren. In order to spread environmental messages to children, it is as well to show the versatility and diversity of plant based activities across as many school topics as possible.

Demonstrating Mathematical principles is an area that is often viewed with trepidation by teachers, but by using plants and Botanic Gardens as a focus, such themes as symmetry, number work, estimation, shape and space, data handling and algebra can be delivered in a more "user friendly" fashion. The bonus is that an environmental message is delivered at the same time.

This workshop explores the themes in mathematics that can be covered using Botanic Gardens and their plant collections.

RESUMEN

Los jardines botánicos proporcionan un recurso rico y único para la educación, y puede jugar un papel muy necesario en la ayuda a los profesores desarrollando trabajos curriculares excitantes e innovadores para los escolares. Con el fin de difundir ideas ambientalistas entre los niños, es muy positivo mostrar la versatilidad y diversidad de las plantas basándose en tantas actividades como sea posible, al igual que en muchas materias escolares.

La demostración de principios matemáticos es un área a menudo vista con temor por los profesores, pero mediante el uso de las plantas y los jardines botánicos como enfoque, temas tales como la simetría, cálculo numérico, estimación, forma y espacio, toma de datos y álgebra pueden ser desarrollados de un modo más «afable para el usuario». La ventaja es que un mensaje ambiental es enviado al mismo tiempo.

Este taller explora los temas matemáticos que pueden abarcarse usando los jardines botánicos y sus colecciones de plantas.

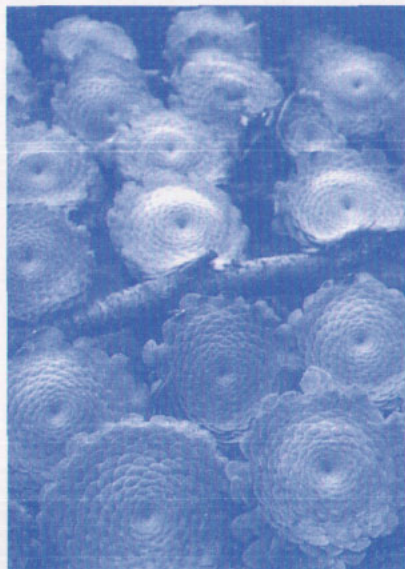
INTRODUCTION

Botanic Gardens are increasingly aware of their role as educators of schoolchildren and educationalists and many now provide a range of topics, focussing on plants, to enhance school programmes. In Britain, where teachers are under pressure to deliver curriculum targets, there is a real need to justify every trip out of school and programmes offered at Botanic Gardens are coming under scrutiny to see if they meet the needs of schools! Offering programmes that incorporate Mathematics is a sure way to endear the Botanic Garden to the teaching fraternity (or sorority!) Mathematics at primary and lower secondary levels is often a curriculum area that can cause problems for non-specialist teachers. Such teachers are occasionally ill at ease with the mathematical concepts they have to explain, and the result is that both teachers and students suffer in the learning process. Plants can be used as a focus to deliver many mathematical concepts, and often provide a more user-friendly resource for mathematics. Even teachers who are extremely conversant with the delivery of this subject can find that using plants provides a new and exciting approach to Mathematics! And what do the Botanic Gardens get out of the exercise? Information about the plants, their uses and the work of the gardens themselves can be packaged into the teaching resource, ensuring that another outlet is tapped into to deliver vital environmental messages.

USING PLANT FORM AND FUNCTION

There are numerous ways of using plants as a teaching resource for mathematics. Several areas within the British National Curriculum relate to pattern and symmetry and plants show a wonderful diversity of rotationally symmetrical and bi-laterally symmetrical forms, amongst many others! Botanic Gardens have an immense wealth of such shapes to draw on as examples, and often stimulate skills in children for spotting similar symmetrical shapes in their surroundings. Children will naturally absorb the fact that the plant kingdom is extremely diverse at the same time, information that will enhance their science studies. Symmetry and pattern can be noted in flowers, fruits, seeds, leaves and stems, as well as in overall growth patterns; Botanic Gardens can therefore provide a rich resource to work with even in "seasonal" regions.

The principles of Taxonomy are also rooted in Mathematics. Plant classification is based on the number and arrangement of flowering and fruiting parts of the plant, on whether the leaves are arranged alternately, are opposite, are spiralled or are whorled and on whether plant parts are present or absent. All taxonomists play the "numbers game" to identify their plant! It can be so much fun to play Sherlock Holmes and track down your plant by counting numbers of flower parts, or examining their arrangement! Children



"Enlargements" seen in rows of Aeoniums in the nursery of Jardín Botánico Canario «Viera y Clavijo»

at Kew become taxonomists at the age of 7 or 8, and revel in the Latin names at the same time! If children can pronounce *Tyrannosaurus* they can certainly manage Monocotyledon; its the adults that have the problem! As children look to see if their plants have their flowering parts in 3's (monocotyledons) or in 4s' / 5's (dicotyledons), they also take on board the name and function of the parts they are looking at; this instantly builds links to the science curriculum.

Children can also be asked to present their information on aspects of the plants in a variety of ways. This allows teachers to develop such skills as table

or graph production; in some instances the development of skills in Information Technology will be even more appropriate.









Certain games are also very suitable for developing number skills. An environmental game on how pollution is passed down through food chains involves children taking on the role of elements within a selected food chain; the starting point is with minerals etc in the soil and soil water, some of which may be polluted. These "polluted" and "non-polluted" resources are represented by coloured paper stickers for polluted water or minerals which are "taken up" and white paper stickers for non-polluted materials which are "taken up". The number of children at each stage of the chain is important; children start to understand the "pyramid of numbers" effect in food webs and chains. For example teachers could select children to role play: 20 plants, 8 herbivores, 3 carnivores, 1 top carnivore etc. The number of pieces of paper representing polluted and non-polluted "food" that is "taken up" (ie collected / eaten) through each part of the food chain can be counted and monitored as it is passed on from group to group. There are several opportunities for mathematics to be used here, but in an enjoyable way... and the environmental messages are getting passed on as well!

One particularly exciting way to develop several mathematical themes is to

incorporate them into a "Mathematics Trail" for your garden. This idea, first developed at Kew by Dr. Mary Harris of London University, provides a fun way for children, and also adults, to "discover" the plants and mathematics at the same time. Dr Harris developed an in-

novative trail around the Princess of Wales Conservatory, Kew, using diversity of plant form and plant symmetry found throughout the glasshouse; you could however also use the pattern and symmetry of landmarks or buildings well known on your site to excellent effect.

Some simple transformations

	Image	Outline
translation: a sliding without turning		
enlargement: from a centre		
reflection: about an axis		
rotation: about a fixed point		

Symmetry in Mathematics is the ability of a shape to fit its own outline in more than one way and can be seen for example in the following ways: (see diagram and notes)

The workshop session participants at Las Palmas, having looked at various aspects of symmetry eg rotation, transformation, reflection etc. were launched on an unexpected fact finding mission across the Garden to procure some examples of plants to use for a "Las

Palmas Mathematics Trail". Several came back, (which proves that at least some participants were still awake at the end of the workshop!) and may still, at some future date, find themselves on sheets for use by visitors to Jardín Botánico Canario "Viera y Clavijo".

Useful Resources and Contacts

Dr Mary Harris, University of London
Institute of Education

The Education Officer, Royal Botanic
Gardens, Kew, Richmond, Surrey

The Education Officer, Chelsea Physic
Garden, London

The Education Section, The Natural

History Museum, London

"Common Threads", a resource based
on Mathematics and Textiles

from Mathematics in Work, Statistics
and Computing, University of London
Institute of Education, 28 Woburn
Square, London WC1H 0AA.

POR LA RECUPERACIÓN DE LA NATURALEZA Y EL HOMBRE COMO ELEMENTO ESENCIAL: PROGRAMA CULTURAL TOMÁS SÁNCHEZ

Marta Aleida DÍAZ DUMAS

ABSTRACT

A project of environmental education for students from a special school has been conducted for educators of National Botanical Garden of Cuba.

RESUMEN

Un proyecto de educación ambiental para estudiantes de una escuela especial ha sido realizado por educadores del Jardín Botánico Nacional de Cuba.

El programa cultural Tomás Sánchez, respaldado por la obra de este pintor cubano es un proyecto que se propone fomentar la continuidad y desarrollo de la tradición paisajística cubana y promover la conservación del medio ambiente.

Dentro de esta línea de trabajo se ha puesto en marcha una primera experiencia en la escuela especial Víctor Marante Prieto, enclavada en el valle de Guanabacoa, que atiende a niños con problemas de conducta.

Uno de los propósitos del proyecto

integral en la escuela es la realización de trabajos de limpieza y reforestación en el entorno de la escuela, que es hoy una cantera abandonada de roca serpentínica convertida en un basurero, y donde existen pocetas a las que se les atribuyen propiedades medicinales. Esta cantera en sus orígenes fue una de las importantes áreas de vegetación de serpentina de la Habana, conocidas como cuabal.

Los trabajos de limpieza y reforestación son orientados por la Comisión Provincial de Medio Ambiente del Po-

der Popular de la ciudad de la Habana, con el apoyo del Jardín Botánico Nacional. Estos trabajos serán ejecutados por los propios estudiantes lo que propiciará modificaciones en la actitud.

Desde el punto de vista pedagógico estos estudiantes presentan trastornos conductuales que los han llevado a problemas en el aprendizaje y los procesos cognocitivos. El trabajo que se desarrolla con ellos en esta escuela está encaminado a la modificación de su actitud y de hecho recuperar su función social desde dos ángulos: cómo ven ellos a la sociedad y cómo la sociedad los ve a ellos.

Ahora bien, la modificación que se quiere lograr en el entorno de la escuela, no puede ser una tarea impuesta, sino que es necesario vincular a estos niños y jóvenes a la naturaleza y sensibilizarlos en la necesidad del cuidado y conservación del medio. El programa de educación ambiental concebido especialmente dentro del proyecto pretende cambiar en los estudiantes la actitud hacia la vida y la sociedad en los niveles cognocitivos, emocional y conductual.

Esta es una nueva experiencia ya que en estudiantes de la enseñanza general los conceptos priman sobre las emociones y conductas, sin embargo en el tipo de estudiantes con problemas de conducta es necesario motivar el aspecto emocional como forma de cambiar la conducta y los conceptos.

La enseñanza de las ciencias y la educación ambiental requieren la aplicación de metodologías afectivas.

La verdadera educación cambia el significado de la experiencia humana (NOVAK Y GOWIN, 1984) y en este sentido la acción educativa ha de conseguir un enriquecimiento de las experiencias personales con el medio natural y en particular la relación hombre-planta.

Aquí chocamos con varios factores: la concepción antropocéntrica de la realidad que tiene un niño; el esquema conceptual del niño, sobre todo el del medio urbano, donde el concepto «ser vivo» excluye al mundo vegetal y a estos problemas generales se añaden los factores afectivos y educativos desfavorables que han determinado los trastornos de conducta.

Todo ello nos obliga a implantar un sistema de educación con grandes motivaciones que propicien el interés por la adquisición del conocimiento.

OBJETIVOS:

- 1.- Fomentar a través de un programa educativo una cultura de la naturaleza y crear hábitos de cuidado y protección del medio ambiente en niños y jóvenes con problemas de conducta.
- 2.- Lograr cambios en la actitud de niños y jóvenes con problemas de conducta que le permitan su incorporación a la sociedad.

CARACTERÍSTICAS DE LA ESCUELA VÍCTOR MARANTE

Esta escuela brinda enseñanza especial a menores que han cometido algún hecho delictivo de menor grado. Es de régimen interno con salidas sistemáticas los fines de semana. El colectivo de profesores está compuesto por pedagogos de la enseñanza especial y los programas de estudio se basan en la combinación del trabajo y el estudio en aulas talleres. Además del colectivo de profesores cada grupo es atendido por instructores de oficio y personal médico especializado.

Caracterización del grupo:

- Nivel escolar: 7° grado
- Edades: 12-18 años
- Mujeres: 5
- Varones: 10

Causas que motivaron la separación de la enseñanza general:

- Hurto
- Conducta sexual inadecuada
- Agresión

Principales manifestaciones:

- Hiperquinesia
- Desacato a la autoridad
- Agresividad

Principales características del medio

social:

- Hijos de padres alcohólicos
- Promiscuidad en el hogar
- Falta de atención familiar
- Reunión con elementos antisociales

ACTIVIDADES

Las actividades deben tener como requisito:

- Desarrollarse al aire libre y en movimiento
- Actividades competitivas por equipo
- Desarrollo de juegos como motivación

Las actividades se realizan en ciclos con objetivos específicos.

Ciclo 1

Objetivos:

- 1.- Lograr a través de sensaciones agradables la fuente primaria de adquisición del conocimiento.
2. Identificar al estudiante con un cual.
3. Que el estudiante comprenda la acción del hombre sobre el medio natural.

Actividades

- 1.- El entorno de mi escuela
- 2.- Un paseo por el JBN

-
- 3.- Conozcamos un cuabal
4.- La acampada

El objetivo 1 está implícito en todas las actividades.

El objetivo 2 se logra a través de trabajos en cuabales naturales y un cuabal artificial en áreas del Jardín Botánico Nacional.

El objetivo 3 se cumple al comparar el estudiante el cuabal natural, el entorno de la escuela degradado por la acción humana y cómo el hombre puede construir artificialmente un cuabal para

el cuidado y conservación de las especies.

Cada actividad cuenta con una guía de trabajo.

EVALUACIÓN DE RESULTADOS

La evaluación se hace a través de las guías de trabajo donde la expresión plástica resulta la vía de interpretación. Se toman en cuenta: expresión plástica, utilización del color, precisión de formas, detalles de imagen.

ACTIVIDADES ESCOLARES EN EL MUSEO DE ETNOBOTÁNICA: INTEGRACIÓN DE PLANTAS, CULTURA E HISTORIA

María del Mar GUTIÉRREZ-MURILLO; Javier FONSECA-AGUILAR; Josefa JURADO-LÓPEZ y Francisco VILLAMANDOS DE LA TORRE

RESUMEN

De 1988 a 1992 el Área educativa del Jardín Botánico de Córdoba (España) y la Junta de Andalucía han llevado a cabo un proyecto educativo escolar en el Jardín Botánico. Dicho proyecto se ha centrado en una amplia muestra de escolares de Córdoba. Los principales objetivos son el descubrimiento del mundo vegetal promoviendo al mismo tiempo la conservación. Este período ha estado enfocado especialmente a la investigación educativa (publicaciones, actividades para la visita de los alumnos al jardín, seminarios para los profesores...) que lleve a los escolares a conseguir una diversidad de aprendizaje y una educación actualizada sobre temas de medio ambiente.

Durante el último año académico (92-93) la actividad educativa del Jardín Botánico estuvo subvencionada solo por el Ayuntamiento a través de diferentes programas educativos. Al mismo tiempo una nueva idea, el Museo de Etnobotánica, se inauguró en septiembre de 1992 ofreciendo realmente una peculiar visión de las relaciones históricas entre los seres humanos y las plantas. Esta idea ha presentado a la vez ventajas e inconvenientes al ser utilizada como recurso didáctico en los colegios (en forma y contenido).

Siguiendo las mismas líneas de trabajo de años anteriores, nos hemos propuesto salvar las grandes dificultades y utilizar las ventajas del Museo para conseguir el acercamiento de los escolares al mundo de las plantas y, fomentar su conocimiento, respeto y conservación. Venimos poniendo en práctica progresivamente la utilización del Museo de Etnobotánica como soporte físico y como marco simbólico de dichas actividades (talleres, juegos, dramatizaciones, ambientaciones, biblioteca...

ABSTRACT

School activities at the Etnobotanical Museum: an integration between history, culture and plants

From 1988 to 1992 the Educational Area of the Botanical Garden of Córdoba (Spain) and the Junta de Andalucía have carried out an educational project-school at the Botanical Garden. The project has been centre on a broad sample of school-children in Córdoba. Its main objectives are the disclosure of the vegetal world promoting, at the same time, its preservation. This period has been specially focused on the educational research (publications, activities for the visits of the students to the garden, seminars for teacher...), that will drive the students to achieve a meaningful learning and an actual education on environmental matters.

The last academic year (92-93), the educational activity of the Botanical Garden is only supported by the local city council, through different Educational Programmes. At the same time, a new device, the Etnobotanical Museum, was inaugurated in September 1992. It offers a quite peculiar vision of the historic relationship between human being and plants. This special conception has developed both an useful and inconvenient role when it was used as a didactic resource at the school (both in form and content).

According to the same aims we had earlier years, we sorted out those difficulties and definitely use the Etnobotanical Museum as a device to approach the students to the plants, promoting its knowledge, respect and preservation. We have been increasingly using the Etnobotanical Museum as a physical and supportive frame to house a large range of activities: e.g. games, plays, workshops, a library...

De 1988 a 1992 el Área Educativa del Jardín Botánico de Córdoba, en colaboración con la Consejería de Educación de la Junta de Andalucía, ha venido desarrollando un proyecto educativo denominado: "La Escuela en el Jardín Botánico". Con él se ha pretendido la divulgación del mundo vegetal, promoviendo al mismo tiempo, su con-

servación. Durante este período, ha existido una especial preocupación por la investigación educativa (traducida en elaboración de publicaciones, actividades y experiencias para las visitas, cursos para profesores...) que lleve a la consecución de un aprendizaje significativo, una verdadera educación en temas medioambientales. Todo ello diri-

gido a un amplio espectro de la población escolar cordobesa.

En este curso (92/93), se ha producido un cambio en la actividad educativa del Jardín, soportada ahora sólo con recursos propios y con los de los Programas de Acción Educativa del Ayuntamiento de la Ciudad. Coincidiendo con esto, la oferta educativa ha incrementado en gran medida su infraestructura, desde Septiembre de 1992, con la inauguración del Museo de Etnobotánica.

El contexto teórico general en el que se enmarca la actuación tiene como referente fundamental la Educación Ambiental y, en concreto, la educación para la conservación de los recursos vegetales. Todo ello en el marco del papel a desarrollar por los J.J.BB. en esta labor.

Desde esta perspectiva, lo que el Museo de Etnobotánica aporta es un recurso específico para este fin, centrado en el presupuesto de que la Etnobotánica, como estudio de las relaciones culturales del hombre y la planta, supone un óptimo acercamiento al principal problema educativo que se nos plantea: Poner de relevancia la importancia que el mundo vegetal tiene para la vida de las personas y de cada uno de nosotros en particular.

La concepción concreta del Museo avanza en el desarrollo de la actividad pedagógica. Además de sentar este

contexto, propone unos procedimientos centrados en explicaciones concretas, que buscan la elaboración cognitiva del visitante o del escolar, hacia la creación de un esquema cognitivo en el que se integran: El hombre y su historia; la diversidad de usos de las especies vegetales y; la situación actual, consecuencia de los 500 años de intercambio entre América y Europa y punto de partida para un futuro incierto.

La impactante novedad que supone el Museo, así como su peculiar manera de hacer un recorrido por la historia de las relaciones humanidad-planta, han sido al mismo tiempo ventajas e inconvenientes a la hora de ser utilizado como recurso didáctico en la escuela (en su forma y contenido).

Siguiendo las mismas líneas de trabajo de años anteriores, en el Área Educativa nos hemos propuesto salvar las grandes dificultades y utilizar las ventajas del Museo para conseguir el acercamiento de los escolares al mundo de las plantas y, a continuación, fomentar su conocimiento, respeto y conservación.

En este sentido, venimos poniendo en práctica, incipientemente, una serie de experiencias y actividades a las que les hemos dado forma de talleres, juegos, dramatizaciones, ambientaciones, biblioteca... que utilizan el Museo de Etnobotánica como soporte físico y como marco simbólico de dichas actividades.

I.- MUSEO DE ETNOBOTÁNICA

Con la inauguración del Museo de Etnobotánica, el Jardín Botánico ha incrementado su amplia oferta cultural y educativa, constituyéndose en uno de los jardines europeos con más contenidos y de mayor atractivo para el visitante no especialista.

El Museo de Etnobotánica es, por su estética, por su novedad expositiva y por sus contenidos, el mayor atractivo que oferta el Jardín en la actualidad, especialmente para los escolares, que encuentran en sus instalaciones un lugar donde aprender jugando.

1.- Orígenes

La inauguración del Museo de Etnobotánica ha sido la culminación del proyecto ETNOBOTÁNICA 92, desarrollado por el Jardín Botánico de Córdoba dentro del marco del Programa de la Junta de Andalucía: ANDALUCÍA 92.

Así nació ETNOBOTÁNICA 92 en Córdoba.

Fue organizado por el Jardín Botánico de Córdoba con las aportaciones del Ayuntamiento, Universidad, así como las de organismos nacionales e internacionales.

El proyecto se desarrolló en varias etapas:

- ◆ Un Programa Cultural: con una duración de cuatro años se ha pretendido el acercamiento de la sociedad cordobesa al complejo mundo vegetal.
- ◆ Un Congreso Internacional: que acogió en Córdoba a cientos de participantes de las más diversas disciplinas y nacionalidades.
- ◆ Una Exposición: dirigida a toda la sociedad, que da a conocer los mensajes y contenidos relacionados con el proceso histórico y cultural que incluye ETNOBOTÁNICA 92. Para acoger esta Exposición, y como sede de la misma, el Jardín Botánico ha ampliado sus instalaciones con tres invernaderos monumentales, cuatro salas de museo y un salón de actos (Museo de Etnobotánica).

2.- Objetivos

- ◆ Rendir homenaje a las culturas tradicionales relacionadas con el manejo del mundo vegetal.
- ◆ Reconocimiento del singular significado histórico de 1.492 como Encuentro, que supuso una transferencia de culturas, especies vegetales e información, invitándonos a reflexionar sobre el Patrimonio Etnobotánico que América dio al mundo, y que aún continúa dando.
- ◆ Reconocimiento de la gran importancia de la relación humanidad-planta.

- ◆ Dar a conocer la importancia del intercambio cultural y fitogenético entre el Nuevo y el Viejo Mundo.
- ◆ Ofrecer una panorámica sobre la situación actual y promover reflexiones sobre el mañana inmediato de las relaciones humanidad-planta.
- ◆ Fomentar la conservación de los recursos etnobotánicos y divulgar las actuaciones de los diversos organismos nacionales e internacionales.

3.- Resumen del guión expositivo

El Museo consta de tres salas de exposición permanente en las que se estudian las diferentes modalidades en la interacción humanidad-planta mediante una gran variedad de objetos etnobotánicos, módulos instalados con sistemas de transiluminación, piezas de museo, paneles interactivos y documentación gráfica, para acabar con una reflexión sobre la trascendencia de la conservación de la biodiversidad del planeta. La cuarta sala está dedicada a exposiciones itinerantes. Los Invernaderos de Exhibición de Flora Americana muestran una extensa colección de la riquísima flora de este continente, distribuida en tres pabellones (templado-húmedo, cálido y xerofítico).

II.- LA ESCUELA EN EL MUSEO

1.- Marco general en el desarrollo de las actividades del área educativa dentro del Museo de Etnobotánica

El Museo de Etnobotánica no es sólo un lugar de exposición de objetos con información. Marca un entorno donde el visitante es trasladado en el espacio y en el tiempo a lo largo de todo el recorrido, conducido por un guión expositivo.

Los escolares pueden encontrar en él un marco tremendamente atractivo para llevar a cabo sus actividades, así como para la realización de descubrimientos realmente impactantes.

Como una de las características didácticas más singulares de este Museo habría que destacar la continua preocupación por contextualizar cada tema, cada información, dentro de su referente social e histórico. De esta forma, el profesorado puede encontrar las referencias necesarias para hacer entender las distintas aportaciones de la ciencia en el momento histórico o social en el que tuvieron lugar.

En todo momento las experiencias en el Museo propuestas a los escolares van encaminadas a su utilización como recurso didáctico para la Escuela dentro del ámbito de la Educación no formal.

2.- Justificación didáctica de las experiencias escolares en el Museo

Con la inauguración de las nuevas instalaciones, el Área Educativa del Jardín Botánico encontró una realidad concreta y unas necesidades a cubrir a la hora de utilizar el Museo como recurso didáctico.

El análisis de la realidad del Museo se concretó, en sus inicios, en los siguientes puntos:

- Novedad que suponen las instalaciones tanto para el Área Educativa del Jardín como para los escolares, en el diseño de líneas de trabajo y utilización didáctica de las mismas.
- Impacto de los recursos museográficos de las instalaciones.
- La gran cantidad de contenidos existentes en el Museo y sus delimitaciones didácticas.

El Área Educativa está intentando cubrir algunas de las necesidades que plantea el sistema educativo, creando al mismo tiempo otras, relacionadas con el conocimiento e integración del mundo vegetal como fundamento para la conservación, no sólo de la planta, sino también de la cultura que genera.

Teniendo en cuenta la realidad concreta en la que nos movemos y las necesidades a cubrir, el Área Educativa del Jardín se ha marcado una serie de objetivos en la planificación de expe-

riencias con escolares en el Museo:

- Acercamiento de los escolares al mundo vegetal que les lleve a interesarse afectivamente en su descubrimiento y comprensión.
- Fomentar el interés por la observación de los procesos naturales que les provoque la necesidad de un conocimiento más profundo de los mismos.
- Incitar al descubrimiento de las necesidades de protección y conservación del mundo vegetal.
- Ayudar a que los escolares se impliquen - personal y grupalmente - en la protección de las plantas y revalorización de las tradiciones que generan las culturas que se sirven de ellas.

Una vez analizada la realidad, y habiéndonos marcado una serie de objetivos, el Área Educativa del Jardín ha diseñado unas propuestas de actividades que se concretan en experiencias a realizar con los escolares. Estas propuestas giran en torno a talleres, dramatizaciones, juegos, marcos simbólicos, etc.

Estas actividades surgieron tras una primera fase, en la que miles de alumnos cordobeses tomaron contacto con el Museo. Nuestra actuación se limitó en un principio a facilitar a los escolares el acercamiento a las nuevas instalaciones, su acceso a la comprensión de los mensajes del guión expositi-

vo, familiarizarles con los recursos del Museo y entrenarles en el correcto uso y extracción autónoma de la información. Durante esta fase se hizo un continuo seguimiento de las expectativas iniciales de los escolares, sus reacciones y del desarrollo y validez de las actividades.

Paralelamente a este seguimiento, se fueron diseñando una serie de experiencias destinadas a ser llevadas a cabo en una fase posterior de actuación.

Superada la primera fase, se fue detectando que la realidad escolar exigía dar un paso más. Era el momento de dialogar y elaborar cuestionarios para recabar información sobre las diferentes ideas previas y posteriores con las que los escolares llegan y las que adquieren tras su paso por el Museo, en relación con los temas allí tratados.

Toda esta información nos ha llevado a comprobar que los niños llegan con muchas ideas erróneas susceptibles de ser cambiadas.

Precisamente con el ánimo de cambiar ideas y esquemas y para que haya construcción de conocimiento con un aprendizaje significativo, teníamos muy presente que habríamos de seguir los procesos naturales que les llevarán al mismo:

♦ El primer paso, era crear conflicto, controversia en el pensar y sentir de los niños.

♦ El segundo, sería ayudarles a romper algunos esquemas.

♦ Y el tercero, ayudarles a crear unos nuevos que sustituyeran a los anteriores.

Para el desarrollo de este proceso se han puesto en marcha las experiencias ya diseñadas y que pasamos a describir.

3.- Actividades escolares en el Museo de Etnobotánica

Talleres sobre plantas de interés etnobotánico

- **Nº de participantes:** 15 alumnos por taller.

- **Niveles educativos:** Educación Infantil, Primaria, Secundaria y Adultos.

- **Desarrollo de la actividad:** se trata de acercar al alumnado a la cultura que generan plantas de alto interés etnobotánico en Andalucía (olivo, alcornoque, azafrán, esparto...). Estos talleres se estructuran en torno a cinco grandes bloques: gastronomía, industria, artesanía, cestería y combustibles. Por ejemplo, en los talleres relacionados con el olivo se realizan las siguientes experiencias:

♦ **Gastronomía:** obtención de aceite, conservación de alimentos con aceite, aliño y condimentación, realización de platos, pruebas de cata, ali-

ños de distintas variedades de aceitunas, recogida e invención de recetas para la realización de un fichero...

- ♦ **Industria:** elaboración de medicamentos, recetas medicinales, candiles de aceite, cosméticos; elaboración de documentos con información sobre el uso industrial de esta planta...
- ♦ **Artesanía:** tallas en madera, taracea, elaboración de collares, juguetes, murales...
- ♦ **Cestería:** elaboración de canastos con la vareta del olivo.
- ♦ **Combustibles:** elaboración de picón y carbón vegetal con leña de poda del olivo, empleo del aceite como combustible...

- **Observaciones:** Estos talleres se pueden realizar de forma simultánea, adaptándose a los diferentes niveles educativos a los que van dirigidos.

No se circunscriben a estas plantas únicamente, pudiéndose incluir muchas otras.

Parte de la preparación o desarrollo de estas actividades pueden realizarse tanto en el aula como en las instalaciones del Jardín.

Las plantas son... las plantas nos dan... ¡las vamos a conservar!

- **Nº de participantes:** un aula escolar, que se subdividirá en 6 equipos.

- **Edad:** de 9 años en adelante.

- **Desarrollo de la actividad:** consiste en dar a conocer la Etnobotánica, el Museo y la necesidad de la conservación de la cultura y de la planta. Esto se consigue a través de un juego de preguntas y respuestas con el soporte físico de un tablero de grandes dimensiones (10 m x 10 m) con forma de flor, donde los participantes se mueven por él a modo de fichas.

Las preguntas están relacionadas con plantas del Nuevo y Viejo Mundo, en su doble vertiente:

ETNOLÓGICA (Historia, leyendas, textos y curiosidades; alimentación; medicina y cosmética; mundo espiritual; música, poemas y juegos; vivienda y vestido; artesanías objetos domésticos)

BOTÁNICA (nombre científico; dibujo; clasificación botánica; estructura y ciclo de vida; condiciones de suelo, clima y altitud; origen del cultivo; distribución geográfica actual).

Las respuestas están pensadas para ser extraídas tanto de la información que facilita el Museo, como de una pequeña biblioteca que hemos elaborado expresamente para ello. Las res-

puestas las da el portavoz de cada equipo tras un pequeño debate entre los componentes del mismo, siendo éste el punto neurálgico del juego. Cada acierto se convierte en la obtención de las diferentes partes para formar un árbol (raíz, tallo, ramas, hojas, flores, frutos y semillas). Gana el equipo que con mayor rapidez logre formar un árbol.

- **Observaciones:** La información de la biblioteca incluye 100 plantas del Viejo y Nuevo Mundo, pudiéndose ampliar progresivamente.

Esta actividad se desarrolla al aire libre, en la explanada de acceso al Museo.

La información de la biblioteca, a pesar de estar pensada para el juego, puede ser muy útil en otras actividades del aula. Sería por ello interesante que los centros escolares dispusieran de ella.

Cuadernos escolares de etnobotánica

- **Nº de participantes:** un aula escolar.

- **Niveles educativos:** Educación Infantil, Primaria, Secundaria y Adultos.

- **Desarrollo de la actividad:** consiste en fomentar la actitud investigadora en Etnobotánica para la posterior elaboración de cuadernos de trabajo a los que se van incorporando fichas de trabajo

sobre plantas de interés etnobotánico.

- **Observaciones:** Esta actividad puede realizarse en el aula, previa o posteriormente a visitas al Museo.

Las fichas de trabajo se adaptarán a los diferentes niveles educativos.

Ambientaciones en diferentes marcos simbólicos

- **Nº de participantes:** un aula escolar.

- **Niveles educativos:** Educación Infantil, Primaria, Secundaria y Adultos.

- **Desarrollo de la actividad:** consiste en la ambientación de la cuarta sala del Museo, dedicada a exposiciones itinerantes, con diferentes marcos simbólicos (el Encuentro con el Nuevo Mundo, los Ecosistemas, un viaje a través de la Historia y de países...) que introduzcan a los escolares vivencialmente en el mundo de las plantas y su cultura.

- **Observaciones:** Esta actividad está programada para que los escolares pasen un día en el Jardín Botánico, en el que se realizan numerosas y diversas actividades.

Los resultados de los trabajos realizados hasta el momento nos ponen sobre la pista de que, es a través de la vivencia cercana de la relación

humanidad-planta, en todos sus aspectos, como mejor se llega al primer paso del camino hacia la conservación étnica y vegetal. Nos estamos refiriendo a Etnobotánica para la conservación,

instrumento de enorme eficacia dado el prisma de humanización que aporta y que facilita la comprensión por parte del alumnado.

DEVELOPPER UNE STRATEGIE DE RELATIONS PUBLIQUES POUR UN JARDIN BOTANIQUE

Didier J. ROGUET

RÉSUMÉ

L'atelier est divisé en trois parties.

Une partie introductive présente différents aspects liés à la communication externe dans un Jardin botanique. Elle aborde les avantages inhérents à la mise en place d'une stratégie de relations publiques.

La deuxième partie a permis aux participants d'élaborer une stratégie, d'en discuter le contenu et les priorités.

Un troisième partie pratique aborde les notions d'image, son fonctionnement et sa subjectivité.

Une synthèse devrait permettre de fixer un cadre l'élaboration d'une stratégie de communication externe et de relations publiques pour les jardins botaniques.

RESUMEN

Elaboración de una estrategia de relaciones públicas para los jardines botánicos

El taller está dividido en tres partes:

Una parte introductiva presenta diversos aspectos relacionados con la comunicación externa de un jardín botánico. Aborda los avances inherentes a la puesta en práctica de una estrategia de relaciones públicas.

La segunda parte permite a los participantes abordar una estrategia, discutir el contenido y las prioridades.

Una tercera parte práctica aborda las nociones de imagen, su funcionamiento y su subjetividad.

Una síntesis deberá permitir fijar un cuadro de elaboración de una estrategia de comunicación externa y de relaciones públicas para los jardines botánicos.

ABSTRACT

Developing a public relations strategy for a Botanical garden

The workshop is divided in three parts:

An introductory part presents the different aspects of external communication of a Botanical Garden. It will touch upon the advantages that are inherent to the establishment of a public relations strategy.

The second part has allowed participants to elaborate a strategy, discuss its content and priorities.

The third part more practical has raised the issues of image, vector and targeted public.

Finally, a synthesis should provide the framework for developing an external communication strategy for botanical gardens.

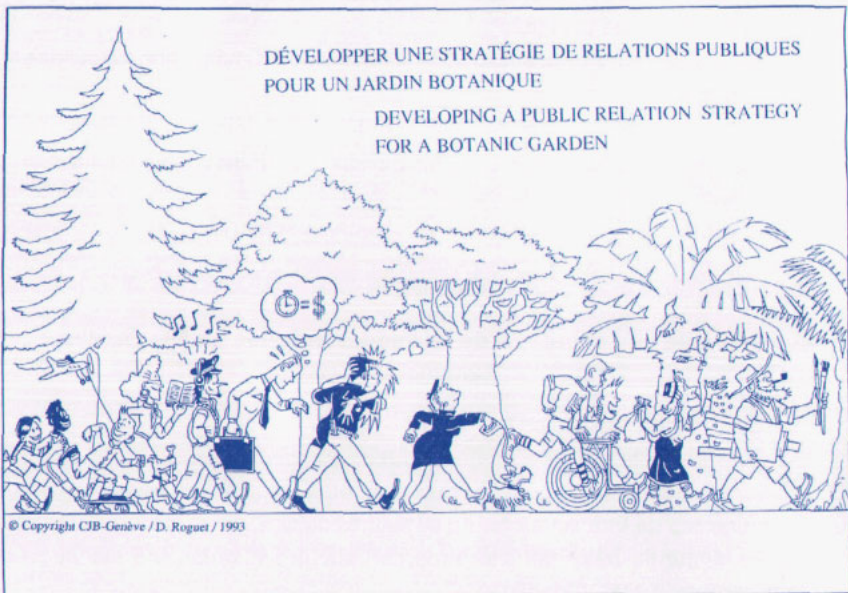


Fig. 1

PREAMBULE

Il n'est pas aisé de rendre compte par écrit du déroulement d'un atelier qui se veut par essence interactif, très illustré et inventif dans sa présentation. La forme même de l'atelier, l'opposé d'une conférence ex-cathedra, induit cette difficulté. Nous allons néanmoins essayer de la surmonter et de vous proposer un reflet imagé de cette matinée fort

intéressante et productive, qui s'est déroulée par une splendide journée de mai dans le cadre enchanteur du Jardin Botanique Viera y Clavijo (Gran Canaria).

"Relations publiques", un terme qui fait peur, un terme qui fait appel à des critères économiques et commerciaux, un terme qui n'a rien à voir avec les



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Fig. 2

missions de recherche et d'éducation d'une institution scientifique comme des Conservatoire et Jardin botaniques. C'est peut-être vrai mais ceux qui pensent de cette façon font fausse route et nous allons tenter de le démontrer à travers ces quelques lignes. Le compromis entre rigidité scientifique et libéralisme économique est souvent devenu indispensable, si ce n'est vital pour un musée scientifique.

INTRODUCTION

Le terme RELATIONS PUBLIQUES (R.P.) implique beaucoup plus que la simple notion de relation AVEC le public, puisqu'elle englobe toute la mise en scène inhérente à l'attractivité et à la valorisation du lieu ou de la manifestation en question.

Plus que tout autre secteur d'activités d'un jardin botanique, celui des relations publiques doit être pensé et animé par une stratégie car il dépend directement de facteurs externes, par essence difficilement contrôlables.

Les questions préliminaires, qu'il faut se poser pour évaluer ces besoins en terme de R.P. et éventuellement établir un plan d'actions ou une stratégie, sont les suivantes:

- Le jardin botanique est-il (assez) connu dans sa région?
- Souhaite-t-il accueillir plus (ou moins) de visiteurs?

- Souhaite-t-il valoriser ses collections et le travail qui leur est lié?

Si vos réponses sont respectivement NON, OUI et OUI, alors poursuivez le questionnaire ci-dessous. Si ce n'est pas le cas: votre jardin est assez connu, il ne souhaite pas être plus visité et ne désire pas valoriser ses collections auprès du public. Cet article vous concerne peu. Vous avez beaucoup de chance mais pensez quand même au vieillissement naturel de la branche somptueuse sur laquelle vous êtes assis, elle pourrait céder un de ces jours!

Poursuivons cette petite enquête:

- Votre jardin botanique connaît-il son public (type, fréquentation, but de sa visite, etc...)?

- A-t-il une (ou des) mission(s) spécifique(s) (enseignement, éducation, loisirs, tourisme, etc...) vis-à-vis de ses commanditaires?

- Fait-il l'objet d'attentes particulières (cours universitaires, éducation pour les écoles, visites, expertises...)?

- Votre public est-il content de sa visite?

- A-t-il vu ce que vous souhaitiez qu'il voie durant sa visite?

Lorsqu'on a répondu aux questions ci-dessus et analysé les quelques paramètres qui en émanent, on a déjà fait une grande partie du chemin menant vers la prise de conscience des besoins relationnels du jardin en question et vers la mise en place d'une stratégie de

relations publiques. Cette dernière aura pour but la prise de contact, imagée ou physique, des publics réels, ciblés ou potentiels du Jardin botanique avec celui-ci. Le feedback résultant de cette confrontation est l'élément moteur de votre stratégie. Ne l'oubliez jamais. Un simple sondage ponctuel à l'entrée du Jardin, une collaboration avec l'office du tourisme local ou les hôteliers peut permettre d'obtenir des informations intéressantes sur l'image du jardin botanique et les motivations des visiteurs. Une évaluation après des visites guidées est également un moyen peu onéreux pour obtenir des renseignements.

Ces informations évaluées et publiées sous forme de nouvelles ("newsletter") internes ou externes, tout en valorisant le travail des collaborateurs,

démultiplient l'effet des mesures R.P. en les réactualisant périodiquement.

RELATIONS PUBLIQUES ET JARDINS BOTANIKES

La transmission du message publicitaire ou d'information peut se faire par différents canaux que vous retrouvez ci-dessous. La communication de masse, trop onéreuse, est rarement à la portée des jardins botaniques, à moins de bénéficier de l'aide de sponsors (état, ministère de la culture ou secteur privé). Par contre la communication ciblée, souvent moins onéreuse est plus adaptée, les jardins botaniques connaissant en principe leurs publics cibles.

TRANSMISSION DU MESSAGE PUBLICITAIRE

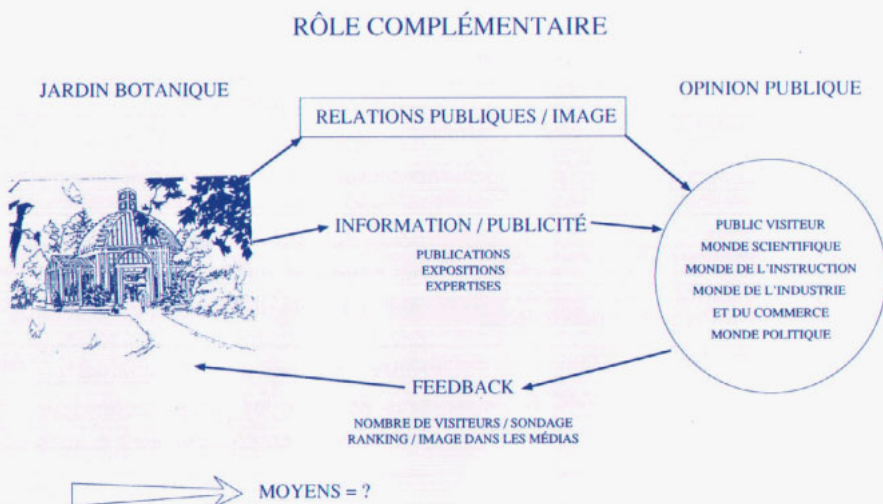


Fig. 3

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Quel est le rôle des relations publiques dans la transmission du message

que le jardin botanique souhaite faire passer?



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Fig. 4

Les relations publiques jouent un rôle complémentaire en soutenant toute action d'information et en suscitant le feedback attendu. Ce dernier peut prendre différentes formes mais les informations qui sont les plus faciles à apprécier sont:

- le nombre de visiteurs
- l'intérêt des médias et l'image qu'ils véhiculent- les sondages effectués auprès de touristes
- les lettres de lecteurs (newsletter) ou

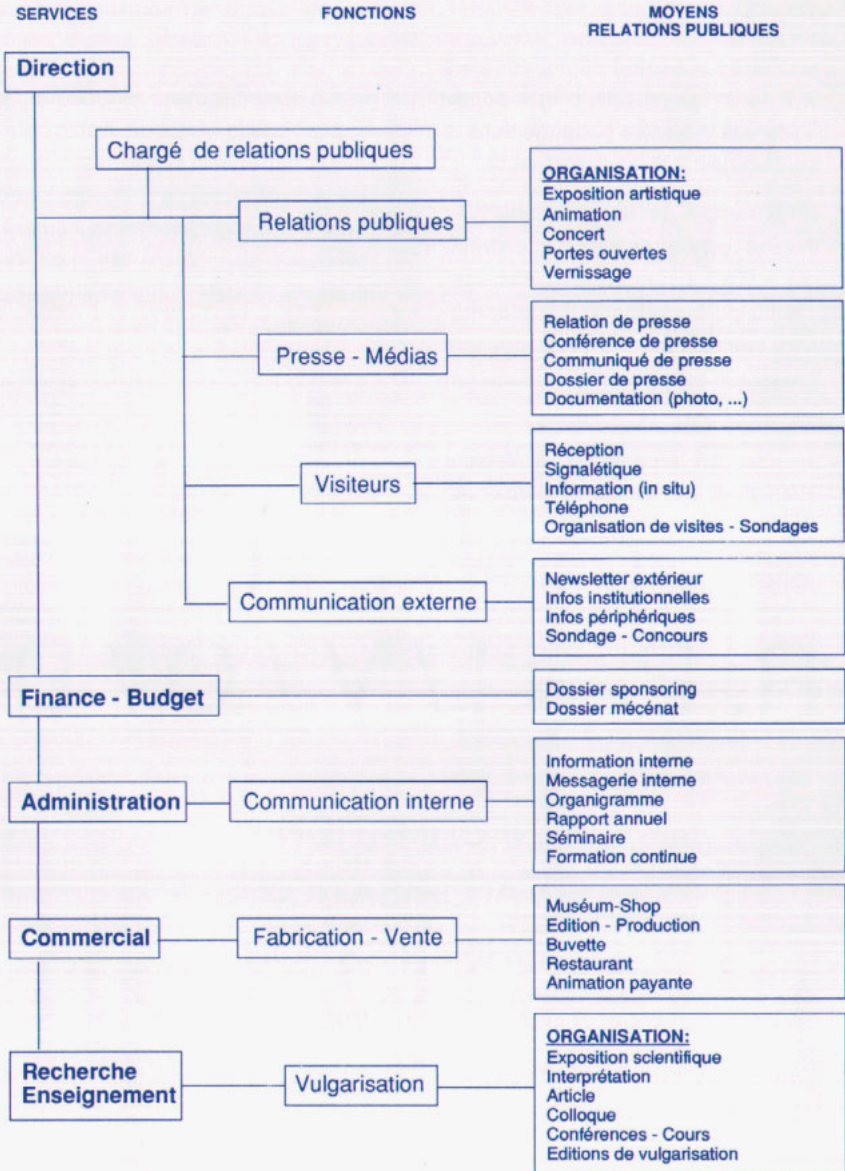
de visiteurs...

Quels sont les moyens théoriques dont disposent les relations publiques pour exercer leur mission au sein d'un jardin botanique?

Les relations publiques (R.P.) peuvent s'appliquer dans chaque secteur administratif d'une institution telle qu'un jardin botanique. La majeure partie des moyens à disposition appartient néanmoins au domaine des R.P. proprement dit. Une liste exhaustive s'appli-

Fig.5

Relations publiques pour un Jardin botanique



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quant aux Conservatoire et Jardin botaniques de Genève vous est présentée à la fig.3. Nous mettrons simplement l'accent sur quelques points:

- les liens naturels et étroits entre les R.P. et la vulgarisation: une bonne vulgarisation restera caduque sans le soutien des R.P. et vice-et-versa;
- l'importance de la communication interne dans la réussite d'une stratégie R.P.: le personnel doit être convaincu du bien-fondé d'une opération, elle doit lui être préalablement présentée et si possible avalisée par lui;
- le rôle fondamental d'un vecteur charismatique vis-vis des médias:

une personnalité scientifique ou politique, connue du public ciblé, interne ou externe à l'institut, doit être si possible associée au lancement d'une opération;

- le rôle essentiel d'une association de soutien solide (Amis du Jardin botanique par exemple) dans la mise en place d'une stratégie R.P., elle forme une base logistique (financement, bénévolat, disponibilité, etc...) capitale pour la réussite d'un événement ou d'une stratégie.

Les RELATIONS PUBLIQUES peuvent être résumées par les abréviations suivante:

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R. P. = I / V / O / D

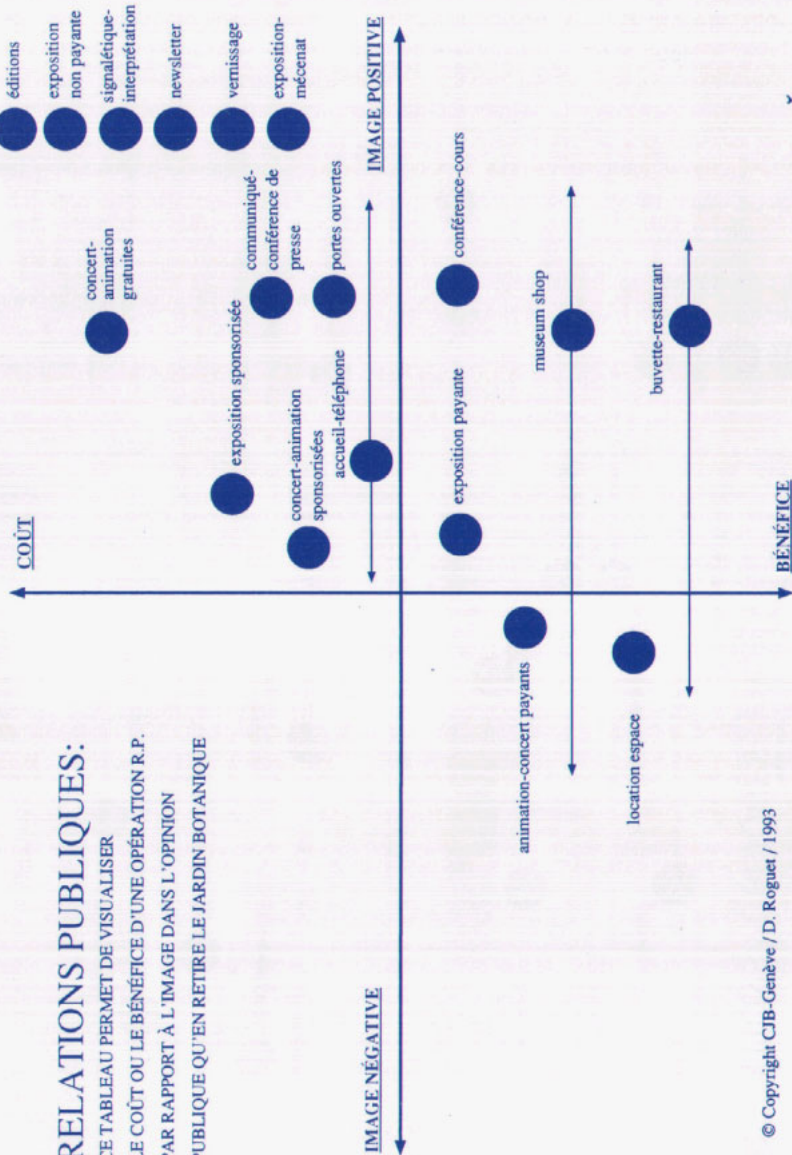
- ★ INFORMATION
- ★ VALORISATION
- ★ ORGANISATION
- ★ DIFFUSION

Fig. 6

Leur fonctionnement peut être visualisé sur les diagrammes suivants:

RELATIONS PUBLIQUES:

CE TABLEAU PERMET DE VISUALISER
LE COÛT OU LE BÉNÉFICE D'UNE OPÉRATION R.P.
PAR RAPPORT À L'IMAGE DANS L'OPINION
PUBLIQUE QU'EN RETIRE LE JARDIN BOTANIQUE



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Fig. 7

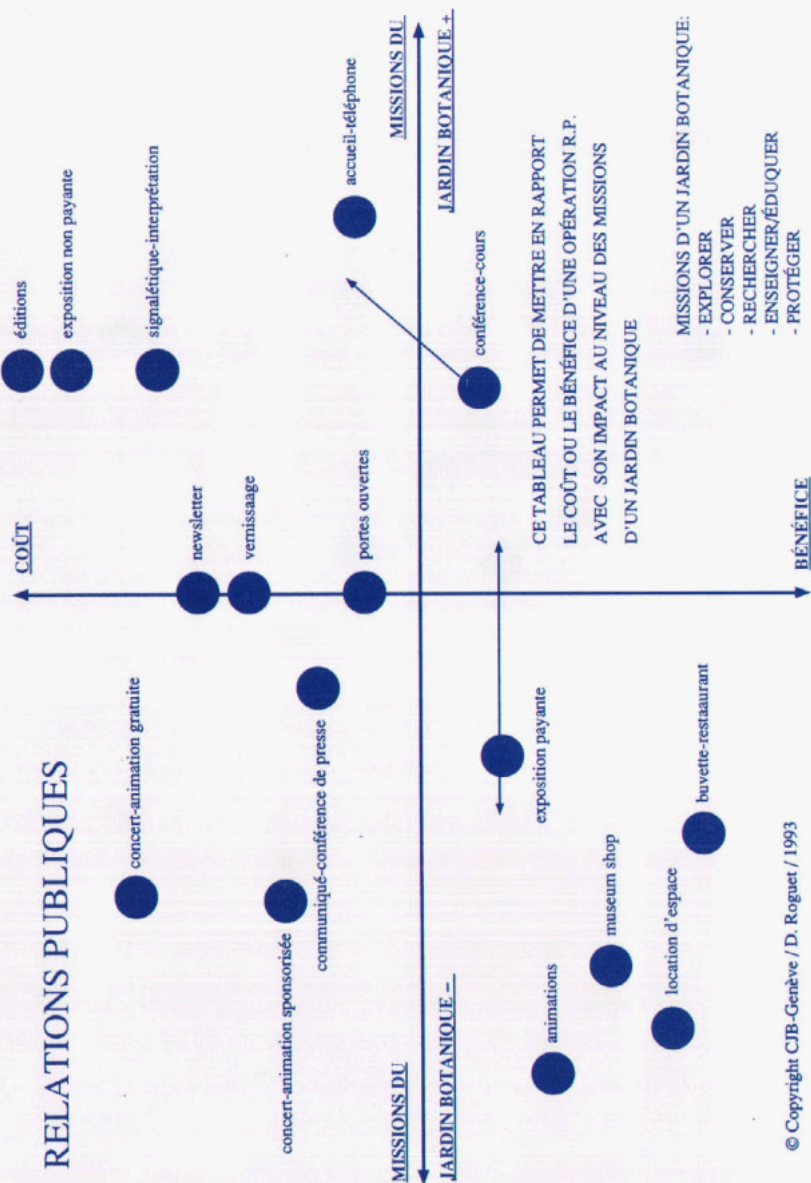


Fig. 8 © Copyright CJB-Genève / D. Roguet / 1993

Le premier de ceux-ci (fig.7) met en évidence le positionnement de ces différents moyens (ou vecteurs) de relations publiques dans un diagramme incluant deux variables essentielles:

- l'impact (+/-) sur les missions d'un jardin botanique;
- le rendement économique (coûts/bénéfices).

En terme de relations publiques, on remarque que les opérations qui répondent le mieux aux missions des jardins botaniques sont celles qui coûtent le plus cher (éditions, expositions gratuites, signalétique). A l'opposé, on remarque que des postes bénéficiaires comme la location d'espace, les buvettes (ou restaurants), l'animation extra-scientifique payante, sont assez éloignés des préoccupations de nos musées vivants. D'où le hiatus important entre la stratégie qui nous intéresse et son adéquation avec la politique d'un institut scientifique.

Le deuxième diagramme met en exergue les mêmes valeurs de coût et de bénéfice mais cette fois en les comparant l'image (+/-) qu'en retire le jardin botanique dans l'opinion publique.

Il s'avère heureusement que la plupart des opérations de relations publiques appliquées à un institut scientifique ou un musée vivant comme le jardin botanique fournissent une image positive. Il faut néanmoins mettre sur un piédestal certaines de celles-ci, que leur

coût modéré rend intéressantes dans la mise sur pied d'une stratégie de relations publiques, si l'on possède peu de moyens:

- opération portes-ouvertes,
- conférence de presse,
- cours grand public,
- exposition sponsorée

Il faut par contre et préalablement faire très attention à certains postes sensibles que leur latitude importante sur le diagramme rend très dangereux à manipuler en terme de relations publiques:

- museum shop
- restaurant/buvette
- accueil/téléphone

A ce propos, une constante des R.P. peut être formulée ainsi:

la qualité des prestations payantes proposées dans un jardin botanique (ou un musée) doit être optimisée au maximum, au risque de perdre en image ce que l'on peut gagner sur une base financière. L'évaluation de ce paramètre est essentiel si l'on souhaite que cette stratégie soit viable à moyen terme.

RELATIONS PUBLIQUES APPLI- QUEES A UN JARDIN FICTIF

Cette introduction servait à présenter les bases théoriques des R.P., actualisées, synthétisées et adaptées aux contingences d'institutions comme les jardins botaniques.

Elle constituait la partie théorique de cet atelier. La seconde partie que nous abordons maintenant consistait, à partir du cas d'un jardin fictif présenté aux participants (descriptif reproduit ci-dessous), à essayer de définir des

priorités devant former la base d'une stratégie de relations publiques. Le travail s'effectua en trois groupes linguistiques (anglophone, français et espagnol).

DESCRIPTIF

JARDIN BOTANIQUE RÉGIONAL

FONDATION : 1915

SITUATION : à 7 km d'une ville de 200.000 habitants
à 80 km de la capitale (2 Mo d'habitants),
ville industrielle et universitaire

Zona rurale de collines boisées, forêt attenante au Jardin, avec étang (biodiversité intéressante)

SUPERFICIE : jardin 15 ha
forêt et étang 10 ha

CARACTÉRISTIQUES : 1 ancienne serre chaude (100 m²)
herbier régional (5000 échantillons) + petite bibliothèque

STRUCTURE: **Personnel:** un directeur (professeur d'horticulture au technicum)
une assistante scientifique
une secrétaire
un chef de culture
7 jardiniers
un conservateur-botaniste

Bâtiments: un villa (administration, réception, etc.)
un local attenant (herbiers et bibliothèque)
une serre (100 m²)
un local technique (100 m²)
une maison de fonction (versitaire, rangement)

Spécificités botaniques: rocailles 500 m², collections
collection conifères
collection ethnobotanique historique
projet de réserve naturelle
collections horticoles de premier plan

Fig. 9

BUDGET et COMMUNICATION

Spécificités techniques et administratives

Le jardin est financé et entretenu par la ville proche à travers son service des parcs et promenades.

Lien académique avec le technicum horticole.

BUGDET	Fonctionnement:	OK
	Administration:	OK
	Communication:	-
	Développement:	-

COMMUNICATION:

Signalétique archaïque, étiquetage traditionnel

publications : photocopie du plan du Jardin (annexé)
 Guide noir-blanc du jardin (publ. 1975)

PERSPECTIVES et QUESTIONS

PERSPECTIVES

- 1) 1994: Débloquage d'un budget "information publique et communication" de 5000 \$ (intérêt politique de la municipalité)

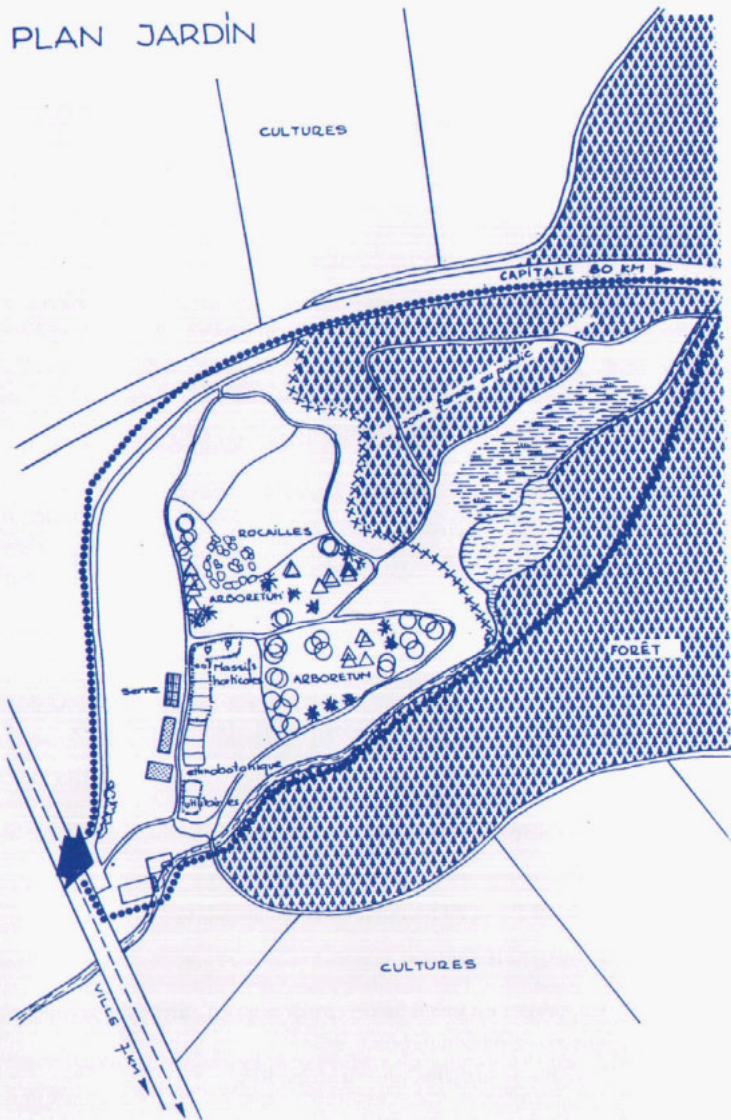
BESOINS IMMÉDIATS = ?

- 2) Un sponsor est prêt à financer une mise en valeur du Jardin botanique vis-à-vis du public.
Il veut une projet et une stratégie RP.

A VOUS DE LA DÉFINIR
PRIORITÉS = ?

Fig. 10

PLAN JARDIN



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Fig. 11

Les dix minutes de réflexion accordées, très insuffisantes pour faire plus qu'ébaucher une stratégie, permettent néanmoins de définir, si ce n'est une stratégie, tout au moins un plan d'action, que nous pouvons résumer comme suit, les idées étant placées dans un ordre prioritaire compte tenu du budget à disposition et des objectifs:

- mise sur pied d'un événement appelé "big-bang" permettant de valoriser le Jardin botanique vis-à-vis des médias, du public, des autorités administratives et politiques et des écoles.

Par exemple: un festival thématique, style "portes ouvertes" sur une semaine et deux week-ends avec une mise en exergue des qualités intrinsèques du Jardin et des améliorations potentielles possibles. Edition d'un programme "tout ménage", conférence de presse (parrainage de personnalités locales), musique, animation, visites guidées ciblées, conférences, mise en valeur des collections avec une interprétation muséologique de plein-air légère (panneau en bois, marchés (fruits et légumes, tropical, artisans)...

- Mise en place d'une signalétique (interne et externe), d'un plan du jardin (édité et reproduit aux entrées); contrôle et optimisation de l'étiquetage (première carte de visite);

- Définition d'un message et mise en place d'une structure d'interprétation, de parcours féchés et de cheminement spécialisés dans le jardin. Contact avec

les écoles et collaboration. Aide envisagée des élèves du technicum horticole pour ce type de prestations;

- Tour audio-guidé, exposition en collaboration avec des collectivités locales ou régionales (associations, musées, communes politiques), utilisation des synergies. Création d'une association de soutien au jardin botanique (bénévolat, travaux, éducation...)

- Fidélisation du public par l'organisation d'événements saisonniers et ponctuels (expositions de vulgarisation ou artistiques, concerts, etc...) et la création de points de rencontres (museum shop, buvette, librairie spécialisée, jardin des aînés, atelier vert pour les élèves des écoles, cours du soir, etc...);

- Rôle d'expertise au niveau local et régional, le jardin hors de ses murs (excursion "grand public", exposition hors du jardin, etc...).

Cette réflexion bien que modeste est néanmoins intéressante; elle mérite plusieurs commentaires:

- ce n'est pas la créativité et l'imagination qui manque la plupart du temps aux jardins botaniques pour mener une politique de relations publiques dynamique, génératrice d'amélioration d'image dans le public mais aussi et surtout vis-à-vis des milieux économiques et politiques. C'est avant tout une question de motivation, de temps et de moyens, trois axiomes dont il faut favoriser l'épanouissement. De plus, on ne peut pas promouvoir du "scientifique" com-

me on vend des savonnettes. La (ou les) personne(s) en charge de cette problématique des relations extérieures, souvent nouvelle pour une institution scientifique, devrait donc être ambivalente. C'est-à-dire connaître les techniques de relations publiques et de publicité, mais aussi être intégrée dans le milieu scientifique. Il en va de la réussite et de la crédibilité de son action.

- le choix des vecteurs utilisés est primordial. Il doit se faire en fonction des moyens à disposition et d'objectifs définis préalablement. L'appel à un professionnel (mandaté ou travaillant par exemple pour l'autorité de tutelle) peut s'avérer, au début en tout cas, fort intéressant car on ne s'improvise pas technicien en publicité ou attaché de presse.

- Mieux vaut une bonne visite guidée que des panneaux mal faits. Cette maxime reflète bien l'attention qu'il faut apporter à la qualité du matériel de communication produit.

- Certains médias, comme la vidéo, sont à éviter dans un premier temps car il demande des financements trop importants, si le jardin ne bénéficie pas d'une aide directe pour produire un film de qualité. Par contre il est souvent primordial dans une campagne de relations publiques d'arriver à intéresser une chaîne de télévision (locale régionale ou nationale) car ce vecteur est de loin le plus porteur.

- La création d'une signalétique (flécha-

ge, information, interprétation) implique de fait son entretien et son renouvellement futur. Il s'agit d'y penser au niveau budgétaire quand on crée du matériel muséographique de plein air;

- Un autre aspect important à prendre en compte dans la production de matériel d'information est sa résistance au vandalisme, malheureusement fréquent dans les jardins botaniques non payants et peu surveillés.

L'IMAGE GRAPHIQUE DU JARDIN BOTANIQUE

La deuxième partie de l'atelier était consacrée à l'image graphique des jardins botaniques. Elle n'avait pas pour but de se substituer au graphiste et au concepteur d'images mais de faire réaliser aux participants la complexité du problème et le rôle de ses paramètres éminemment subjectifs dans la conception d'une démarche de relations publiques.

Après une introduction (fig. 12) présentant les différentes façons d'aborder l'image du jardin botanique, un exemple pratique montrait l'importance relative du texte et de l'image dans un logo. Certains de ceux-ci, fort connus du monde de la botanique, étaient d'abord présentés sans leur texte qui étaient superposés dans un deuxième temps (fig. 13): la différence de perception est assez parlante!

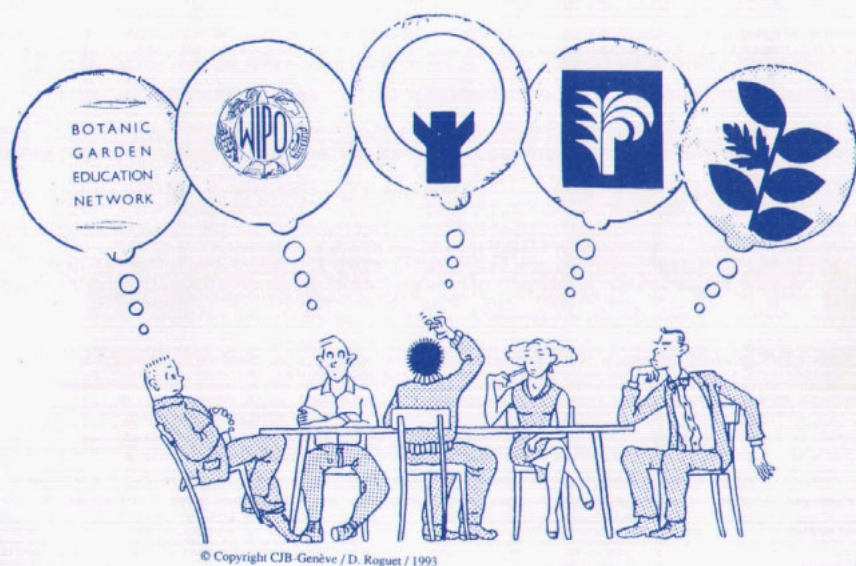


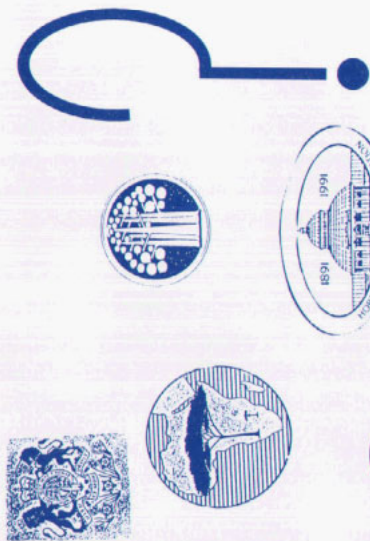
Fig. 12

Quelques exemples internationaux étaient ensuite présentés, montrant une grande variété de concepts et une importante hétérogénéité graphique, mais aussi une certaine homogénéité régionale ou nationale. Vous en trouverez quelques exemples ci-dessous parmi la centaine présentée aux congressistes. (fig. 14, 15)

En ce qui concerne l'image, une deuxième partie pratique consista ensuite à demander aux participants de définir quelques options graphiques en fonction des critères ci-dessous sous

formes de mot-clés et de lettres initiales correspondant au même jardin fictif que pour la première partie de l'atelier. (fig. 16)

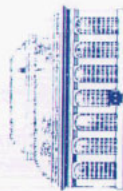
Ce travail de groupe bénéficia encore moins que le premier du temps suffisant à un début de réflexion. Certaines propositions intéressantes émanèrent néanmoins des trois groupes de travail. (Nous ne les présenteront pas ci-dessous par respect pour la propriété intellectuelle de leurs auteurs, Genève étant le siège de l'OMPI (Organisation mondiale de la propriété intellectuelle)!).



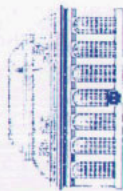
Brooklyn Botanic Garden



THE INTERNATIONAL SOCIETY FOR HORTICULTURAL SCIENCE



THE ROYAL BOTANIC GARDEN EDINBURGH



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Fig. 13



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Fig. 14. Importance relative de la taille des composantes d'un logo lors d'une réduction par exemple

MUSEO BOTANICO
FACULTAD DE CIENCIAS EXACTAS, FISICAS Y NATURALES
CORRIORA - ARGENTINA.

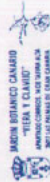


Asociación Ibero-Mesopotámica de Jardines Botánicos

JARDIN BOTANICO
DE BUENOS AIRES



INSTITUTO DE
INVESTIGACIONES
AGROPECUARIAS



S. E. E. P.



HORTUS
Botanicus



BLOEMEN
BUREAU
HOLLAND

BELLENDEEN HOLLAND
LUTJES PLANTEN EN BLOEMEN
LUTJES PLANTEN EN BLOEMEN
LUTJES PLANTEN EN BLOEMEN
LUTJES PLANTEN EN BLOEMEN
LUTJES PLANTEN EN BLOEMEN
LUTJES PLANTEN EN BLOEMEN



Rijksherbbarium / Hortus Botanicus
Leiden University
Postbus 9513
2300 RB LEIDEN
The Netherlands

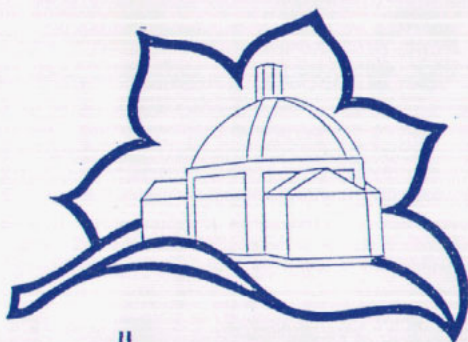


Figura 15: Nombres ejemplos du monde entier

CONSERVATOIRE ET
JARDIN BOTANIQUE
GENÈVE

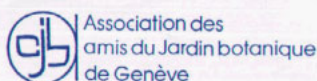


CJB AAJB
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DU JARDIN BOTANIQUE DE GENÈVE
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tel. (022) 32 69 69



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Fig. 15.1: Différents exemples de logos et d'images utilisés par les Conservatoire et Jardin botaniques de Genève depuis 15 ans.



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Fig. 15.2: Différents essais concernant le logo des Amis du Jardin botanique de Genève.



Brooklyn Botanic Garden



Missouri Botanical Garden



THE



SMITHSONIAN INSTITUTION
Washington, D.C.



BOTANICAL SOCIETY OF AMERICA



Gesneriad

Saintpaulia

News



Fig. 15.3: Quelques exemples de logos provenant des Etats-Unis d'Amérique

IMAGE

- 3) **Le sponsor et la Ville désirent donner une image au Jardin botanique.**

Idée:

Le logo, l'image ou le pictogramme doivent s'accorder aux mots clés ci-dessous et doivent utiliser les initiales:

J B (pour le Jardin botanique)

et **U V L** (pour la ville et sponsor)

Mots clés:

Accueillant, Calme, Propice à la découverte du végétal et de la nature,
Educatif, Conservatoire du patrimoine,
Zone de réserve naturelle reliée directement au Jardin.

TROUVEZ UNE IMAGE OU UN LOGO

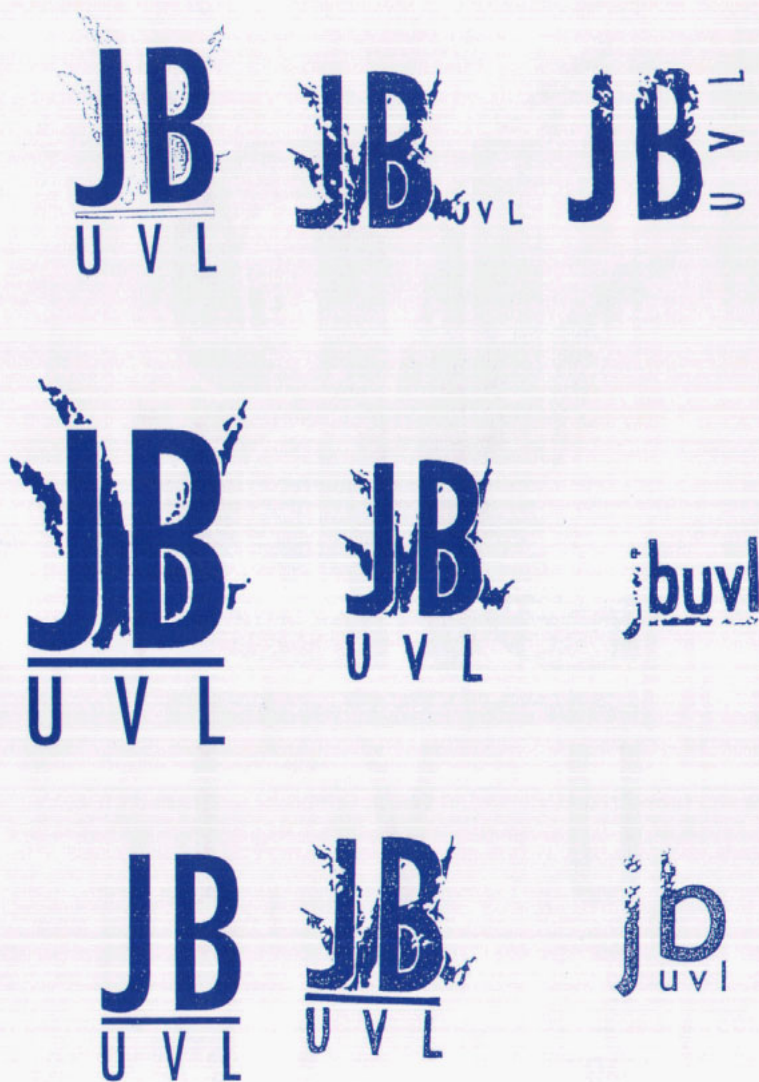
CORRESPONDANT À CES IDÉES.

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Fig. 16.

Le choix des initiales et des mots-clés dans l'énoncé du problème n'avait pas été fait sans arrière-pensée, dans la mesure où nous possédions le travail effectué selon les mêmes critères par une élève d'une école de graphisme (L.

Drapela) sur un projet similaire. Le résultat se trouve ci-contre (fig. 17). S'il a fait le bonheur des commanditaires, le Jardin botanique de Lugano (en Suisse), il n'a pas semblé déchaîner les passions chez les participants à l'atelier!



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Fig. 17.1: Plusieurs projets présentés

JIB
UVL



Fig. 17.2: Le projet retenu

Cela nous inspire les commentaires suivants :

- la subjectivité et les modèles régionaux jouent un rôle fondamental dans l'appréciation d'un logo ou d'une image ;

- les valeurs universelles et primordiales pour ceux-ci semblent être :

- leur adéquation au lieu
- leur adéquation un public
- leur maniabilité dans la forme, la taille et la couleur
- leur reconnaissance aisée et originalité dans leur zone d'influence
- leur simplicité

- l'importance du lettrage est essentielle à l'identification de l'image (très peu de jardins botaniques dans le monde peuvent se targuer d'être reconnu par un logo dépourvu de lettres, voir fig. 13)

CONCLUSION

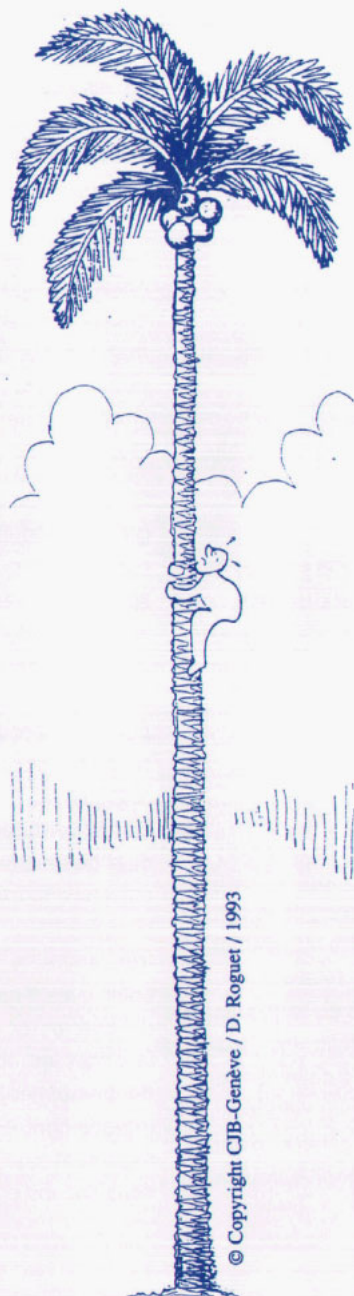
En conclusion, cet atelier s'est déroulé dans des conditions optimales et a permis de mettre en exergue la difficulté et l'importance du travail effectué par les chargé(e)s de relations publiques pour des instituts scientifiques. A l'interface entre le public, les jardiniers et les scientifiques, il doivent souvent mener un combat peu valorisant, réglant conflits et divergences d'opinions avec toute la diplomatie voulue,

essayant de concilier impératifs économiques, politiques et scientifiques.

La valorisation vient souvent du public, les collègues de l'institut étant souvent fort critiques, estimant, peut-être à juste titre, que la vulgarisation, la publicité et les relations publiques ne mettent pas assez en valeur le travail scientifique de l'institut. Cette tâche est ardue et nécessite la collaboration de tous, à commencer par celle du directeur, dont nous avons la chance de bénéficier aux Conservatoire et jardin botaniques de Genève.

Dans l'esprit de la nouvelles stratégie sur l'éducation dans les jardins botaniques, qui est en voie d'élaboration, il nous semblerait intéressant que le BGCI produise un document technique proposant des pistes de travail et de réflexion en matière de relations publiques. Associé à des exemples précis d'opérations et de campagnes R.P., réussies ou non, il devrait permettre d'apporter une aide pratique à des jardins botaniques ne disposant pas de moyens importants. Dans ce domaine, plus peut-être encore que dans d'autres secteurs d'activités des jardins botaniques, il nous semble fondamental de confronter nos expériences et de favoriser les échanges de services et de personnes. C'est en effet le seul remède contre la sclérose et le découragement qui guette chaque chargé des relations publiques !

A.P.R. STRATEGY ?
not an easy job !!!



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Fig. 18

Didier J. Roguet
Floristique appliquée et
relations publiques

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PLANNING AN INTERPRETATION PROGRAMME

Laura GIUFFRIDA

ABSTRACT

Interpretation is essential, without it a Botanic Garden is little more than an attractive park. On site interpretation provides the vital link between the work and mission of the organisation and its visitors.

With the necessary resources there is enormous potential to promote wider learning opportunities, to increase visitor numbers and to raise the awareness of the work of your Garden.

The methods used must be selected to provide the most effective means of communication with visitors. Their initial expectations and enthusiasm should be built upon. This can be achieved by providing information that is accessible, entertaining and thought provoking.

RESUMEN

La interpretación es esencial. Sin ella un jardín botánico es poco más que un atractivo parque. De esta forma la interpretación proporciona el lazo vital entre el trabajo y la misión de la organización y sus visitantes.

Con los recursos necesarios hay un enorme potencial para promover unas amplias oportunidades de aprendizaje, incrementar el número de visitantes y aumentar la conciencia del trabajo de tu jardín.

Los métodos usados deben ser seleccionados para proporcionar los medios más efectivos de comunicación con los visitantes. Deben tenerse en cuenta su entusiasmo y expectativa inicial. Esto puede ser llevado a cabo proporcionando información que sea accesible, entretenida y algo provocativa.

The need for interpretation

Whatever the size your Garden our interpretation needs are fundamentally the same.

Interpretation is essential, without it a Botanic Garden is little more than an attractive park.

We need to communicate to our visitors to stimulate and raise awareness of the importance of plants.

On site interpretation provides the vital link between the work and mission of your organisation and its visitors.

With the necessary resources there is enormous potential to:

- promote wider learning opportunities
- increase visitor numbers
- raise the awareness of the work of your Garden.

Your visitors initial enthusiasm can be built upon by providing information that is:

- accessible
- entertaining
- thought provoking.

The number of desirable interpretative activities at most Gardens is almost limitless, though staff and financial resources are usually limited. We all have different priorities and constraints.

We must decide what we want to say, and select the most effective and practical way of saying it.

Planning an interpretation programme

Before any proposals are considered and developed look carefully at your objectives and your target audience.

Objectives

Your objectives will vary depending on the needs and focus of your organisation.

Is the objective education? visitor management? Fund raising?

eg Your objectives could be:

The need to stimulate and raise awareness of the importance of plants.

To enhance public understanding of environmental issues, and manage resources sustainably.

To enhance the experience of the general visitor to the Gardens.

To attract wider audiences eg school groups, family groups, and multi-cultural groups.

Target audience

Your target audience - Who is your interpretation for?
everyone?
enthusiasts/specialists?
what age?
race?

class?
disability?

Determine your target audience and consider how this will affect your approach to developing an interpretation programme.

The next stage is to establish what should be interpreted and develop a prioritised list of suitable topics and methods of interpretation.

Look at your collections and think about their importance, relevance and potential interest to visitors.

Consider the duration and seasonality of the plant material, the good condition and appearance of the subjects.

Consider the Variety of Interpretation Methods

Live interpretation - Guides, drama, workshops, events.

Printed material - Garden trails, leaflets/information sheets, guidebooks, publications, maps.

Teletext - providing constant updated information

Exhibitions - explain more complex biological ideas than possible in a small display, and can also provide a focal point for other interpretation in the Garden.

Plant labels - basic identification, can be modified by colour coding and/or

suitable symbols to highlight areas of interest eg categories of economic use. These could form the basis of Gardens trails.

Information labels - usually a standard format providing clear information on major features and important plants.

Site-specific interpretation - design of the labelling and other display elements developed specifically to suit the particular subject and location.

Developing information labels and site specific displays.

Consider the opportunities and constraints of your selected locations.

Discuss the suitability of the potential locations with all relevant staff - essential for well considered planning.

The display should be located close to paths to provide easy access for visitors.

The design of your display should be sympathetic with the surroundings.

The position of your display should ensure ease of general garden work.

Displays should be sited at popular locations to provide information to the maximum number of visitors and also be positioned to encourage exploration of less visited parts of the Garden.

NB Think about the production

specification - should the display be vandal proof? weather proof? have a minimal maintenance requirement?

What will it all cost?

You now need to develop costed proposals checking that you have adequate staff and financial resources.

REMEMBER

We must decide what we want to say, and select the most effective and practical way of saying it.

Interpretation is very demanding on staff time, involving:

Research

Discussion

Drafting

Testing ideas - can the information be understood?

Is it accessible? entertaining? thought provoking?

Checking and clearing texts

Good photographic and illustrative material

High quality design

Production specification

Co-ordination of production

Installation

Evaluation

Monitoring

Maintenance

Design and Content

Graphic images are often the most effective way of communicating information.

When possible illustrative material (illustrations, photographs, maps and diagrams) should be used to complement text.

Text should be of a size and typeface that is easily read by the majority of visitors. eg body text 24pt on 28pt leading - 24pt=6mm.

Text should be kept to the minimum as visitors will only absorb a limited amount of information in one bite (maximum 155 words on a standard label 310x465 mm).

Text should be user friendly and not filled with jargon.

Information can be targeted at different levels using a combination of simple statements with a more detailed explanation of the topic. The reader can then select the level of information that suits them.

Bullet-point and question and answer approach recommended.

Interactive elements can be very stimulating, from a simple question - lift

flap for answer approach, to a high-tech solution such as inter-active video.

Examples of production methods for external displays: duralite, metal photo, screen recess, slate, engraved, hermetically sealed.

SPREADING YOUR MESSAGE THROUGH THE WRITTEN WORD

Julia WILLISON

ABSTRACT

Newsletters can take your message out of the garden to a far greater audience than you would otherwise be able to reach through tours or education programmes.

This workshop presupposed that delegates knew why, what and to whom they wanted to communicate. It concentrated on the two basic ingredients needed to produce a good newsletter: writing and design as both need to be considered if a newsletter is to be effective.

Delegates examined and commented on different writing styles and looked at the basic design skills required to create a newsletter. Guidelines were provided on production, printing and distribution.

RESUMEN

Las revistas informativas pueden llevar tu mensaje a una audiencia mucho mayor que la que de otra manera conseguirías mediante visitas o programas de educación. Este taller presuponía que los delegados conocían lo que querían comunicar, a quién iba dirigido y por qué. El taller se centra sobre los dos ingredientes básicos necesarios para producir una buena revista informativa: deben considerarse tanto la escritura como el diseño si la revista ha de ser efectiva.

Los delegados examinaron y comentaron diferentes tipos de escritura y de diseño que se requieren para crear una revista informativa. Se proporcionaron las líneas maestras sobre la producción, impresión y distribución.

INTRODUCTION

Botanic garden newsletters and magazines exist to keep readers informed of what is going on in the garden. The better informed readers are about the work of the garden the more likely they are to support the garden.

Publications vary considerably from simply-produced, two sided, newsletters giving up-to-date news without elaborate design, to magazines with more pages, 'in-depth' articles and perhaps a specially designed cover. A newsletter is quicker and simpler to produce and cheaper to print. It is easier to start modestly and become more ambitious when the newsletter is successfully established.

GETTING STARTED

It helps if the garden is able to find someone willing to be the newsletter editor. Successful publication of a regular newsletter depends on someone having overall responsibility for it and this is helped by continuity. In many gardens, however, editing the newsletter will be undertaken by the public relations person; if so, it is likely to be one of the most important parts of her or his job.

Decisions to make first

Frequency

Regular publication is essential in order to be topical and keep a high profile. It is better to publish a simple newsletter frequently and regularly. Once this is working successfully the newsletter can be developed.

Quantity

This will depend on who the audience is and the budget available. The larger the number of copies produced the cheaper it is per unit cost.

Production

Printers will often handle all the production work - typesetting, design and paste-up - as well as the printing. After supplying the copy, all that will need to be done will be the proof-reading and checking the layout. However, if the garden could do some or all of the production work then it would be cheaper and would give the garden more control over how the newsletter looks.

Distribution

There is nothing worse than working hard to produce a good newsletter only to find copies languishing in the garden weeks later! Efficient distribution is essential for all publicity materials.

Budget

Produce a draft annual budget.

The newsletter itself

What will you call it?

Choose a short title so that the title panel (masthead) can be displayed big and bold.

Contents

The editor will develop her or his own ideas, but a useful checklist includes:

- ◆ new initiatives in the garden;
- ◆ decisions that affect the public;
- ◆ people - new staff, events that staff have been involved in (eg. charity work);
- ◆ education courses;
- ◆ short articles;
- ◆ opening/closing times of the garden and contact numbers for the public;
- ◆ 'fun' material eg. quizzes, competitions or crosswords.

EDITING AND WRITING

The responsibilities of the editor cover four main areas: editing, design, production and distribution. It is always helpful if other colleagues can be persuaded to take on specific jobs, such as design or distribution, but overall responsibility for the publication will remain with the editor.

Collecting the material

Newsletters do not write themselves, and the editor has to make sure that there is enough 'copy' to fill each issue. Some copy, such as information about events, may arrive without asking, but most of it will be written by the editor or will be commissioned for others to write.

Commissioning articles

When someone else agrees to write for the newsletter it is important to agree with them:

- ◆ a deadline - a specific time within which to deliver their article. It is important not to underestimate how long it can take for people with other commitments to write: agree a deadline which allows a day or two for late delivery and leaves time to edit the piece;
- ◆ the length of the article;
- ◆ format - whether copy will be typed or sent in on a computer diskette;
- ◆ photographs and illustrations including captions and logos.

In-depth articles

In-depth features, providing information which isn't date-tied, can be commissioned in advance. Such features have a longer 'shelf life' than news articles: if more articles arrive than can be used immediately, they can be kept on file to use in future issues.

News

The editor will be the person who is likely to write most news stories - people making the news do not often have time to write it as well! It is important to develop a good system of communication with members of staff and other sources. As deadline for the issue approaches, phone them to ask for any news. Organising questions into 'who?' 'what?' 'where?' 'when?' and "why?" will provide all the facts needed to write a good news story.

Writing

The aim of an editor is to produce a newsletter or magazine which is easy to read, lively and informative. Copy will need to be sub-edited to achieve this aim. The following advice will be useful to take into account.

Grabbing attention

Aim to catch the readers' attention right from the start with a good headline and a short, clear introduction. The main facts - the 'who?' 'what?' 'where?' 'when?' and 'why?' found out when fact-gathering - should all be given as near the start of the article as possible. The less important information and background material should appear towards the end.

'News is people'

Try to link news items with how they affect people and liven up the copy with

'quotes' from individuals. Talk to staff and (with their permission) use what they say. 'How have the staff found using biological control in the green houses?'. Using their own words, articles will come to life.

Be clear

Never assume prior knowledge of an issue; every newsletter may have new readers. If the progress of a new building is being reported on, for example, include details of the 'why' it is being built. Cut out jargon and always use the full word rather than the initials or abbreviations. Avoid unnecessary words and phrases and never use a long word where a short one will do.

Be concise

Keep sentences and paragraphs short and simple: copy will be more lively and its appearance when printed easier to read. Use active language wherever possible: not only does it read better, but it will generally be more concise.

Be controversial...

Do not shy away from debate: a newsletter is not just there to transmit garden decisions but to stimulate discussion and community involvement. But beware of mixing facts and opinions. A news article should report the facts, with individual views attributed directly in quotation marks. If an editorial is written, in which events are commented on, or action urged, it should

be labelled 'editorial'. As an extra safeguard, a standard disclaimer could be included in every issue - 'the opinions expressed in this newsletter are not necessarily those of the editor'.

...but not offensive

Do not write or publish any material which is sexist, racist or offensive to groups of people.

SUB-EDITING

Planning

An overall plan needs to be made of how the newsletter will look and where the different kinds of articles might go. One plan is to have the most important news on the front pages, in-depth articles inside, with noticeboards, events and quizzes etc. at the back. Consistency can help: you will save time when planning each issue and readers will know where to find what interests them. Work out how many words on each page, taking headlines and illustrations into account; word counts will help when planning a page.

Page plans

When working within an overall plan, each issue will need more detailed planning to decide what goes on each page. A rough page plan will give an idea of the length each article will need to be.

Sometimes, after all the copy and

illustrations have been received, it is necessary to revise the plan. An illustration may not have turned up, an important news story needs more space, or someone hasn't delivered their copy - be prepared to alter the plan to accommodate these changes.

Sub-editing

No matter how well contributors keep to the guidelines, editors will need to 'sub' the copy they get - that is make it more readable, and make it fit. Sub-editing ones own copy can be harder; ask a colleague to read it and make suggestions.

Sub-editing for sense

If the author has not made the meaning clear the editor will need to rewrite the copy. Be careful not to change what the author intended to say (except where it is offensive).

Sub-editing to fit

Copy may need to be cut, either because it will not fit the allotted space or because the the copy is vague and wordy. Again, be sensitive about keeping the author's intended meaning but do not be afraid to précis points in order to make the copy fit.

Copy may need to be divided into more paragraphs. If the article needs to be continued on a different page, keep the continuation as close as possible to the first part. When it is laid out, the

article will need a note telling the reader on which page it is continued.

House style

You may want to decide on a 'house style' covering such things as spelling (where alternatives exist) and punctuation (what to capitalise, whether to use single or double quotation marks). Make sure everything is sub-edited into house style.

Introductions

Articles benefit from a short introductory paragraph (generally set in bold type if possible). If the author has not started with such a paragraph, the most important point from the article can be selected and written by the editor. The aim is to catch the reader's interest, so make it concise and attention-grabbing.

Headlines

A headline has two main functions: it should convey the essential point of the article and should make the reader want to read the story below. Headlines should be short, preferably taking up no more than two lines above the article and should use short words.

Straplines

A strapline is a subsidiary headline usually used to provide additional information.

Crosshead

The line above this paragraph is a crosshead - a short, preferably one line,

headline used to break up the text. It can make long articles much easier to read. A crosshead should pick a key word or phrase from the following section of text.

Proofreading

If the garden produces its own typesetting (on a typewriter or word processor) the editor will need to correct the copy as he or she goes along. Read through everything and check it. Typing mistakes can be picked up easily by working through the copy backwards.

MODEL HOUSE STYLE

'House style' is an agreed set of basic rules for the production and presentation of a publication. It relates mainly to the use of language - spelling, punctuation and grammar - but may also include design disciplines such as typography and spacing. Its purpose is to achieve consistency of tone and appearance.

Establishing a simple house style is useful, even when a publication is produced mainly by one person. However, it is essential when a number of people are involved and needs to be available as a ready reference.

TYPOGRAPHY

Text type

Typefaces

The typefaces used will depend on the ones available. Text typed on carbon ribbon electric typewriter can be made to look attractive with the addition of display headlines. If desk top publishing is used, there will be a variety of typefaces available plus the ability to use them in *italic* and **bold**. An even wider range may be available at an outside typesetter.

Choose one or two typefaces to use throughout and use them consistently. Except with typing, variety can be achieved by using different size letters and by using italic and bold fonts. For instance bold type can be used for introductions to articles and italic or bold (or ***bold italic***) for captions to pictures. However, be sparing with their use for emphasis in the main text. Emphasis in typed text can be achieved by underlining (but not too often) or using CAPITALS (even less often!).

Type size

Type size must relate to column width: type that is too small or too large for its column width is hard to read. Avoid wide columns as they are hard to read, and never use the full width of an A4 page. They eye needs to read every word unlike columns where it can scan the page.

It is often tempting to try and squeeze too much text onto the page, but this will be self-defeating as generally people are not prepared to struggle through dense pages of text unless it is very interesting. Having decided on the typeface and size at design stage, be ruthless in sticking to that and always sub-edit the copy to fit the design rather than reduce the type size to get more copy in.

Type is measure in points. Anything smaller than 10 points is likely to be too small.

Headlines

Headlines can either be all in capital letters (this works best with a short, large headline) or 'upper and lower case' (capitalising only the first letter of the first word and any proper names). Depending on the format, the leading headline could be about 60 points size with 48 or 36 points more common, and 24, 18 and 14 points reserved for small articles and snippets. Headlines can be 'ranged left' (starting flush with the left of the column) or centred.

Straplines

Straplines above a single article will generally be set smaller and even in medium, rather than bold, type.

Crossheads

Crossheads should be set in bold type, like headlines, but are smaller (12, 11 or even 10 points) and generally in

'upper and lower case' not capitals. Like headlines, they can be 'ranged left' (as they are on these handouts) or, if they are single words centred. They should be placed close to the text which follows, with more space between them and the text above.

Reverse outs

If desk top publishing is being used or an outside typesetter, try reversing out display type so that white type appears on a black background. This can add variety and impact.

GRAPHICS

Photographs, cartoons and other graphics to illustrate articles can liven up the appearance of the newsletter.

Photographs

Nothing illustrates news better than a good photograph. Generally such photographs are likely to be taken by the editor or other staff members.

Taking your own

If possible, work in black and white - not colour which reproduces badly. Interesting pictures show people doing things (working, talking to each other, approaching members of the public). Take pictures of staff - the director and others who are likely to be 'in the news' in the garden - but avoid portrait shots.

Marking up photos

It is unlikely that the photographs received for the newsletter will be the right size to fit the space available. Also only part of a photograph may be wanted.

If the whole photograph is to be used, this is how to 'size' it:

- 1 hold the print up to the light and look at it from the reverse
- 2 lightly mark with a pencil the actual area of the picture (assuming a margin has been left on the print).
- 3 with a ruler, measure the width available in the artwork (for example over two columns) and, working from the bottom left corner of the print, mark this distance on the bottom line.
- 4 with a ruler, draw a diagonal line across the area of the actual picture.
- 5 next, with a ruler, draw a line at right angles from the first measurement to the diagonal line and measure this perpendicular line.
- 6 This will give the measurement for the depth of the picture. Use this measurement to allow space in the artwork and to give the printer instructions.

If only part of the picture is to be used, the process is similar. Mark the area to be used on the back of the picture and mark it up, as described above.

Before giving the photograph to the printer, do not forget to put the subject on the back, plus the measurement it needs to be. For future reference it helps to add the date, the photographer and further information about the subject. **Never** cut up an actual print just because part of it needs to be used now!

Tips

- ◆ Glossy prints screen better than matt prints.
- ◆ Photos of people in profile should always be placed so that they look into the page.
- ◆ Make sure your photos avoid discrimination.
- ◆ Always put a caption under each photo describing what it is about and who is in it.
- ◆ Always print a credit for the photographer (this can be run vertically beside the photo).

Cartoons

Unlike photographs, cartoons do not have to be screened. They can also be enlarged or reduced on a photocopier to fit the column size and then simply pasted direct onto the artwork. If no photocopier is available which can do this, mark them up for the printer as if they were photographs.

FORMAT AND LAYOUT

Format

Always use standard paper sizes. A4 is most common.

Careful consideration needs to be given to the basic format of the newsletter. It should look lively, interesting and be easy to read and follow. This means using a two or three column format. Two column is simpler and better for larger type. However, three column format can be more versatile especially if the text is typeset.

The Grid

Below are examples of two and three column layout grids within which the layout is assembled.

How to use gridsheets

Paste text and illustrations onto them to form 'finished artwork'. Gridsheets can also be used to measure text and headlines and mark out 'roughs' either for the printers to follow if they are doing the final artwork or for ideas to be tried out before doing the paste up.

WAYS TO BRIGHTEN THE PAGE

Using simple techniques can add variety and make the newsletter look more attractive. For example:

Turning a photograph into a graphic

Photocopy a photograph and try different levels of contrast until a bleached out effect is achieved.

Cut round the image

For a different effect, try cutting round the image of the photocopy or screened bromide.

Reversing out

Headlines can look very effective if they are reversed out.

Using tones

Using tone as a background can be effective, either for reversing out headlines or to give emphasis to a particular article on a page. Tones are described in percentages and can be specified to the printer.



Big quote marks

Take a quote out of a story and make a graphic out of it

PRODUCTION

This note applies if a garden is doing its own paste up for artwork which is to be printed or photocopied.

Paste up: what you need

- **Gridsheets**
- **Dry transfer lettering**
- **Letraset.** The most widely available brand, can be obtained from most artists' materials shops in a wide range of typefaces, plus extra symbols and rules. A catalogue will contain useful information about how to use Letraset, as well as the range of styles and sizes. It is best to decide on a limited number of typefaces to give the newsletter a recognisable style.
- **Steel ruler.** This is less likely to break than a plastic one and is essential for use with a scalpel.
- **Scalpel.** A scalpel is the quickest method of cutting up typesetting - and fingers, so keep them well clear.
- **Spray fixers**
- **Roller.** To make sure artwork is stuck down firmly.
- **Blue pencil.** Use this to write on gridsheets or artwork: it will not show up when work is photocopied or a plate is made for printing.

Paste up: what to do

Find a clean room with a large table to spread everything out on. Paste up can be fiddly and demands lots of patience, so taking breaks for rest and refreshment helps!

Rough artwork

It may help to have a stage between the page plan and final past up. Photocopy the typesetting and do a rough layout to see whether it all fits or whether a rethink of the layout is needed. Remember to leave precisely measured spaces for graphics and headlines.

Measuring headlines

Write out the words to be used, then measure a letter 'A' on the Letraset sheet and multiply that measurement by the number of letters to be used. Add half the 'A' measurement for each break between words. This will provide a rough idea of whether the headline will fit; if it will not, either reduce the size of the typeface or rewrite the text.

Using Letraset

On each Letraset sheet there are guidelines printed 3mm below the letters. Draw a blue line 3mm below the required base for the headline. Then, after removing the protective tissue from the back of the sheet, position the letter by placing the Letraset guideline over the line. Using a smooth rounded

object, such as the end of a ballpoint pen, rub lightly but thoroughly over the letter to transfer it to the paper. Carefully peel away the sheet, making sure the transfer has been completed. If part of an adjacent letter is accidentally transferred, scrape this off with a scalpel.

When the work is complete, put the backing paper over it and rub firmly with a roller to ensure firm adhesion.

Pasting up

Lay the headlines and text in position on the gridsheet, inside the inner blue lines. Line up the edge of the text with the lines, not the edge of the paper the setting is on. Use the ruler to make sure the edges are straight and line up the lines of setting at the top and bottom of adjoining columns. Then stick each piece down in order.

Black lines

Black lines - called 'rules' - can be used effectively to put boxes round articles, divide columns or 'frame' graphics. They look better if they are not too thick. Letraline looks good but is fiddly to use; it has to go straight onto the grid and is hard to change if a mistake is made. Black felt tip is easy to use but gives a fuzzier line.

A final check

Before the artwork goes for printing check everything again:

◆ reread the text to make sure there

are no mistakes and the pieces of setting are pasted up consecutively.

- ◆ check that everything is pasted up straight and well stuck down
- ◆ check that all the pages are numbered in order:
- ◆ make sure the instructions given to the printer are clear, including instructions for graphics to be processed and headlines to be set and a list of where they are all to be positioned.

The artwork is now ready for printing.

PRINTING

Choosing a method

The choice of method will depend on the resources available, how quickly the newsletter needs to be printed and to what standard you are working.

Duplicating

For print runs of between 750 and 2,500 copies, duplicating could be the cheapest option.

Photocopying

Depending on the cost, photocopying may be as cheap as duplicating, certainly for the first few hundred copies. It is quicker, cleaner and simpler to do. Modern copiers will reproduce graphics well but photographs less so.

Most will reduce or enlarge, allowing a better fit on the page. Like duplicating, photocopying looks more attractive if it is used on a coloured, pre-printed masthead (make sure the paper is suitable for photocopying).

Printing

For a professional job use a printer. Also, for a longer print run printing will be more economical.

Correcting Proofs

Before the newsletter goes to print final proofs will need to be checked to make sure that everything is correct. Correcting proofs must be done as neatly and clearly as possible. It is worth learning the symbols for correcting proofs, as this reduces the amount of explanation needed. As far as possible, all corrections should be made in the margin, the only marks made in the text being those needed to show the place to which the correction refers. If a mark may not be understood, put an explanatory note in the margin.

Other options

If desk top publishing is available, a diskette can be given to the printer or a bureau specialising in setting can be used to print the newsletter. In both cases it is important to check whether their equipment is compatible with the gardens.

Working with printers

Before selecting a printer get quotes from two or three. Prices can vary considerably. Also find out whether they can undertake the quality of work required and how fast they can deliver.

Getting a quote

Be as specific as possible, to ensure that the printer can meet the requirements and that no extra costs will appear when the bill arrives.

The following information needs to be specified:

- ◆ whether finished artwork or typed copy will be supplied;
- ◆ the number of copies. Printers often work in 500s or 1000s. If unsure, ask for a price for a minimum quantity and the cost of run-ons. A small run will have a higher cost per unit;
- ◆ the colours (black counts as a colour);
- ◆ the sort of paper required (see below);
- ◆ whether the work is to be folded, collated and stapled;
- ◆ how many photographs are to be processed;
- ◆ the schedule for production;
- ◆ if the publication is to be regular, how frequent it will be;
- ◆ the size and number of pages;

- ◆ whether or not the finished copies are to be delivered.

It can be very helpful to show examples of the type of work required.

Paper

Paper sizes are standardised: A3 folded in half to A4, makes a good newsletter. Paper comes in different weights which are measured in 'grammes per square metre' (gsm). Recycled paper is often more expensive.

Instructions

It is vital to confirm an agreement in writing with the printer so there is no risk of misunderstanding. The following points need to be confirmed:

- ◆ all the details in the checklist above;
- ◆ a detailed schedule (for delivery of copy or artwork, receipt and return of any proofs, and delivery of completed job);
- ◆ the price.

DISTRIBUTION

However good the newsletter is, it will not be effective unless it reaches the audience it is aimed at, and arrives on time. The way the newsletter is distributed will depend on the garden's circumstances but it is a good idea to set up a system. This will involve:

- ◆ choosing the most suitable method of distribution;

-
- ◆ working out who will need to be involved and discussing plans with them;
 - ◆ deciding on the frequency;
 - ◆ working out the cost;
 - ◆ keeping the mailing list up to date;
 - ◆ ensuring that there is an efficient address system. Mechanical or computerised devices for addressing can save a lot of time and, in the long run, money.

CONCLUSIONS

A newsletter is a powerful vehicle for carrying a garden's message beyond its boundaries. Its production requires great commitment and energy on the part of the editor, but it is worth the effort - particularly as it can play an important part in developing good relations between the garden and its local community.

SETTING UP A SMALL SCALE EXHIBITION IN A BOTANIC GARDEN

Timothy WALKER & Ruth TAYLOR

ABSTRACT

The workshop aimed to cover the practicalities of mounting a small scale (low cost) exhibition at a botanic garden. It covered the planning for a particular audience, selecting and ordering the contents of the exhibit to communicate the carefully chosen objectives. Planning the layout and selecting the appropriate media was considered as was evaluating the effectiveness of the exhibit and possible funding problems.

RESUMEN

Este taller taller trata de cubrir en la práctica el montaje de una exposición a pequeña escala (bajo coste) en un jardín botánico. Incluye la planificación para una determinada audiencia, seleccionando y ordenando los contenidos de la exposición para comunicar los objetivos elegidos cuidadosamente. Se consideró la planificación de la disposición y la selección de los medios apropiados para evaluar la efectividad de la exposición y los posibles problemas de financiación.

INTRODUCTION

This workshop was designed to help delegates plan and execute a small, static display/exhibition in a botanic garden. Small here means a 3m square site (or its equivalent floor area). The workshop was conducted using participative techniques to draw ideas out of the participants.

AIMS OF SUCH AN EXHIBITION

The aims of such an exhibition might be to:

- 1 - bring in new visitors;
- 2 - publicize events and Friends organisations;
- 3 - give new information without altering the garden;

-
- 4 - show interesting plants;
 - 5 - give information on conservation for example;
 - 6 - outline the history of the garden;
 - 7 - familiarize the visitor with the garden layout.

TARGET AUDIENCE

The potential audience can be divided into several categories:

- 1 - casual visitors to the garden, including tourists;
- 2 - interested visitors to the garden, including retired people & families;
- 3 - school children & teachers and students;
- 4 - interested enthusiasts, including amateur (home) gardeners;
- 5 - other professionals in your field;
- 6 - other professionals in related fields;
- 7 - non-visitors;
- 8 - politicians & potential sponsors;
- 9 - press and other media.

SUBJECT CHOICE

It is important that you choose a subject that you personally are well informed about and in which your garden is strong. This is especially important the first time that you attempt this sort

of project. Before embarking on the project you should try to contact a world or national expert who might check your final text. Possible topics for an exhibition included:

- 1 - history of plant introductions;
- 2 - plant products;
- 3 - plant adaptations to environment;
- 4 - conservation;
- 5 - activities within the garden;
- 6 - culture of specific plants.

This list is not in any way exhaustive.

SELECTING PLANTS & OTHER MATERIALS

There must be some thing familiar in the exhibit to catch the eye of the visitor. Once you have their attention then you can introduce less familiar plants. Other materials that can be incorporated into your display might be:

- 1 - leaflets or booklets;
- 2 - "touchies & feelies";
- 3 - interactive material;
- 4 - knowledgeable staff;
- 5 - audiovisuals;
- 6 - models;
- 7 - something very dramatic to catch the eye.

WRITING THE TEXT

This depends on the audience but it is very important to have as many people check the text before it is committed to a permanent display. This should include a sample of the target audience plus experts in the field to check the facts.

DESIGNING EXHIBIT

This is much better done in close collaboration with a professional grap-

hic designer. This will make the project far more expensive but the final result will be much more professional. Remember your public image is being projected by the exhibit.

EVALUATING EFFECTIVENESS

If there is an information package or hand out then there may be a returnable card that you could put in with the literature.

GREEN AWARENESS - WHAT CAN WE LEARN FROM ABORIGINAL AUSTRALIANS?

Julie FOSTER

INTRODUCTION

The Australian National Botanic Gardens (ANBG) contain the world's largest collection of Australian native plants. A great many of these plants were (and in some cases, are still) used by Aboriginal people for food, medicines, and tools. More than one third of the approximately 20,000 students who visited the Gardens in 1992, came to take part in activities and programs related to Aboriginal plant use. Some had specific interests such as the use of timbers in tool making, use of fibres for basket making, ethnobotany and music and dance while others had a more general interest.

Aborigines have lived in Australia for at least 50,000 years. In this time they have developed a deep understanding of the environment. One of the aims of the ANBG is to encourage an understanding of the use of plants by Aborigines. This is done in such a way that it develops in students an awareness of the care and respect for plants and the environment shown by Aborigines.

In all Aboriginal cultures the emphasis was on the richness of the ceremonial and spiritual life with the material culture reduced to a minimum.

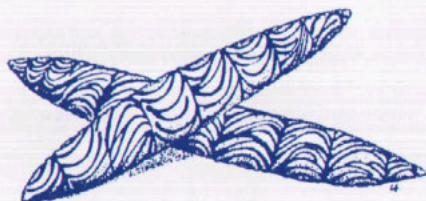
THE SCHOOL CURRICULUM AND BOTANIC GARDENS

The new national statement on curriculum guidelines in education includes Aboriginal Studies as a compulsory subject for all students aged 5 to 15 years. It is to be taught across the curriculum.

It is hoped to develop in all children an understanding and a pride in Aboriginal culture as part of the heritage of all Australians.

Botanic gardens have an important role in this area. Most botanic gardens in Australia grow many of the plants used by Aboriginal groups for food, shelter, tools, other implements and medicines. At the ANBG students can experience the collection and preparation of food as well as making baskets and string bags from fibres used tradi-

tionally. They can play traditional music on instruments made from timbers of trees grown in the gardens, participate in dance and learn of the complex technology possessed by Aboriginal people in the functioning of the boomerang and spearthrower and the production of cutting tools.



knocking sticks used to provide music in ceremonies

Theatre

One of the most effective ways of conveying positive messages to children is interactive theatre. It has the potential to change attitudes in an atmosphere of fun and enjoyment.

A pantomime titled *To the Forest Born* was performed at the Gardens by **The National Indigenous People's Theatre Group** during January, February and March 1993. The performers took the parts of native animals such as the kangaroo, lizard and emu and wore very evocative make-up and head-dresses. The theme of the pantomime was the animals' need for trees, grasses, fresh air and clean water. The pantomime also considered the

inter-relationship of Aboriginal people and the environment. There was much audience participation.

The cast painted the children's faces and taught them a number of traditional dances. The children also learnt how to play a toy didgeridoo, using plastic pipes. These were highlights of the show and gave children some insight into the ceremonies of Aboriginal people.



Sign made for *To the Forest Born*

Most of the performances were outdoors beneath large trees with occasional cries of kookaburras and parrots providing an ideal setting. Here the performers could demonstrate the importance of the trees and the land around them. Each child promised to plant a tree this year.

A total of 5400 children attended the 40 performances.

To complement the pantomime

most of the groups completed the **Aboriginal Plant Use Trail** and spent time using some of the ANBG's collection of Aboriginal implements and artefacts such as grinding stones and fire sticks.

Special groups such as students from non-English speaking backgrounds and special education students were given conducted tours of the Trail.

There is no entry fee to the ANBG however a charge of \$2.00 per person was made for the pantomime. The show was promoted through the local press and Tourism Commission during the summer holidays. For the school term performances, promotional flyers were sent to all primary schools in the ACT and surrounding areas of NSW (about 200 schools).

This performance and associated activities provided an excellent introduction to the **International Year for the World's Indigenous Peoples** for most school groups attending.

TEACHER TRAINING COURSES

These form an important part of the educational function of the ANBG. Two to three courses on topics related to Aboriginal plant use are held each year. Each is half a day and there is a fee. A course titled **Aboriginal Plant Use and Technology** was held to co-incide with the production of *To the Forest Born*.



Wooden bowl or coolamon made from *Acacia* sp.



Shield made from *Casuarina* sp

Each participating teacher is required to complete a comprehensive evaluation of the course and to pass on to staff at their schools details of the course. This is an excellent method for disseminating information.

There are many Aboriginal people teaching about their culture and the importance of the natural environment. During **The Australian Science Festival** Aboriginal people from a NSW coastal area demonstrated the collection and preparation of some of their foods and medicines as well as how to make and use a variety of implements.

Many medicines were made by boiling up the leaves or flowers of selected plants and drinking the resulting potion.

Other treatments involved applying a poultice to an affected area e.g. one made from the large fruit of the crinum lily was used to relieve the pain of a sting ray barb.

The techniques involved in cutting a boomerang from a curved branch were demonstrated.

Their deep understanding of plants and obvious empathy for their environment were inspirational and very popular with students as well as the general public.

It is preferable to have Aboriginal people demonstrating the use and conservation of plants. During spring a number of Aboriginal people will spend 2 weeks in the ANBG. Students will have the opportunity to make tools and baskets as well as collect and prepare foods and medicines, another group will teach dance to the sounds of the didgeridoo and knocking sticks, both made from trees which grow in the Gardens. However, with increasing numbers of students visiting the ANBG as part of their Aboriginal Studies programmes it is necessary for non-Aboriginal staff to participate in these activities.

An appreciation of the use of a wide variety of plants in Aboriginal societies for medical purposes provides students with the understanding that we must conserve the world's plants if only for their great medical potential.

It was essential for Aborigines to understand the environment as their existence depended on it. To assist them with this they used calendars based on the seasons (solar calendars). The Ngemba people from western NSW had a calendar with six seasons based on food cycles and determined by the movement of stars, the presence of birds and insects, the blooming of trees and other plants, rain and the rising of rivers. To help students get in touch with their environment they can visit the ANBG at different times of the year to see what is flowering or fruiting, what birds are nesting, when the lizards or echidnas are about.

This exercise will help them become aware of the subtle changes in the environment and hopefully with knowledge will come a desire to conserve.

Aborigines took only what was needed from the environment, for example only a small amount of a tree was taken to make a didgeridoo, a canoe or shield. Trees were not cut down or ring-barked, they were seen as homes for animals who would provide food.

Australian Aborigines have a very close association with the land. They are taught from very young that they are a part of the land and it is up to them to respect and care for it. Institutions such as botanic gardens can provide a real learning experience for children and help them develop this attitude of caring for the environment.

OUTREACH PROGRAMS FOR BOTANIC GARDENS

Terry KELLER & Lucy JONES

written by Linda RICHTER

ABSTRACT

Two case studies of community gardens in ethnically diverse New York City neighborhoods demonstrate the possibilities for hands on learning by local residents concerning matters of ecology, horticulture and conservation which affect their own neighborhoods. Participants will discuss the needs of their communities and develop a plan that will work for their own particular community.

RESUMEN

Dos casos estudiados de jardines comunitarios en barrios con diversidad étnica en la ciudad de Nueva York demuestran las posibilidades de los residentes locales para aprender y practicar materias de ecología, horticultura y conservación que afecten a sus propios barrios. Los participantes discutirán las necesidades de sus comunidades y el desarrollo de un plan que acometerán para cada comunidad en particular.

INTRODUCTION

When you love the land, that love can extend from wide-open country spaces to small window boxes in heavily urbanized areas. Most of us live in or near cities as we approach the end of the 20th century and more of us move to urban areas every day. For a closeness with nature, city dwellers are

dependent upon islands of green... of all types:

- a private home with a lawn and a place for a garden, a tree or two for shade--a place we would consider ourselves lucky to live in or even to see from our window;
- house plants scattered about our

homes;

- municipal park land--from the well-maintained showcase parks of a city to the forgotten neighborhood corner "playgrounds" in poor neighborhoods;
- a botanical garden--usually only one per city;
- an apartment building guarded in front by a lone tree, branches reaching for sunlight and roots grasping for water and nutrients in soil hidden from view by concrete; its green company?--only some tufts of grass growing between sections of sidewalk;
- a vacant lot with weeds eking out an existence in the midst of thrown-away hulks of automobiles, broken appliances, and garbage of all sorts, with barren earth soaked by discarded chemicals offering a habitat shunned even by the most indiscriminating weeds.

This last "island of green", the abandoned lot, is the focus of two New York City programs: Bronx Green-Up, the outreach program of The New York Botanical Garden; and Brooklyn Green-Bridge, the outreach program of the Brooklyn Botanic Garden.

How do people turn a vacant lot containing the ugly discards of urban life into a garden with all the peace and nurturing of nature? How do urban folk get some of the benefits of living close

to the land even in the midst of an overwhelming concentration of concrete and the pervasive urban problems of crime, excessive noise, litter, poverty, and despair? The problem is really no less daunting than this. The process is no less than a reaffirmation of humankind's connection to the earth.

New York City is heavily urbanized and densely populated--the term "concrete jungle" was popularly coined with New York in mind. The prototype of the urban area which is in need of green, New York, none-the-less, was blessed many years ago with the designation of huge tracts of land as parkland. However, for the poor--or even the working and middle class--transportation to such areas is not always easy and, even if possible, does not affect their daily life. A community garden down the block or across the street, however, is a 365 day a year event, 365 days of benefits.

IMPORTANCE OF OUTREACH FOR BOTANIC GARDENS

Both the Brooklyn Botanic Garden and The New York Botanical Garden have developed an outreach program to assist in creating community gardens. The importance of such programs cannot be overestimated. Such programs counter the perception of botanic gardens as elitist, with a history of exclusion. As recipients of public funding, it is especially important that bota-

nic gardens not be entrenched against the surrounding communities, but rather accept a responsibility to the community and seek to build their audience from the community.

APPROPRIATE OUTREACH PROGRAMS

Creating community gardens is one aspect of an outreach program. Education is another important goal: going out to schools, e.g., with a "science suitcase," or bringing people into the garden for educational programs. The subject areas of horticulture, botany and environmental science are all relevant subjects. Listen to the vocalized needs from community groups and from individuals. Tailor your programs accordingly. In multi-ethnic and multi-cultural cities such as New York City, outreach programs need to be relevant to different ethnic groups. Listening is the key; preconceptions are the danger. One community garden or program need not be like another to be successful.

Of great importance in any outreach program is the effective use of volunteers, most notably volunteers from the community who are interested in creating a community garden or working with a school or church garden. Botanical garden staff cannot do the effective networking that someone who lives in the community can. Yet, volunteers will need help and guidance--this may be the first garden they've helped create or

the first time they've worked with a group of neighbors.

EFFECTIVE OUTREACH

Needs assessment. If a botanical garden has never had an outreach program before, the first step is to assess interest and need by surveying other community organizations and individuals (e.g., visitors to the botanic garden). Pay attention to the demographics of the communities involved and try to formulate a balanced approach to include all groups of people.

Selling your administration. Ascertain the interest of garden staff in an outreach program. Present the needs of the community and a plan of action for beginning an outreach program.

Getting influential people involved and committed. It is important to gain support from politicians and community leaders. You can then utilize such support in selling your program to the administration of the garden, in getting funding for your program, and in publicizing the program to interested community groups and individuals (whose interest will in turn gain support from other politicians, administration and potential funders).

Funding. All possible sources of funding should be pursued: public money; foundations; corporations; individuals, through parties and dinners; and events which attract the press and pos-

sibly result in news stories—which in turn can be used to sell the program to funders. Speaking at events is constantly important.

Program: Using Botanical Garden Resources. After assessing needs, start... but start small. Build upon small successes. One successful garden can spawn many more. The first community garden which Bronx Green-Up assisted in was so inspiring to the community that four other gardens—of different types, quality and degrees of success—were started within one or two blocks of the first garden.

The Brooklyn Botanic Garden found a logical starting point for "Brooklyn GreenBridge" in working with school/ community gardens, building on a long-standing relationship between the Garden and New York City schools. Nearby schools and schools in targeted communities were selected for the first year of programs.

Staff also will be learning. You will need to develop a criteria as to how and who you will help in your outreach program, how much staff will do, what your resources are, etc. For instance, if you have a truck, you can assist community gardeners in picking up supplies; if you have a staff horticulturist with good speaking skills, you can give workshops.

Its important to be realistic about how much time you have. You need to decide how much follow-up you can

handle. A planting demonstration may be reasonable, but the actual planting should probably be the responsibility of the community gardeners. Without community involvement, the garden will not succeed. Encouraging that involvement, even at the risk of failure, may be more important than actually doing the work. Bronx Green-Up has assisted in over 170 projects. Watering and planting chores would quickly fatigue the staff of four!

EVALUATION

The continuation of an outreach program is dependent on appropriate evaluation. Because of the nature of gardening—vacant lot, window boxes, roof top gardens—aneecdotal evidence can be compelling. If a community garden helped residents feel safer because drug dealers were no longer using the lot to sell drugs... that is a powerful message!

Of course quantifying information is always important. You can keep track of who you helped, what you did, what plants were distributed, workshops given, etc. The more numbers you can generate, the more you can compare one year to the next and more specific you can be with garden administration, politicians, and funders.

Creating a newsletter is a valuable tool. A newsletter can be a forum of recognition for individuals and communities who have created something spe-

cial and an inspiration for those who are trying. It can help you step back from the day-to-day running of the program, and get a broader perspective of what you have done and are doing. It is a history of your efforts and has multiple uses in validating your efforts to those whose support you need.

WORKSHOP

At the II International Congress on Education, held in May of 1993 in the Canary Islands, Terry Keller, Director of Bronx Green-Up, The New York Botanical Garden and Lucy Jones, Vice-President, Education and Information Services, the Brooklyn Botanic Garden, presented a workshop which walked participants through these areas of concern. Mental practice of the steps you will take, writing down your plan, assessing your resources, anticipating problems, is essential when starting a new program. Such practical workshop experience allowed participants to visualize the "lay of the land", or what they will need to do when they return to their respective communities and botanic gardens.

CONCLUSION

Bringing areas of green to our cities where there currently are none can elicit all sorts of heartwarming emotions. The steps to turning such

"thoughts" to reality is, however, nitty gritty. The practical steps outlined in this paper need to be followed. Vigilance is constantly necessary. City gardens, community gardens, do not "take care of themselves". They will fail unless there is one or two very committed persons in the community and an outside resource to facilitate the negotiation of all the obstacles inherent in creating and maintaining an urban community garden.

Botanical gardens will provide a valuable service if they assist in creating green spaces in the communities beyond their gates. In return, they will gain a greener, more beautiful urban area of which the botanical garden can be the jewel. They will build a community of knowledgeable visitors who will aspire to visit botanical gardens as their appreciation of plants and nature grows along with the vegetables, flowers, and trees in the community gardens they tend. Perhaps most importantly, children will not have to grow up without knowing a tree, without smelling a flower... without all the treasures of a garden outside their door.

Comparatively few people will ever see the tropical rain forests and the other beautiful wilderness areas of the earth; everyone will see the green--or the garbage--outside of their homes. What could be more meaningful than greening our cities?

CONOCE ALGUNAS PLANTAS SILVESTRES Y COMESTIBLES DE MÉXICO

Edelmira LINARES, Carmen Cecilia HERNÁNDEZ y Teodolinda BALCÁZAR

RESUMEN

Se indican los aspectos importantes que se deben tomar en cuenta cuando se va a organizar un taller de esta naturaleza. Se mencionan las actividades realizadas durante el taller de la Gran Canaria y se hace un análisis de los comentarios de los participantes, entre los cuales, todos mencionaron que les gustó y que fue interesante y divertido. Se comprobó que la técnica usada en México se puede aplicar en otras partes del mundo.

ABSTRACT

This work summarizes the important points to be included in a workshop on wild and edible plants. The activities associated with a class on Mexican edible plants given at the Gran Canaria are presented as an example. An analysis of the commentaries made by the participants is made; not only did they enjoy the consumable samples but also found the program interesting and entertaining. The syllabus as applied in Mexico can be employed in other parts of the world.

INTRODUCCIÓN

Para nosotros los talleres, son cursos cortos que incluyen actividades prácticas. Constan de una parte teórica, donde el maestro que conduce la actividad da un marco general de referencia, con información sobre el tema, generalmente los profesores de los ta-

lles son especialistas en el campo, e incluyen información actualizada que enriquece el programa. Lo importante de los talleres es que la información teórica se complementa con vivencias personales del profesor, así como con actividades que incluyan el mayor número de órganos de los sentidos, para

apoyar el aprendizaje. En este caso al tratarse de un taller de plantas silvestres comestibles es importante que éstas se puedan probar y oler y dar las herramientas para poderlas reconocer en el campo (LINARES *et al.*, 1993).

Este tipo de enseñanza concentrada tiene que ser divertida, amable e interesante para despertar la motivación del público. Los talleres con estas características deben ser personalizados, los grupos que se integran para ésta actividad deben ser de cupo limitado, dependiendo del tipo de taller. En términos generales hemos encontrado que un grupo entre 20 y 30 personas es el óptimo para realizar éste tipo de actividades.

Cuando planeamos un taller tenemos que tomar en cuenta lo siguiente (LINARES *et al.*, 1993):

- Definir a quien va estar dirigido.
- Cuales son los intereses del grupo.
- Con que recursos se cuenta.
- Que tiempo se requiere.
- Que facilidades se tienen y en ciertos casos la época del año idónea para realizar esa actividad.
- Probar primero las actividades seleccionadas para ser incluidas, con el propósito que cuando se presenten salgan bien.
- Elaborar materiales escritos y didácticos para cada participante, con un

concentrado de la información que se va a presentar.

- Apoyar las actividades con plantas vivas de las colecciones del Jardín Botánico.
- Dirigir la difusión al núcleo indicado, por ejemplo si se trata de un taller de plantas comestibles se tendrá que contactar a las amas de casa, trabajadoras sociales y guisanderas, entre otros grupos.

DINÁMICA DE TALLER

Se escogieron plantas originarias de México, que fueran de gran interés, que tuvieran uso tradicional, que fueran nutritivas y que además se pudieran conservar secas para transportarlas a La Gran Canaria y ahí los participantes pudieran degustar algunos platillos elaborados a base de las mismas. Se hidrataron y se cocinaron a la usanza tradicional.

Para contar con plantas frescas que los participantes pudieran observar, se enviaron algunas semillas al Jardín Botánico «Viera y Clavijo», para germinarlas y tenerlas disponibles a la hora de la presentación.

Por otro lado se preparó información escrita que incluyera los nombres comunes de las plantas, los nombres científicos, reportes Históricos, ilustraciones antiguas (HERNÁNDEZ, 1959; SAHAGÚN, 1979), así como siluetas de las partes útiles de las plantas mencio-

nadas, en especial de las hojas. También se incluyó su distribución en México, usos actuales, así como su valor nutritivo (LINARES Y AGUIRRE, 1992) (Fig.1).

Las plantas que se escogieron fueron:

Los **quelites cenizos** (*Chenopodium berlandieri*), el **epazote** (*Ch. ambrosioides* sin. *Teloxys ambrosioides*), ambos de la familia de las Chenopodiáceas; la **flor de calabaza** (*Cucurbita pepo*) de la familia de las Cucurbitáceas; los **quintoniles** (*Amaranthus* spp) de las Amarantáceas; los **nopales** (*Opuntia ficus-indica*) de las Cactáceas y el hongo **huitlacoche** (*Ustilago maydis*) de la Ustilagináceas.

Durante el taller se presentó la información teórica relevante sobre cada una de las especies, mostrando con diapositivas las diferentes regiones donde crecen, como se cultivan, como se preparan y algunos platillos preparados con ellas. Para admiración de los participantes de otros países algunas de estas plantas se encuentran disponibles en sus lugares de origen, ahí como fueron introducidas no se conoce como emplearlas.

Después de la presentación teórica se observaron las plantas vivas y se degustaron cada una de ellas, tratando de comparar su sabor con algo conocido, para que posteriormente ese sabor se pudiera recordar (Fig 2).

Se hizo énfasis en la utilidad de estos alimentos en la nutrición para demostrar su importancia y potencialidad.

Los participantes conservaron la información escrita que se les proporcionó y algunas muestras de los alimentos.

Para finalizar se les pidió que contestaran una hoja de evaluación donde se les preguntó: ¿habían conocido antes esas plantas?, ¿las habían usado?, ¿que pensaban del taller, como lo mejorarían?, ¿que otro tipo de taller les gustaría? y ¿les gustaría recibir información posteriormente?. Recibimos 24 cuestionarios contestados, de los cuales todos mencionaron que les parecía interesante. El 62,5% de los participantes ya conocían estas plantas con anterioridad y de ellos sólo el 29,1% las habían consumido alguna vez. La mayoría opinó que el taller fue dinámico y divertido y que les gustaría tener más talleres de este tipo. Los temas que propusieron, son en orden de importancia: plantas medicinales, tintes, artesanías y Etnobotánica en general. Coincidentemente esos temas son los mismos que han sido sugeridos en México y los que hemos presentado en varias ocasiones, sobre todo el de las plantas medicinales.

CONCLUSIONES

Este tipo de talleres representan una herramienta interesante para motivar al público sobre la importancia de

las plantas en la vida cotidiana y a invitarlos a una aventura para conocer y consumir nuevos alimentos.

Para la planeación exitosa de los talleres es necesario prepararlos con anterioridad, probar los materiales para ellos diseñados y tratar de abordar el tema de la forma más atractiva posible. Para nosotras fue la primera vez que aplicamos un taller a personas de diferentes culturas y países, fue una expe-

riencia muy interesante y nos permitió comprobar que la metodología que hemos aplicado en nuestro país también puede ser aplicable a otros tipos de público, de diferentes idiosincrasias y de idiomas distintos, pero que comparten el interés por conocer más sobre la naturaleza, la botánica y como transmitir estos conocimientos, a través de la educación a otras personas.

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Agradecemos la colaboración de Ana Laura López-Escamilla en la elaboración de la tabla nutritiva y al personal del Jardín Botánico «Viera y Clavijo» todo su apoyo, el cual hizo posible la realización de este taller.

Quelites Cenizos (*Chenopodium berlandieri*) (a).

Conocido en náhuatl como hoauhquilitl o Verdura con semillas dispuestas en penacho. Según Hernández (1959) (b) se sembraban y cultivaban en huertos y jardines de Nueva España y se comían en su mayor parte cocidos, como hortalizas.....los mexicanos preparan unas bolas y la bebida llamada michihoauatolli, que toman como alimento muy sabroso. Las bolas mencionadas por Hernández (1959) aún se pueden encontrar en los mercados de México y se conocen actualmente como tortitas (c).

Son plantas de la familia Chenopodiaceae, son malezas y crecen espontáneamente en los campos de cultivo y a las orillas de los caminos. Se encuentran distribuidas comúnmente en todo México. Se consumen ampliamente en la Cuaresma (Linares y Aguirre, 1992).

Sopa de quelite cenizo (Tomada del Recetario Los Quelites un Tesoro Culinario, Linares y Aguirre, 1992):



(6 raciones)

Ingredientes

Quelites (limpios) 2 manojos (1 k)
 Caldo de pollo 4 tazas
 Cebolla picada 4 cucharadas
 Margarina 1 barra
 Sal Al gusto

Modo de preparación

SE PICAN EL QUELITE Y LA CEBOLLA. Se colocan en una cacerola con la margarina previamente derretida y se sofríen a fuego lento. Se agregan el caldo de pollo y la sal al gusto. Se deja a hervor durante 5 minutos y se sirve caliente.

Valor nutritivo del quelite cenizo en comparación a la espinaca

	Proteínas (g)	Grasas (g)	Carbohidratos (g)	Calcio (mg)	Hierro (mg)	Tiamina (mg)	Riboflavina (mg)	Niacina (mg)	Ascórbico (mg)	Retinol (mcg E ₆)
1	4.8	0.4	4.0	150	3.6	0.15	0.19	0.9	40	928
2	2.9	0.4	1.7	66	4.4	0.10	0.16	0.5	40	323

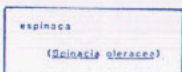
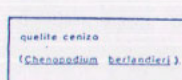


Fig.1 Ejemplo del material usado como apoyo didáctico, el cual se repartió entre los participantes. En este caso sobre los quelites cenizos. Fotografía de las tortitas de quelites: Robert Bye



Fig.2 Diferentes vistas del taller presentado en el Jardín Botánico «Viera y Clavijo». a) y b) Los asistentes tuvieron oportunidad de saborear los platillos preparados con las plantas silvestres. c) Los participantes procedían de varios países. d) Con la ayuda de los mismos participantes se presentaron los platillos.

PRODUCTIONS DE DOCUMENTS ILLUSTRES POUR NON VOYANTS

M. PATERNOSTER

RÉSUMÉ

Favoriser l'approche de la nature aux personnes non voyantes: quand la démarche éducative devient elle-même éducatrice pour les animateurs...

RESUMEN

Favorecer el acercamiento de la naturaleza a las personas ciegas: cuando el proceso educativo se convierte en sí mismo educativo para los animadores...

ABSTRACT

To favour an approach of nature to the blind: when a walk instructive become itself educative for stimulating persons...

Aujourd'hui, un certain nombre de jardins publics proposent des collections de plantes odorantes, en aménageant des parcours pour les personnes non-voyantes.

Heureuses initiatives!

Avec eux apprenons à solliciter tous nos sens de connaissances.

Leur offrir des moyens d'informa-

tions (étiquetage et documents en Braille et illustrés de dessins en reliefs, animations particulières), c'est aussi leur permettre d'être plus responsables et mieux intégrés dans leur environnement aussi bien naturel que social.

Cette démarche de communication, nous conduit à chercher l'essentiel du message à faire passer, à le structurer avec précision et à chercher des mo-

yens appropriés et diversifiés, afin de permettre à la personne non voyante de s'en faire une représentation spatiale et mentale. La démarche passe par la

découverte du concret, puis une maquette et enfin un dessin en relief, support de la mémorisation.

SHARING LIMBE EXPERIENCE

Nouhou NDAM

The workshop on one of Limbe's activities was designed to present an informal education session to a mixed audience (gender+age).

Many institutions have a well set up education programme. At a time, they deal with clearly defined groups of the community such as preschool children, school children, students and adults. In Cameroon, an audience for environmental activity is hardly homogeneous. For such a mixed public, different interpretations have to be given to one image (slide, photograph etc) to be able to interest each major group which composes the audience. It was an experience Limbe Botanic Garden had to share with congress participants.

The "Limbe workshop" was a session on slide projection, using Limbe Project slides. The audience was divided into three groups to match the three major groups that usually make-up an audience in Cameroon. The audience groups are children (6-18 years), Adult males (from 18 years old) and women (from 18 years old). Their major interests and devastating activities to the environment were listed followed by proposals to make their attitudes friendly towards the environment:

GROUP: CHILDREN (6 to 18 YEARS)

This group is usually composed of Primary School children and primary School drop-outs.

Their activities of major interest include various games, tourism and listening to music.

Some of their harmful activities are:

- trapping of small animals,
- collection of fuel wood from the forest (tree felling),
- traditional farming systems (slash and burn, shifting cultivation etc.)
- collection of Forest fruits, nuts and seeds (shooting of fruits or felling of trees)

GROUP: ADULT MALES (>18 YEARS)

Secondary School children, secondary school drop-outs, farmers, workers and business men make-up this group.

Among other things they like craft-work, dances and theatres and drinking beer or palm wine. Some of their activities which may contribute to forest destruction include:

- clearing of the forest for farm land,
- collection of fuel wood,
- logging for timber,
- trapping, and
- burning of grass land for hunting (at altitudes > 2000 m)

GROUP: WOMEN (>18 YEARS)

Primary and secondary school drop-outs, secondary School children, workers and business women constitute this group.

Their activities of major interest are:

- market visits
- farming
- church going
- participation in choral groups
- participation in lending / borrowing unions and
- exchange visits

Some of their activities which may contribute to forest disappearance include:

- ◆ soil cultivation
- ◆ burning in forest farms
- ◆ collection of fuel wood

Participants were separated into three groups each representing a group described earlier. Knowing the

audience's interest and their devastating forest related activities, participants' task was to use their skills as educators to interpret each slide presented to them to be able to educate in an interesting manner the three different groups of their audience. A group should not be left out during the interpretation of two consecutive slides.

Comments on the Limbe slides

Participants came out with useful proposals.

The negative approach of children can be alleviated with environmental friendly processes such as:

- ◆ trapping using forest ropes,
- ◆ collecting dead tree parts (avoiding felling),
- ◆ practice good farming methods,
- ◆ collect only fallen fruits, seeds and nuts, and
- ◆ planting more nut or fruit producing trees to serve more people.

Some proposed means of alleviating men's negative process were:

- ◆ use of good farming methods
- ◆ use of vegetable ropes and not snares
- ◆ obtain permits before hunting

-
- ◆ follow rational logging and
 - ◆ practice bee Keeping.

For women, it was proposed that emphasis be put among others on:

- ◆ use of good cultural practices
- ◆ use vegetation (cut) as compost manure
- ◆ collect dead wood, not kill trees for fuel-wood, and
- ◆ use recommended methods for collecting nuts, fruits and seeds.

Outcomes of the "Limbe workshop"

From the evaluation of the workshop it was understood that:

- the audience should be encouraged to participate in the slide presentation as it keeps everyone interested,
- with a mixed audience, a quick preli-

minary discussion is needed to enable an education officer to identify the different groups present in order to select and interpret the slides accordingly,

- a planning of photographs to be taken (slides) is needed to directly address the environment related issues to an audience,
- a member of the education staff should be in the audience to informally record all necessary information such as the uses of a plant, where a particular animal can be found in the forest, who can help to obtain a needed decision or fund.

POSTERS

Photographs with English and French captions were exhibited to illustrate the educational role of Limbe Botanic Garden.

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