This became abundantly clear to me after a 17 hour transcontinental flight from Delhi to Toronto with my two small children. Sitting next to us on the first leg of the flight was an elderly, distinguished looking businessman. My little son, then a year and a half old, was sobbing miserably. "I'm sorry, this is going to be a nuisance for you," I said apologetically to our travelling companion. "Poor chap, he's worn out," said the businessman sympathetically. He opened his briefcase and took out pens, books, and a calculator to amuse my little boy. Moments later my son had transferred himself to the lap of our fellow traveller and was happily playing with the calculator. Around us other Indian passengers were watching us with amusement. "When you feel sleepy, just hand me your little girl," said a motherly south Indian woman across the aisle. During the flight to London other passengers offered us homemade Indian food, toys and treats for the children, and (inevitably) advice on the care of small children during transcontinental flights.

Most of the Indian passengers got off in London, and our fellow travellers on the flight to Toronto were mostly British or Canadian. The atmosphere became more formal and less comfortable. Later during the flight both children began to sob miserably, worn out by more than 24 hours of travel. This time there were no offers to babysit or treats for the children. Instead, I had the uncomfortable feeling that people were casting

pointed glances in my direction, expecting me to silence my children. It was a great relief to land in Toronto.

During that visit to Canada I mused about the role of the child in Western countries and India. In India having a child is the focus and meaning of married life. Without a child life loses its colour and joy. Insecurity looms before the childless couple, too, for the child represents the parents' insurance for care in their old age. Children in India grow up with responsibility: in the early years responsibility to contribute to the work of the family, and later to care for older family members. These responsibilities are no longer a part of the role of children in the West. Perhaps, as a result, children in Western countries have lost a little status. They are no longer perceived as a vital part of every family. The child has become an option. Couples in Western countries consider carefully whether they can afford and can cope with a child.

How alien these concepts would seem to Ammaji, our beloved grandmother-next-door in rural India. Perhaps, as we seek to understand the complexities of the population problem, we should try to listen to the views of the Ammajis of this world. For them the child can never be seen as a tiny contributor to an alarming growth curve. The birth of a child is an occasion to be celebrated, and there always seems to be room for one more in Ammaji's lap.

Medicinal plants: another man's poison

Fiona Godlee

Before man intervened in nature, species were formed and became extinct at about the same rate. But rates of extinction are now thought to be as much as a million times faster. With the destruction of the tropical rain forests one fifth of all plant species may be lost within the next 50 years. Among these may be thousands of species of medicinal plants.¹

The loss of the chemical information contained within these plants has been likened to the loss of the great libraries at Alexandria. According to Michael Flint, author of an Overseas Development Agency

report on biodiversity, costs will result from untreated disease and the need to synthesise more expensive alternatives.²

Only last year scientists at the Royal Botanic Gardens, Kew (London), working on the Australian bean tree, *Castanospermum australe*, isolated a poly-hydroxyalkaloid compound that has an inhibitory effect on HIV. Since then another chemical, deoxy-nojirimycin (from the black mulberry, *Morus nigra*) has been found to inactivate the virus and is now undergoing clinical trials.

Drug companies are waking up to the potential of the rain forests and wetlands. A small red flower from the forests of Madagascar has proved a financial winner for Eli Lilly. The Madagascar periwinkle (*Catharanthus roseus*) is the basis for the vinca alkaloids, which include the cytotoxic drug vincristine—in 1985 they had a market value of \$100m. The periwinkle is now farmed in fields. After 20 years when, despite a total drug budget of \$2bn, investment in plant research in America dwindled to nothing, pharmaceutical companies are now racing into the fray. Over 100 companies in America and 223 worldwide are investigating plants for their pharmacological potential.

Chemicals in plants

Modern analytical techniques have shown enormous variety and complexity in plant chemicals. In 1985, 2618 new structures were isolated, says Dr Linda Fellows, Kew's senior plant biochemist. "Everywhere we have looked we have found something new."

Finding active chemicals in plants is not simply a matter of chance. The important thing, says Linda Fellows, is to look at the whole plant, and to test it against as wide a range of biological screens as possible. The National Cancer Institute in America spent 30 years and millions of dollars testing 35 000 plant

Kew's seed bank holds 1% of the world's flowering plants, including 3000 endangered species

By their fruits

What is the name of the traditional Christmas foliage pictured on the cover of this issue of the *BMJ*? This is not such an insulting question as it may seem; in a survey in America only six out of 30 health professionals identified holly berries correctly. Fewer still knew that they can be toxic.³

Ignorance about common plants is worrying. The fact that children will pick brightly coloured berries and put them into their mouths is made much worse by the inability of their parents to tell hemlock from hogweed (both members of the carrot family, *umbelliferae*). That makes a problem for the doctor faced with a distraught parent, a screaming child, and a branch of some non-descript shrub.

This year the National Poisons Unit at Guy's Hospital in London received over 6000 telephone inquiries about poisonings related to plants. One of the commonest villains was the arum lily, a hedgerow plant also known as lords and ladies. Its bright orange fruiting head can prove irresistible to children and when eaten causes a severe burning sensation of the mucous membranes. The subsequent swelling can cause asphyxiation.

Trying to identify plants over the phone, especially when the person at the other end has no idea what they are looking at, is time consuming and unreliable. Often the only answer is to advise an emetic or activated charcoal. This usually means more tears and admitting the child overnight.

But soon staff in accident and emergency departments may be able to identify plants themselves. Armed with Plato, a software package designed by the National Poisons Unit in conjunction with botanists at Kew, they will be able to compare the plant or fungus in front of them with up to 200 common suspects. The program will take them step by step—asking questions such as which part of the plant they have and how the leaves are positioned on the stem—through a process of elimination until there remain only two or three alternatives. Colour pictures of the remaining suspects help to speed up final identification.

Christine Leon with Plato, a database for identifying poisonous plants

The plants on the database are not necessarily the most poisonous ones. "They are the ones we get most inquiries about," says Christine Leon, botanist in Kew's economic and conservation section. "They tend to have attractive fruits, like the evergreen shrub *pyracantha*. Doctors mainly need to know when it's ok not to treat."

Plato (the name is an abbreviation of plant toxins) is about to be piloted in selected accident and emergency units around the country. The plant materials will be sent back to Kew to check the accuracy of the identification. Funding so far has come from the British Library, but to take the project further will need another quarter of a million pounds. Meanwhile, WHO is keen to adopt the system for use elsewhere in the world. "The aim," says Dr Virginia Murray, consultant toxicologist at the National Poisons Unit, "is to bring botany to people with no botanical knowledge."

based chemicals against mouse leukaemia cells in vitro without any drug reaching the market. Vincristine was among the compounds rejected.

Mass screening of plant extracts is important, but success rates are higher where expert knowledge is applied to the process. The director of Kew Gardens, Professor Ghilleen Prance, attributes Kew's high success rate to its systematic approach. Researchers combine ethnobotanical studies (looking at what local people use), taxonomic relationships (comparing the morphology of different plants), and routine chemical work. "If Linda Fellows sees an interesting chemical in one plant extract she may know that it is worth pursuing for, say, antiviral activity because of its chemical structure," he said.

With over 250 years of collecting and classifying of plant species (the gardens were founded in the reign of George III), 300 acres of parkland and glass houses, and the world's largest bank of seeds from flowering plant species, Kew is in a unique position. When castanospermene was isolated the hunt was on for other plants with similar properties. *Castanospermum australe* has no close relatives in Australia, but taxonomists at Kew noticed that its fruit and flower were similar to those of a South American tree, *Alexa leiopetala*. Pods from this tree had found their way to Kew's herbarium from Guyana 50 years ago, and when Kew's plant biochemist, Dr Robert Nash, analysed them he found that they contained the same chemical. "Taxonomists hadn't put the two trees together before because of the geographical distance between them," says Nash. Their common ancestry must date back millions of years, to before the continents separated.

"The fact that plants contain chemicals that affect human viruses is a tribute to their versatility as

synthetic chemists," says Linda Fellows. Castanospermene is what botanists call a secondary compound, one that is not essential to the plant's primary metabolism. Opium in poppies is another. The function of secondary compounds within the plant remains unclear, but it seems likely that they have evolved as part of the plant's defence mechanisms. The result is that medicinal plants are often poisonous if taken in the wrong way. "Ironically," says Linda Fellows, "it is among those substances poisonous to mammals that most of the chemicals we regard as medicinal are found."

Business hopes

Conservationists lobbying for the protection of the rain forests hope that the dollar will succeed where their appeals have failed, and there are some signs of hope. Merck Sharp and Dohme has invested \$1m in a royalty agreement with the National Biodiversity Institute in Costa Rica to undertake "biological prospecting" in what remains of the tropical forest there.

Kew is also committed to sharing the profits from plant based products with the countries of origin. "If something useful is discovered we set up a deal with a drug company to extract, synthesise, and market the drug," says Dr Charles Stirton, Kew's deputy director of science. Half of the profit goes to the company, a quarter to Kew, and a quarter to the country of origin.

Impact in developing countries

But bringing in the big pharmaceutical companies has not always been good news for developing

Kew's Palm House, built in 1848—long before biodiversity became a household word

ROYAL BOTANIC GARDENS

ROYAL BOTANIC GARDENS

Professor Matos encourages "living pharmacies" in Brazil to give local people access to medicinal plants

ROYAL BOTANIC GARDENS

countries. In the past the patenting laws have allowed drug companies to develop synthetic drugs based on plants from the developing world and sell them back to the country of origin at huge profits. The result is reduced access to the drug for local people. Dr Raymond Harley, one of Kew's head botanists, talks of "the nasty business of patents." A species of philanthus that causes relaxation of the ureters was used by local people for treating renal colic. "A company in the United States patented some extracts for use in another disorder and the locals couldn't then use it for treating kidney stones."

Kew's aim is to encourage the use of simple plant based medicines in developing countries. Projeto Nordeste is a collaborative project run by Kew and scientists in the north east of Brazil. One of its initiatives is to document the use of plants in traditional medicine and provide local people with the basic ingredients. Professor Francisco Matos, head of the natural products laboratory at the Federal University of Ceara in Fortaleza, has pioneered the setting up of "living pharmacies," small gardens that stock

commonly used medicinal plants and are run by local people experienced in their use. The idea is to enable people to provide for their own medical needs at affordable rates.

Projeto Nordeste also involves talking to local people and finding out what plants they use. The results of this ethnobotanical research—a combination of anthropology and pharmacology—is fed into a growing database housed in Recife.

Trying to assess what the value of the world's plants will be in the future is an impossible task. The problem, says Linda Fellows, is that we cannot predict in advance which plants are going to be useful. "Plants may contain chemicals that affect diseases as yet unrecognised."

- 1 Fellows LE. Pharmaceuticals from traditional medicinal plants and others: future prospects. In: Coombes JD, ed. *New drugs from natural sources*. London: IBC Technical Services, 1922.
- 2 Flint M. *Biological resources and developing countries*. London: Overseas Development Agency, 1991.
- 3 Scalise JA, Harchelroad F, Dean BS, Krenzelok EP. Berry identification by emergency health care providers. *Veterinary and Human Toxicology* 1988;30:426-8.

Confessions of a Benedictine drinker

Selwyn Taylor

"I here present you, courteous reader, with the record of a remarkable period of my life, and I trust that it will prove not merely an interesting record, but in a considerable degree useful and instructive. That must be my apology for breaking through the delicate and honourable reserve which, for the most part, restrains us from the public exposure of our own errors and infirmities."

Thus wrote that distinguished Mancunian, Thomas de Quincey, in the elegant opening lines of *Confessions of an English Opium-Eater*, in which he recounts why he became an addict while an undergraduate at Oxford, where he matriculated in 1803. He was 18.

"I first came to be a regular opium-eater," he continues, "not for the purpose of creating pleasure, but of mitigating pain in the severest degree." Though I confess to an inordinate and at times compelling pleasure in drinking wine, my reasons for starting to drink it were similar. Like de Quincey, I was a sufferer from the intense cold of sea water bathing. Which of you can tell me where the misery of cold ends and pain begins? Moreover, the choice of relief was mine only by proxy, it was my teetotal father who took the initial steps on my behalf.

In 1923, when I was 9, we took our summer holiday in August on the north coast of Brittany. Now the problem was that I simply could not learn to swim, although both my parents and my elder brother were proficient. So when I went into those cold, cold waves which roll in from the Atlantic I found myself so cold that my skin became purplish blue and covered in goose pimples. I still recall being exhorted to run up and down the beach in the sun to try to warm up and restore my circulation.

My father, being a schoolmaster, thought deeply about my disappointing performance and concluded that a vicious circle had developed between my sensitivity to cold and my inability to swim, and so he sought a remedy. He was rather proud of his French and could often be heard quietly talking to himself and practising new phrases as he walked up and down the beach. Eventually these prefabricated speeches were tried out on some unsuspecting native. The person he most enjoyed buttonholing was the proprietor of our hotel.

One evening my father bearded Monsieur and explained my problem in his best French. At that time of day Monsieur would sit behind the bar. He reached for two liqueur glasses and a bottle of Benedictine, and bidding my father join him he explained that this was a medicinal product which had excellent postprandial "digestif" properties. In addition, it imparted a wonderful warmth to the body which started internally and then moved out to the extremities in a remarkable way. This would help not only the youngest member, he declared, but all the family to enjoy their daily swim if taken immediately on leaving the water.

My father was impressed. Next morning we bought

"The magic lies in the skilful blend of aromatic herbs . . . which soothe the stomach."

a bottle of Benedictine, four tiny glasses, and a corkscrew. Our new equipment joined the tea basket in the beach hut.

In due course I was allowed to open my very first bottle of Benedictine. Initially it had to be divested of its clinging wrap of tissue paper, a most distinctive off white affair, which ended in a sort of Chinese pigtail wound in concentric circles as a top knot. Then the bottle was exposed in all its glory, that handsome distinctive shape—impossible to knock over, easy to grasp, immensely satisfying to look at. A real lead capsule had then to be excised, and then a further thin strip of lead, which plunged down from the collar to a little cleavage in the bosom of the deep green glass, where a magnificent red seal was housed. This displayed a shield with three mitres, which was overtopped by a larger mitre beside a crozier. Below was the splendid circular label with the monogram DOM. It was many years before I could interpret these cryptic initials. I doubt if my father knew their meaning either. They stand for deo optimo maximo—"In God most good, most great." A happy choice.

When I emerged from the freezing Atlantic water

Trippets,
Bosham, Chichester,
West Sussex PO18 8JE
Selwyn Taylor, dean
emeritus, Royal Postgraduate
Medical School (past
chairman, Wine Society)

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