National College of Art and Design

Recycling Paper : Problems and Solutions

A Thesis submitted to the Faculty of

History of Art and Design

and Complimentary Studies

in Candidacy for the Bachelor of Design

in Visual Communications

by

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March 1991

Acknowledgements:

I wish to thank the following people for their assistance:

My tutor Paul O'Brien for his invaluable advice and constructive criticism.

The staff of ENFO for their co-operation.

I wish to acknowledge Smurfit Paper Mills,
Wiggins Teape,
Paperback Ltd.,
Conservation Papers
for their donation of the paper that I have used in my Thesis.

Finally, I wish to thank all the individuals and organisations for the infomation they contributed to my survey.

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Introduction

Introduction:

The history of mankind on Earth has been short but very eventful. During the brief life-span that we have inhabited the Earth, we have made more of an impression than any other life-form. Our history has been discoloured by undesirable characteristics such as violence, aggression and greed. By the end of this century, we will have undoubtedly left our parasitical mark as those responsible for the planet's irreversible destruction.

Earth is faced with a multitude of environmental catastrophes. These problems are of growing concern to me, and for this reason I decided to write this Thesis on one of the major crimes of mankind, namely, deforestation of the natural forests. I will stress the importance of protecting our forests as well as investigating a means of saving them, such as recycling paper. Throughout this Thesis I will discuss the causes and consequences of the ecological disaster that faces us. I will also outline the procedure that can be taken to control this crisis.

Before I discuss the current situation, it is necessary to mention the unyielding process which led us to this crisis. The trail of mankinds' destruction of the Earth is a long one, but the first steps were taken around the turn of the 19th century.

Thus the journey begins with the Industrial Revolution.

The Industrial Revolution

The Industrial Revolution:

The Industrial Revolution that occurred at the beginning of the 19th century, transformed the developed world from an agricultural to an industrial society. The key factor in causing this revolution was the need for manufactured goods. This situation evolved due to the expansion of colonial trade, and the rising levels of population that provided a new market stimulus.

The advancement of the revolution was assisted by the application of mechanical power to manufacturing. Initially the power came from water wheels, but the invention of the steam engine in 1770, allowed for the production of massive amounts of mechanical power. Access to coal and iron was crucial, as was an availability of labour.

Improved transport such as roads, railroads and canals aided communications and the manufacturing progress. However, the Industrial Revolution was not only beneficial to society but also had a number of detrimental effects.The industrial people of Europe, America, Scandinavia and Japan would never give up modern society to go back to a primitive life of centuries ago. The poorer people of Africa, Asia and Eastern Europe, who did not experience this Industrial revolution, constantly strive for an industrial or modern way of life. But for many of them, this prospect is an impossible dream and they abandon all hope.

Whether these underdeveloped countries are actually better off is a subject open to debate. Due to the rapid growth of industrialization, an enormous amount of damage has been inflicted on our environment. The Industrial Revolution evolved in a society where a form of social cohesion previously existed. The people found no problem in obtaining food or fresh water for daily use, and materials to build homes for their families were also relatively easy to acquire. These people were self-sufficient.

But the Industrial Revolution stole this form of freedom from them and forced them into a situation where they had to depend on employment and a regular wage for basic necessities. The family as a unit, also suffered due to the effect of the Industrial Revolution. Skills and trades were practically abolished in a society governed by mass production and specialization. The working population became concentrated in the cities as they left the rural areas in order to get jobs. With the population explosion in the cities came many new urban problems.

When work becomes the central activity in our lives, a system of 'supply and demand' develops. Industrialists, intent on maximising their profits, neglect the fact that their industries have disastrous effects on the environment. We live in a society where the job is more important than the home. This is an example of Capitalist manipulation over our lives. Our livelihood constantly revolves around money to the extent where money becomes an obsession. All values of today are reduced to material ones, which will eventually lead to the disintegration of society itself.

An industrial society is structured around creating new needs for that society. These needs soon become become basic necessities.
As commodities "buy" their consumers, the consumers are unable to differentiate between items that are essential or just a plain luxury. An item that was a luxury yesterday, becomes a necessity tomorrow. To relate this to the world of today, one can give the example of cars, televisions, washing machines and various other domestic appliances. People are classified according to their levels of consumption and in turn become dependent upon consumerism. Consumerism becomes a master of man and grows stronger to become his executioner. The consumer feels threatened by what s/he has not and what s/he ought to have or would like to have. In time, we will all become disabled in our addiction to consumerism.
The extent of Industrial activity is evident in the rising levels of pollution. As the level of pollution increases, it becomes a filthy burden on society, so it is shoved into the future, out of sight for the present, or else it is dumped onto the poorer section of society. Power is concentrated in the lives of a minority and a larger majority depend on handouts. Poverty increases as industrialisation manipulates society. Poverty levels rise and the gap between the rich and the poor widens dramatically.

Industrialisation is epitomized in Charles Dickens' description of Coketown, in his novel, Hard Times :

> It was a town of red brick, or brick that would have been red if the smoke and ashes had allowed it; but, as matters stood it was a town of unnatural red and black like the painted face of a savage.

Industry savages' the environment. Many people survive and depend on the exploitation of natural resources for industrial purposes. Similiar to industry, they trap and engulf their prey - just like a savage.

Conviviality, on the other hand, is freedom of the individual. This is a concept that has arisen to combat years of worshipping industrial productivity. This way of thinking underlines the rights and responsibilities of the individual within a society and environment. Conviviality stresses that the individual has the right to use the tools of society for self-fulfilment, while respecting the needs of other life-forms and the environment itself.

In the past, and indeed it is also true today, humans have considered themselves superior to any other life-forms. This is due to the belief that humans (i) have a soul, (ii) display consciousness, and (iii) have intelligent behaviour. These three factors are contrasted to other forms of life that are controlled by blind instinct. I think it is important that humans should respond as guardians of the earth rather than exploiters. Our relationship to Earth and its' other inhabitants should be as harmonious as possible. Earth was not made for man to abuse. The Earth is a habitat for all creatures and should be respected as such. Mankind is not the centre of life on this planet.

One of the features of the Industrial Revolution has been the massive amounts of paper used in industry, communication and education. It has also led to the detrimental effect of deforestation, as trees are felled for paper and for misguided agricultural and industrial ventures.

Overall View of our Environment

Overall view of our Environment - Economically - Ecologically

In this chapter, I will now discuss the current world situation and the effects of the Industrial age, both ecologically and economically. The aftermath of the Industrial Revolution split the world into two unequal divisions. With the psychological belief that wealth is the central importance in life, many have become obsessed with this ideology and have exploited natural resources to obtain further riches. The levels of luxuriant overproduction have increased rapidly. We are living in a disposable society, with an attitude of 'buy it, use it, discard it.' Such disposable, everyday items that we hardly even consider are razor blades, plastic biros, diapers, toothbrushes, plastic cutlery, plastic/paper cups and plates and milk cartons, coffee filters and tissues, to name but a few. *Planned obsolescence* is part of most of our daily products. This is true with regard to 'Swatch Watches' for example. These watches are designed to function for only a limited period of time - after which they are disposed of. Swatch watches are the ultimate fashion fad.

Most of these products cannot be recycled. However, to avoid excessive wastage, two approaches can be taken - disposable products can be made from recycled materials where possible. On the other hand, razor blades and plastic cutlery which are not easily recycled, can be replaced by conventional, permanent utensils.

Industrialists of the West have become similiar to a cancer cell. The analogy becomes clear if you consider the way they feed off the earths' resources, until they ultimately cause the death of the host. Life revolves around the idea of ownership. Mass production and consumption leads to pollution and poverty. Further growth will lead to a multiple catastrophe in the environment. Over-consumption not only destroys the environment, but is detrimental to all members of this society. We eat food grown by unnatural processes. Later they are saturated with chemicals, emulsifiers, preservatives, anti-oxidants and other various chemicals. This is done to increase the shelf-life of our products and make them more economically viable. Our water is contaminated with metals and other pollutants. Our air is blackened with carbon monoxide, nitrogen-oxides and sulphur dioxide. Furthermore, radioactive pollutants from nuclear power plants continue to poison us. It is no wonder that so many people die every year due to these toxic pollutants that creep into our system.

The developed world, as we call it today, extracts a large percentage of its' wealth from the poor countries of the world. Not only are these countries deprived of a sustainable way of life, but adverse consequences are inflicted on the environment. We have no authority to control the lives of the people of the Third World. Furthermore, we have no authority to snatch and swipe and steal from them in order to upgrade our already over-indulgent life-styles.

Because of the unequal distribution of wealth, a vast majority of the Third World countries owe huge debts to the developed countries - some of them have very little hope of paying back these colossal amounts. Brazil is the worlds' most indebted country. According to a report in The Observer dated 16 September, 1990, Dr. Michael Irwin, the World Banks' chief medical officer who resigned earlier in the same year, claimed that the profits of the World Bank were 'morally wrong'. This statement could possibly be linked with the mass deforestation taking place in Brazil and other tropical regions at present. A great deal of pressure faces the World Bank, particularly on their approach towards ecological issues. For this reason, they announced that an annual report will outline their policy in ecological and economic terms. Yet, while the World Bank claim to adopt an ecological approach with regard to their business, the President of the World Bank has stated :

> ' I worship only at the altar of economic efficiency'
> (Button, 1990, p. 67)

While this statement may seem chilling, there have been horrendous happenings recently in Brazil. On 22 December, 1988, Chico Mendes was murdered. Mendes had been a rubber tapper and also an activist against deforestation in Brazil. During his lifetime, Mendes was the author of many articles on the subject and was a leader of many peaceful protests in the forests. He and his fellow workers would form human chains in order to stop the logging companies from destroying the area. (Fig.1) The victim of constant intimidation and persecution, Chico Mendes had his life brutally ended when he was shot in the chest in his own backyard. It is suspected that two brothers from a rich land-owning family in Brazil were responsible for the killing.

The worst examples of deforestation are in the Southern hemisphere and it is also here where people are at most risk from the ultra-violet light that shines through the Ozone hole. The Ozone depletion was caused by C.F.C.s used in the west and the deforestation is caused mainly by the exploitation of logging companies from America. However, the Industrialised World has also created some problems which

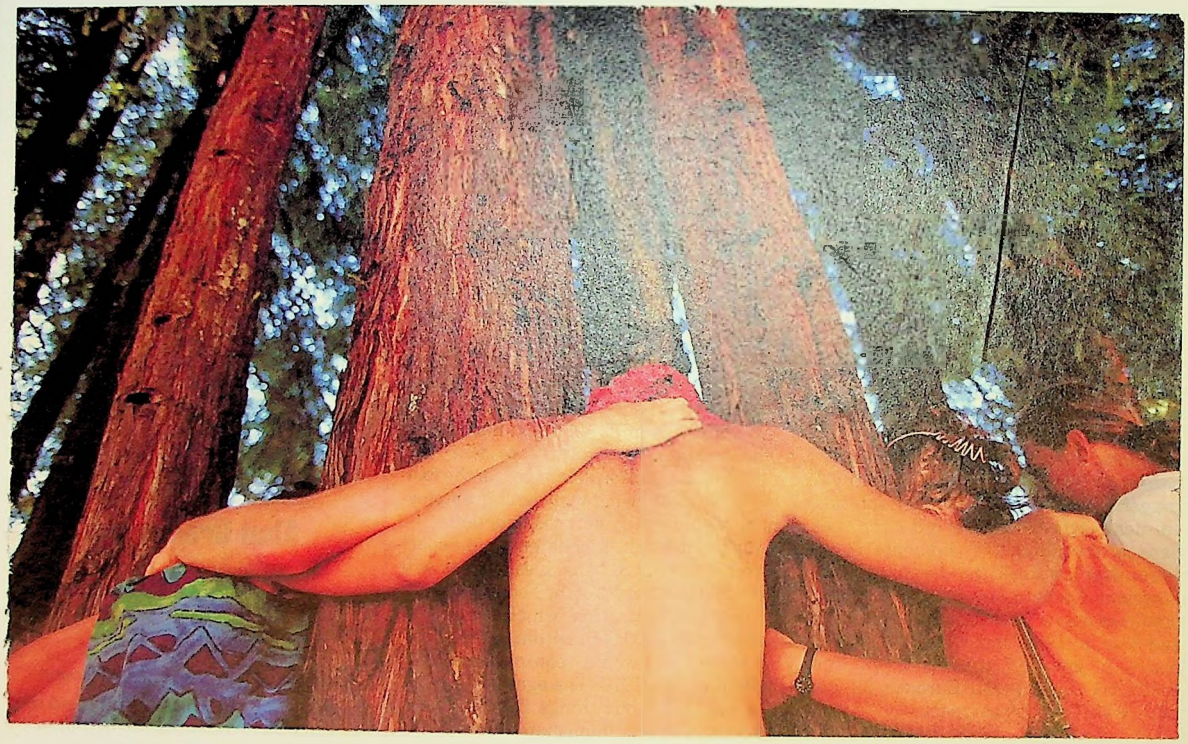

Fig . 1

will strike the very heart of our society. Acid rain has for quite some time been a problem in Northern Europe and there is also the growing threat of Global Warming. This may manifest itself in the future as a rising of the sea-level around the world when parts of Antarctica melt. Many cities such as London, Bangkok and Venice may become flooded and there could also be devastating consequences for many species which will be unable to adapt to the rising temperature.

Deforestation

Deforestation - Causes - Consequences :

Tropical forests cover approximately 14 per cent of the earths' land surface, and are located on and around the equator. They extend from the Tropics of Capricorn, 10 degrees North of the Equator, to the Tropics of Cancer, 10 degrees South of the Equator. About 30 million km^2 of the land surface of the Tropics can be regarded as forest land. It is estimated that 0.6 per cent of the forests are deforested every year as 22 acres are ruthlessly demolished each minute. (Seed, 1988, p.5)

The vegetation, due to its' density, protects the soil against flooding and landslides. The elimination of the rainforests not only cause serious flooding but due to the absence of vegetation, the hot sun dries and hardens the soil, resulting in little or no growth. The destroyed region is of no use to plant, animal or man. (Fig. 2)

Tropical forests contain a wealth of both plant and animal life. Over 50 per cent of the plant and animal species of the world, many of them still unknown to science, are found in this unique world. (Fig. 3) (Sadruddin Aga Khan, 1986, p.45) Unfortunately, many have become extinct due to the disruption of their habitat. Because these species are inter-related, the extinction of one species often leads to the extinction of many others. It is estimated that one species becomes extinct every 30 minutes, and scientists have claimed that by the year 2000, 10 per cent of the worlds' species will become extinct and the following eight years will witness the elimination of a total of 25 per cent. (Tropical Rainforests, Enfo.T69, p.9) The rate of extinction has never been so dramatically high.

Since the 1960's, the main project of Brazil was to colonise the entire country. Brazil is a country that can enable each family to live off 10 cultivable acres of land, without interfering with the Tropical region. But seven million rural families in Brazil are completely landless. (Allaby, 1989, p.90) Such a large number of families completely landless epitomises the avaricious nature of the Third World governments in collusion with the minority of powerful landowners in Brazil. Not only are the rural families deprived of their land but they are faced with constant oppression. Their lives are ruthlessly drained of any form of sustainable living, and they grow more hungry and desperate day by day.

To avoid provoking the influential Brazilian families who own large estates of land, the government point the rural families in the direction of the Amazon Basin, in order to survive. The rural poor sweep through the forest, cutting away the vegetation and

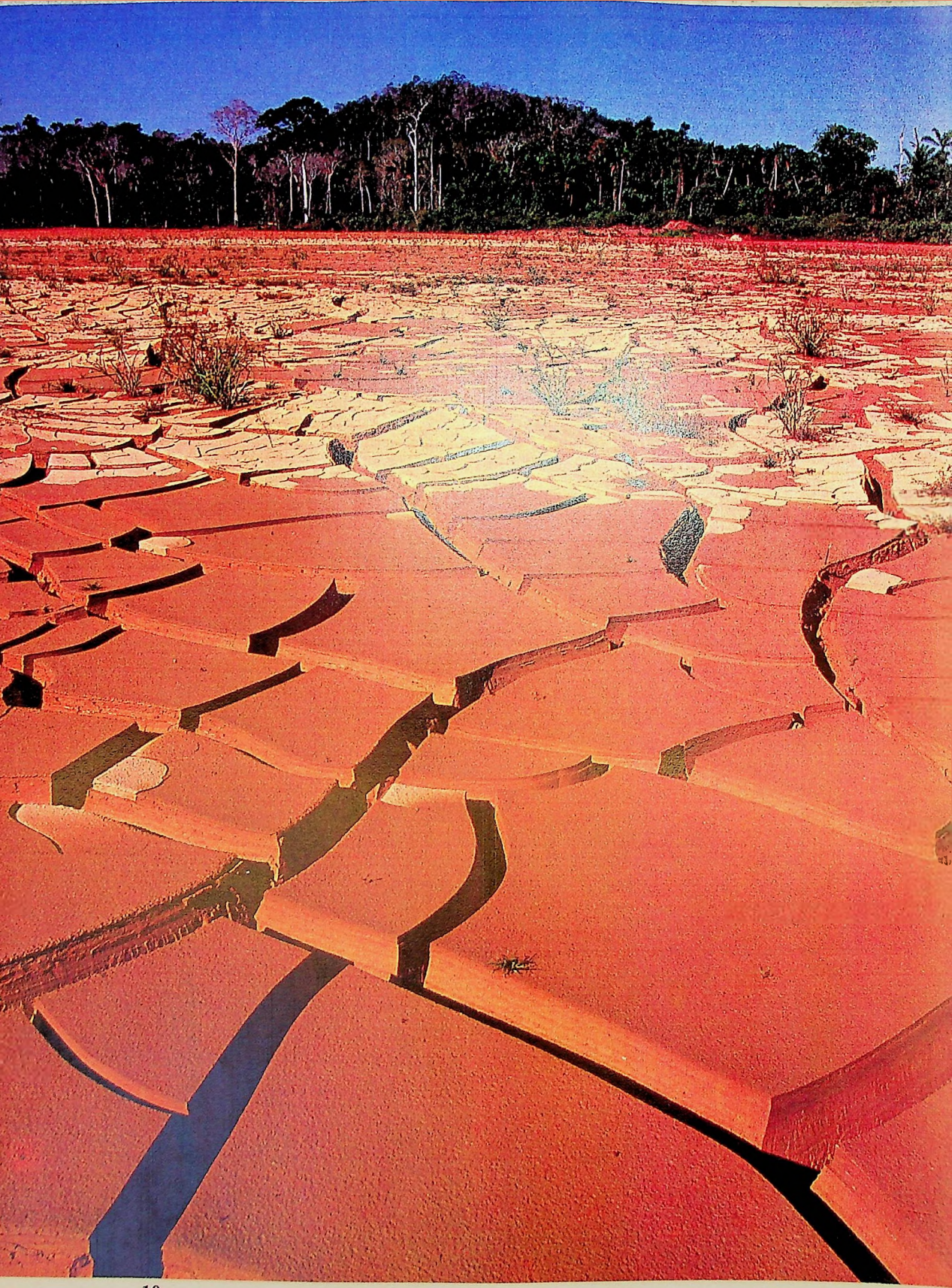

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Fig . 2

11.

Fig . 3

burning the remainder, a process known as "slash and burn". (Fig. 4) They settle in communities for as long as the soil will sustain them, which is usually only for a period of three to four years, due to the infertility of the poor soils. After this time has elapsed, the community moves on and the process is repeated. It is estimated that up to 100,000 square kilometres or 40,000 square miles of rainforest are lost annually due to the process. (Tearful Tropics, p.1)

To suggest that population growth is responsible for the destruction of the rainforest is both unfair and unjust. The problem lies with the greed of the richer classes of society and the unequal distribution of land.

The primary cause of deforestation of the tropical forests is the increase in consumerism in the Western World. Despite public misconceptions, tropical rainforests are for the large part, *not* destroyed for paper production. The splendour of tropical regions is sabotaged for pasture land for cattle ranchers for our fast food industry, and for the increasing demand for tropical timber products. Paper pulp extracted directly from the tropical forests is as little as 0.6 per cent. This figure is minimal in comparison to the 12 million acres that are lost annually for commercial timber products. (Sadruddin Aga Khan, 1986, p.50)

Ireland imports 50,000 tonnes of tropical timber annually. (Gormley,1990, p.128). All these profits from tropical timber or construction timber projects go straight into the hands of strong multinational corporations and do not benefit the rural families whatsoever.

But there is a further considerable connection between tropical deforestation and paper production. After the trees have been extracted for commercial timber products, vast areas of these tropical lands are re-planted with monoculture plantations, namely eucalyptus. These are later felled for the pulp and paper industries of the Western World, and in doing so, supplies the demand for yet more paper.

Eucalyptus Plantations:

Eucalyptus trees can survive almost anywhere and have an extremely rapid growth rate. They are extensively planted mostly in Brazil, Portugal and Spain. While they grow to a productive stage very rapidly, they are also responsible for an array of problems. Eucalyptus have strong surface roots with a radius of approximately 20 metres. These strong roots enable them to absorb large quantities of water and

13.

Fig . 4

nutrients that are required for their growth. Agricultural or subsistence crops in the area cannot compete for water against the Eucalyptus and they wither and die. Eucalyptus plantations also exclude the natural flora and fauna of the area, and result in the extinction of many vital life-forms.

The Eucalyptus is a profitable tree for the paper industry, providing high quality pulp and rayon. Many multinational corporations invest in Eucalyptus plantations for export. The trees are planted to produce pulp to satisfy the over-indulgence in paper products, while the urgent need for fuelwood, timber and fodder in the planted regions is conveniently ignored. Once again, the threadbare lives of these rural people who depend on their natural environment for day-to-day subsistence are overlooked. The hunger on the part of the multinational corporations for yet more sales, more money and more riches weighs more heavily that the hunger of the families that they mercilessly exploit in order to achieve their materialistic goal.

Plantations of any one species are dangerous to the environment. They prevent a diversity of plant and animal life, and are extremely prone to infection and disease. Powerful pesticides saturate the plantations to kill pests. These toxic organochlorine chemicals filter down towards the soil, poisoning wildlife, fish and the local water supplies.

Plantations are more reminiscent of controlled factories than of flourishing forests. Many companies proudly claim that they plant three trees for every one that is felled. What we should really ask is, what are they cutting down and what are they replacing it with?
In other words, 'sustainable forestry' often involves the raping of a natural forest, followed by the substitution of a contrived plantation.

Forestry in Scandinavia is often depicted as an excellent example of sustainable forestry. But the expansion of commercial forestry has led to large areas of native forest being replaced with uniform plantations. These uniform plantations inflict consequences similiar to those associated with tropical deforestation. Many species are threatened with extinction and the livelihood and culture of the indigenous Sami people are constantly disrupted.

Finland:

Finland is one of the leading countries that export pulp. The forests in Finland are being eliminated at a rate of approximately 170,000 hectares per year. The pulp and paper industry hope to increase this by 10,000 hectares per year by using drained peatlands. Some of the Finnish paper companies have ambitious plans to exploit the native forests of other countries. Spain and Portugal are among their prime targets. The land is cheap in both of these countries, and the environment and climate enhance the growth of eucalyptus and pine. The collaboration of pulp and paper industries with the Spanish and Portuguese governments have encouraged farmers to tear up their olive groves in order to increase eucalyptus plantations. The lands and livelihoods of the farmers are brutally disrupted to ensure that an increase in pulp and paper products will follow. The cost of wood is much cheaper in Portugal at only $15 per cubic metre, in comparison with $25 in the USA and $40 in Finland.(WEN, 1990, p.15)

Almost three per cent (600,000 hectares) of Finlands' native forest is still in existence. But the National Board of Forestry have plans to cut down 100,000 hectares of this native forest land. (The Ecologist, Jan/Feb, 1991, p.15) The region threatened with deforestation includes most of the Kessi and Hammastunturi, that are the two most vital regions of native forest wilderness in Finland. These two areas total one thousand hectares, but are only a minute fraction of the total area of forested land in Finland. The logging of this region had been planned to start in 1987 but a collaboration of environmentalists, activists and representatives of several reindeer-raising districts have succeeded in preventing this disastrous operation from taking place.

Kessi is a unique region consisting of more than 350,000 hectares of wilderness (Fig. 5) and many thousands of small lakes which serve as a habitat for a multitude of plant and animal species. (Fig. 6) In this region live also two indigenous Sami peoples, the Skolts and the Inari Sami, who depend on reindeer herding for survival. The logging of Kessi would not make reindeer herding impossible. However, it would create considerable hardship for the reindeer to obtain food and for the people who depend on a sustainable living from raising reindeer.

During the last few decades, the rapid draining of the wetlands of Finland for forestry has had detrimental effects on the environment. Due to this draining process, the percentage of nutrients and humus in the waterways has increased dramatically and

Fig . 5

17.

Fig . 6

has simultaneously reduced the variety and quantity of fish in the region. The spring floods have also suffered from disruption as the previous peatlands regulated the river flow. The quantity of summer pastures for reindeer has declined as have the populations of many game birds and animals.

Drainage of the peatlands causes the carbon contained within them to decompose more rapidly that previously. The peatlands lose their ability to absorb carbon and it is released into the atmosphere to form carbon dioxide. This conversion is occurring at such a rapid rate that the swamps and mires that are still intact, are unable to absorb the large emissions of this gas. The department of Biology of Joensuu University has estimated that the annual net production of carbon from well-drained peatlands is between three and four tonnes per hectare.(The Ecologist, Jan/Feb.1991, p.16) If this estimate represents the entire country, the amount of carbon dioxide released from drained mires exceeds the amount released from the burning of fossil fuels in Finland.

The industry in Finland is contributing to many environmentally-damaging problems. Among these problems, the damage inflicted on vegetation and lakes due to acidic emissions, are of major concern to environmentalists. The forest industry admits responsibility for approximately 20 per cent of the sulphur dioxide and 10 per cent of the nitrogen oxide that accelerate acid rain. (The Ecologist, Jan/Feb.1991, p.17) Nuclear power stations have been promoted largely by the forestry products industry. This is due to the fact that a sizeable percentage of the electricity produced would be consumed by the forest industries - in particular,.the paper mills.

One resolution of the harmful problems would involve the reduction of the annual timber harvests in Finland. The Council for Natural Resources states that by :

* increasing the density of planting
* the efficient use of tree branches
* the lengthening of the period between each harvest
* abandoning the operation of clear felling.

the amount of carbon *contained within* forests could be increased. The use of forests for energy production rather than wood and paper industries, would replace the dependence on fossil fuels and the push for nuclear power. Subsequently, these actions would provide a step in the right direction towards solving the problems of pollution and Global Warming.

Sweden:

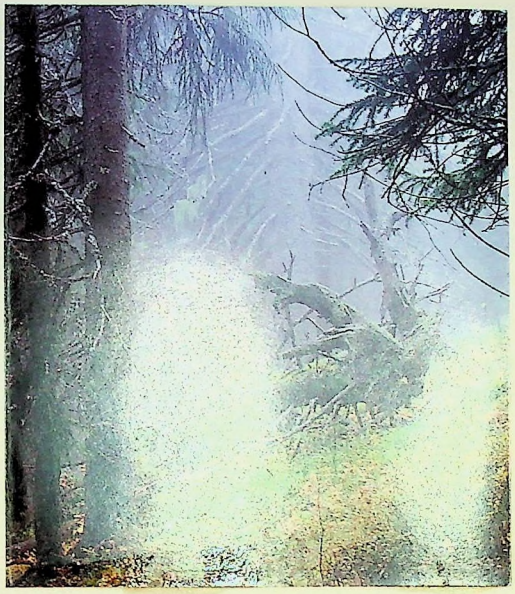
60 per cent of Sweden (24 million hectares) is classified as forestland. (Fig. 7) About half of this amount is owned by private landowners who do not practice intensive methods of forestry. A further 26 per cent is owned by the public sector and the remaining 25 per cent is owned by pulp and timber companies. Seven per cent of the worlds' woodpulp is produced by Sweden. (WEN, 1990, p.16)

However, commercial interests have infiltrated a more intensive system of forestry throughout Sweden, to increase productivity. The native forests of Sweden are now being replaced by plantations of pine which have a 50 per cent faster growth rate. Small landowners are encouraged to increase their felling rate to further production. Habitats such as peatbogs and heaths (Fig. 8) as well as many plants and animals are under immense threat of extinction.(Fig. 9)

The pulp and paper industry in Sweden is dominated by three companies : Stora, MoDo and SCA.

Stora is the largest forest products company in Europe and also one of the leading companies worldwide. Their products include pulp, newsprint, fine papers, packaging paper and board.

Felling trees has increased gradually and has amounted to 4.5 million forest cubic metres annually by Stora alone. The reason why Stora did not extract the entire growth is that the forests in Sweden consist of a surplus of newly-planted and old forests, with a shortage of middle-aged forests. The Swedish forest policy allows the felling of 70 to 74 million forest cubic metres per year. At the beginning of the 1980's between 60 and 65 million forest cubic metres of forest were felled. However, since 1985, this amount has increased and now exceeds 70 million forest cubic metres. (Stora Annual Report, 1989, p.16) The diagram depicts the gross felling in Sweden since 1980. (Fig. 10)



Fig

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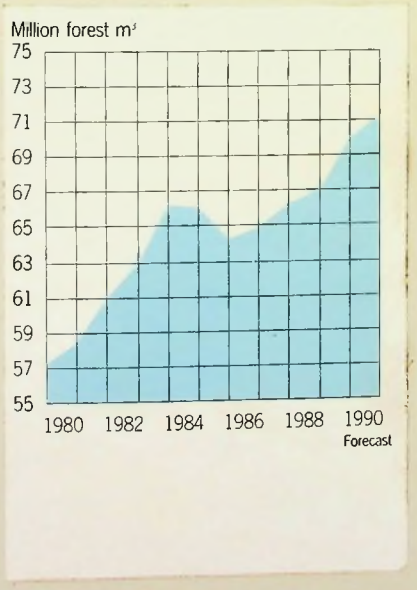
Fig . 8

Fig . 9

Fig . 10


Million forest m³
75
73
71
69
67
65
63
61
59
57
55
1980
1982
1984
1986
1988
1990
Forecast

Stora operate on a global scale. The organisation believes that environmental legislation must be applicable in all countries. Their operations include forestry, power production and industrial processes. As an organisation, they state that they cannot help affecting the environment, and, in turn, being affected by it. They also state that they sometimes receive criticism and have to admit that some of the criticism is justified. The environmental policy of Stora is as follows :

* To weigh economic interests against ecological and other environmental factors when planting, tending and harvesting forests.

* Through pro-active conservation work, to strive towards reducing discharges into air and water and towards reducing the amount of waste produced by their industrial plants.

* Their goal is that each branch of their operations shall have well thought-out strategies for recycling wherever possible and will be able to state appropriate methods of disposal of the products after usage e.g. using recycled paper for an increasing number of products.

* Their intention is to solve the problems of discharges from manufacturing processes so that operations can be continued and so that their position as suppliers of high-quality products is not endangered.

* They undertake to supply information openly and to work for communication on environmental issues with all interest groups.

Stora also states that their ultimate objective is to create processes with no environmentally incompatible discharges whatsoever.

Whether the environmental policy of any organisation is actually in operation, is debatable. The fact remains that the native forests of the Scandinavian countries, notably, Finland, Sweden and Norway, are subject to gradual annihilation due to the rising demand for wood and wood associated products.

Since 1950, the world consumption of paper products has increased five-fold, rising to a total of 216.3 million tonnes annually. (WEN, 1990, p.31)

The economic growth of many countries has contributed towards the rise of paper consumption, with the United States leading the way. The following graph (Fig. 11) depicts the position of various countries in relation to one another, with regard to paper consumption:

	Kilograms per person annually
United States	311.0
Germany	209.7
Japan	204.0
United Kingdom	163.0
Spain	104.7
Portugal	67.8
Thailand	15.0
Indonesia	5.0
Over half of the African nations	0-1.0

(WEN, 1990, P.32)

The past decade has witnessed a dramatic growth in paper production and consumption. Between 1982 and 1987, paper consumption increased by 50 million tonnes. (WEN, 1990, P.32)

Canada:

Canada is the largest supplier of paper pulp to Britain. Most of the wood pulp is extracted from natural forests, (Fig. 12) that the paper industry claims are substainably managed. Canada's boreal forests stretch as far as the frozen wastelands of the Arctic Circle, and are a home to many wildlife species such as the grizzly bear, brown bear, flying squirrels, moose, elk, deer and lynx. (Fig. 13) The rivers in this region are a home for many chinook salmon and sturgeon. A mixture of forest trees, shrubs, mosses and lichen are anchored in the thin soils. Once the trees are felled, the soil becomes a victim of erosion. Approximately one third of one million hectares of this boreal forest are felled annually for the wood industry of Canada. (Fig.14) The majority of this amount is used for paper products, and the remainder for plywood and timber products or is left to rot and die. (WEN, 1990, p.11)

Fig . 14

Fig . 13

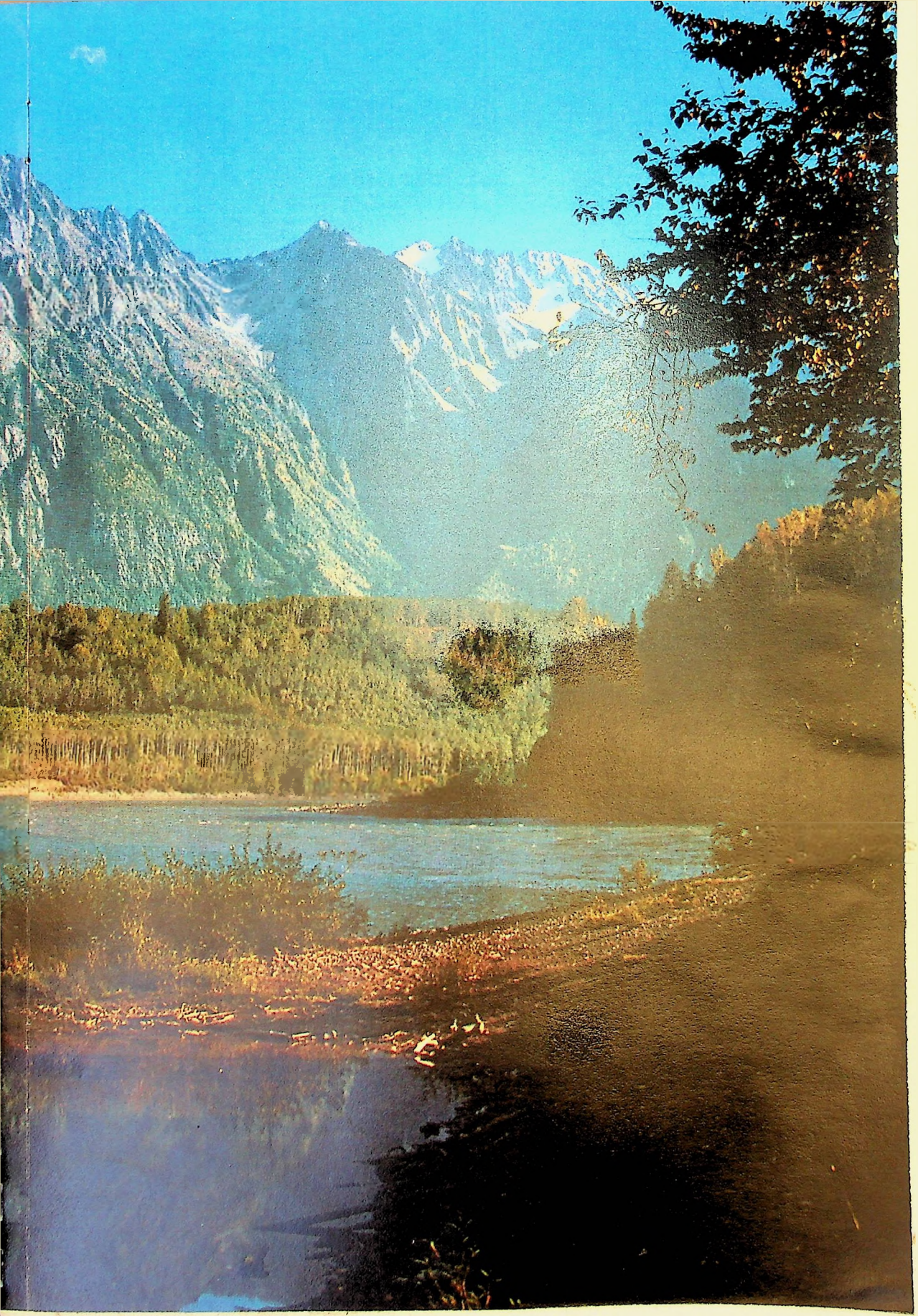


Fig . 12

The most practiced method of deforestation in Canada is clearfelling. Large areas, from 40,000 hectares up to 100,000 are annihilated as quickly and efficiently as possible, ruthlessly eliminating all life-forms. This method of deforestation creates adverse problems such as :

* erosion
* climate changes such as floods and droughts
* slow vegetation recuperation
* destruction of soil and the entire ecosystem

This appalling destruction has been cleverly hidden from they eyes of many. The roads throughout numerous areas of Canada are bordered with trees of immense beauty. However, they only extend for 200 metres either side of the road for tourist benefits. Beyond that 200 metre mark, a skeleton of the splendour is all that remains.

The Canadian Government owns 90 per cent of the countrys' forests, and they claim that industry invests in sustainable forest management. However, an incident in 1986 contradicts this statement. The logging company, Macmillan Bloedel, walked away leaving 640,000 cubic metres of felled timber to rot and die. The reason given for this appalling episode revolved around the company's' decision that the wood was not profitable to process. This they decided, after such a large area of trees were already felled. (WEN,1990, p.12)

It is estimated that within 15 to 25 years, Canada's' old growth forests will be completely demolished unless adequate protection schemes are implemented immediately. (WEN, 1990, p.13)

The continuing devaluation of Canada's' natural grandeur stems from the governments' inadequate reafforestation schemes. The lack of consideration or care that is given to an intricate life-form supporting a multitude of other life-forms is disregarded in the demand for more timber and yet more woodpulp.

Japan:

Japan has always valued wood and paper within their society. Over the past few decades, the Japanese economy has grown, and this growth has also witnessed the growth of the Japanese paper industry. Japan is a major world consumer of paper and the largest importer of raw materials for the production of paper.

Papermaking in Japan was traditionally a peasant and family craft, but the demand for paper products accelerated its' production. Almost everything in Japan is made of


越前和紙 Echizen Japanese

Fig . 15

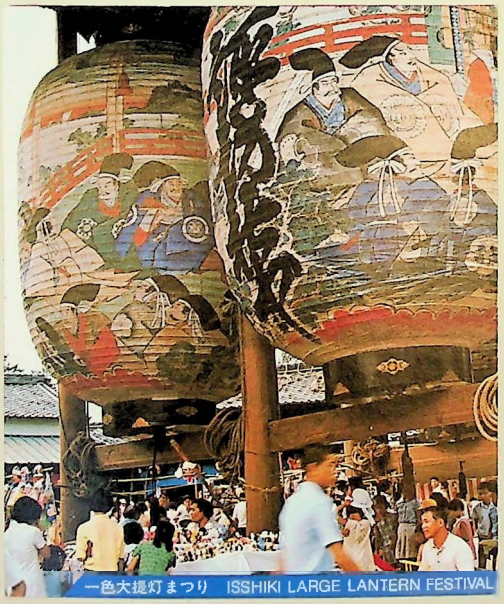

一色大提灯まつり ISSHIKI LARGE LANTERN FESTIVAL

Fig . 16

paper and wood. Paper is used not only as a writing or art medium,(Fig.15) but also in paper lanterns (Fig. 16) and paper screens and windows in Japans' traditional houses. Wood has always been required in Japan as a raw material and by the 17th century, Japan was facing the threat of almost complete annihilation of its' forests. Local and national rulers began to implement forest conservation and replanting schemes. Today 68 per cent of Japan is covered in natural forest which is well protected. (Fig. 17) (WEN, 1990, p.42)

The Japanese value their forests with extreme pride. 98 million of Japans' 112 million people are Shinto followers and it is their belief that the spirit of nature reveals itself through animals, mountains and trees. (WEN, 1990, p.42)
Because of the high valuation placed on their forests, the Japanese will not destroy them so they turn elsewhere for their vital raw material.

In 1987, Japan consumed over 22 million tonnes of paper for a population of 112 million. (WEN, 1990, p.43) Japan is the largest consumer of disposable tissue products. The quality of these products is determined by the softness and whiteness. As a result of this, companies no longer use wastepaper but produce tissue products from 100 per cent virgin paper.

Many Japanese companies are involved in overseas operations. Japan invest in pulp and chipping companies in their ever-increasing search for cheap raw materials. A large percentage of Japanese products are derived from pulp production in Brazil and paper production in Canada. Brazil supplies 70 per cent of Japans' timber needs. (WEN, 1990, p.45)

Intensive logging practices of natural forests and the subsequent forced plantations in Brazil, Australia, Indonesia, Tasmania and Thailand has led to increased opposition from the environmentalists to curtail the eradication of these natural wonderlands.

Indonesia :
The paper industry is new to Indonesia. 20 years ago, the commercial plantations revolved around the production of rubber, palm oil, coffee, tea, and logging concessions for timber. While these products are still important, paper is of prime importance. Concessions from the rainforests are particularly easy to acquire for the paper companies.

Fig . 17

The Indonesian government assists in the vast exploitation of the rainforests for foreign investors. Of the 64 million hectares of productive forest, 55.4 million hectares have been exploited.(WEN, 1990, p.36)The Indonesian government plans to increase its' paper production 10 fold over the next 10 years, producing 10 million tonnes of paper per year. In order to follow through with this plan, the rainforests appear the obvious source of woodpulp with the subsequent planting of monocultures. At present, 2.2 million hectares of Indonesia have been planted with monocultures and over the next 10 years, the government hope to reforest a further 6 million hectares with Eucalyptus plantations. (WEN,1990, p.38)
Reforestation exists in theory only. Replanting is often very unsuccessful. In 1985, only 15 per cent of the seedlings planted, developed to a productive size. (WEN, 1990, p.38)

The destruction of tropical rainforests is one of the worlds' worst ecological disasters of this century. Trees absorb carbon dioxide (CO2) one of the *greenhouse gases*. With the elimination of trees, an excess of CO2 in the atmosphere, accelerates the threat of *global warming* that haunts our lives today. Forests play a vital role in controlling the amount of global rainfall and act as a giant air-conditioner for our planet, by slowing down the movement of great masses of air, due to their uneven surface.

The majority of the worlds' timber and paper pulp is derived from unsustainable forest systems that uproot unique habitats and dismantle the lives and dependence of many species within the habitat. As long as the consumption of paper products escalates, increasing amounts of the worlds' wonderful and vital forests will be eliminated to quench the thirst for paper.

Papermaking

The word paper stems from the ancient Egyptian word for papyrus. Papyrus is not a mat of fibres but a series of split reeds that are laid across one another at right angles in a criss-cross form. These reeds are soaked and then pounded with a mallet. The natural juices of the stems are released and form an adhesive that bonds the reeds together, which are later rolled into scrolls. Paper was preceded by palm leaves, papyrus or vellum that was made from animal skins. With the development of flexible substances, it was possible to make writing portable, in a form that was not too heavy. (Fig. 18)

Paper originated in the Chinese Empire of Samarkand. The Arabs captured Samarkand in 751 A.D. and they took the papermaking secrets with them to North Africa. When the Moors conquered the Iberian Peninsula, and later established the first papermill in Spain in the year 1100, papermaking spread rapidly across the rest of Europe. A variety of raw materials were used such as flax, straw, bamboo and jute. The earliest papers often displayed the natural colour of the raw materials from which they were derived. This meant that the paper was often a dullish brown or grey in colour. The demand for a whiter paper increased and with the development of chemistry in the late 18th Century, the process of bleaching paper was introduced. The discovery of Chlorine in the 1770's by Scheele, resulted in the bleaching of both fabrics and paper to a dazzling white to satisfy the demand of the public. Colour was added using pigments or dyes. The earliest coloured papers were mostly blue, due to the coloured rags or mineral pigments that coloured the pulp. However, natural dyes were soon to become widely used. Initially, these dyes were devoted to the Textile industry and coloured paper was not promoted until the second half of the 19th century.

Paper was made by hand until the late 18th century. An increasing demand for large sheets of paper and the development of paper money led to the mechanized production of paper. Large sheets of paper were particularly desirable in France as wall-paper was very fashionable during the reign of Louis XV.
In the year 1792, the papermaking machine was invented by the Frenchman Louis Nicholas Robert. This invention made it possible to produce an endless strip of paper and the later invention of the cylinder mold machine increased the production of watermarked paper. Watermarks were often used as a form of signature, in order to identify the papermaker. (Fig .19)

33.

Fig . 18

Fig . 19

An essential ingredient for the manufacture of paper is water. All paper mills are situated near sources of fresh water, which is used and then returned to its' original source. One tonne of paper uses 13 gallons of water for its production. (Earthwatch Recycling Briefing Pack)

Bleaching:

Lignin is a natural substance in wood that binds the fibres together. Pulping alone does not remove all the lignin from the cellulose. To produce pure white cellulose, mechanical pulp is brightened using hydrogen peroxide, whereas chemical pulp is bleached to remove any presence of lignin. When paper is bleached it gives the following qualities :

* Purity for hygiene and medical purposes.
* Strength for fast printing.
* Stability and durability to prevent discolouration and deterioration.
* Cleanliness.
* Appearance for colour printing purposes.

The bleaching of pulp produces many toxic chlorine compounds called organochlorines. The pulp and paper industry is a very major contributor to organochlorine pollution, releasing between 30 and 80 tonnes of organochlorine daily. In the year 1987, 4.5 million tonnes of chlorine were used to bleach pulp. According to Dr. Goeran Bryntse, the Swedish paper expert, the world consumption of chlorine in that same year was 35 million tonnes (Kroesa, 1990, p.15)

There are many carcinogenic (cancer-causing) and mutagenic (causing chromosonal damage) components within the organochlorines, that have been proven to be both toxic to humans and the environment. The production of these harmful components must be stopped. The excessive production of 'whiter than white' paper should be reduced to lessen the dangers evolving from the bleaching process. It must be realised that recycling paper is important in many ways, especially when it plays a part in reducing toxic paper pollutants.

Dioxin:

Dioxin, consisting of 75 separate chemicals, is the most toxic chemical known. As well as being highly carcinogenic, dioxin also causes reproductive disorders such as still births, birth defects and sterility. Dioxin also impares the immune system, resulting in the organism being more susceptible to disease and infection.

This toxic chemical is also bio-accumulative, which means that it remains in the host and contamination levels rise with every step of the food chain. (Kroesa, 1990, p.16)

Dioxin has contaminated paper products such as sanitary products, diapers, facial tissue, kitchen towels, toilet paper, copying paper and coffee filters. Dairy products that are packaged in bleached paper cartons actually absorb large amounts of this toxic Dioxin. Chlorine-free diapers are available in Ireland and indeed it would be desirable that feminine hygiene products become chlorine-free immediately because of their close contact with the human body. Chemicals used in scented and/or deodorized hygiene products are often toxic organochlorines and should be avoided. Traces of dioxin have been found in paper, but scientific evidence claims that dioxins from paper accounts for only 0.7 per cent. The other 99.3 per cent comes from food, air, soil and water. (Paper Naturally, p.10) The immediate toxicity of Dioxin is extremely high, being 500 times more poisonous than cyanide. (Dioxin - A briefing from WEN, p.1)
After the pulp has been produced and bleached, it is dried and transported as market pulp to a paper mill. In the paper mill, some of 800 available chemicals are added to the pulp in order to differentiate the final product. After the addition of fillers and additives, the pulp is spread into an even sheet and dried.

Uses:

Paper is vital in all our lives. It's multitude of uses are divided into three categories :

* Printing.
* Packaging.
* Hygiene.

Print affects everyone consciously or subconsciously : Newspaper headlines, daily mail, glossy images in magazines and the heap of paperwork that awaits us in the office. Newsprint is a cheap, low quality paper used for telephone books and newpapers (Fig. 20), while four colour printing processes require a very smooth surfaced paper of high quality. This high quality paper is usually coated with minerals. A glossy grade is obtained when the paper is coated with clay (Fig. 21) and a matt grade is produced when coated with chalk. (Fig. 22) Computer print-outs and copying paper require dust free paper, of reasonable strength and resistant to heat.

Packaging paper is often bleached unnecessarily. Food containers are coated with wax or plastic to prevent leaking, e.g. milk and juice cartons. (Fig. 23)
These containers are non-recyclable and non-biodegradable. Incineration of the containers releases highly toxic dioxins. Cardboard and shopping bags need to be

(February 2nd). I feel failed to convey the effect roposals will have on the y nationally, or on a typi- vidual Irish farm.

ou take Paul Meade's in the *Irish Farmers* of February 3rd, we shall for "setaside". "Setaside" all distort the fundamental e of cheap food produc- underpinning the value of ithout reference to its capacity. In addition it determine the agri-business to the detriment of those sh to continue producing

heap grain policy shall ne the production of food rassland which has been rnerstone of Irish agri- The only other areas Ireland in the world which duce similar quantities of itter" per hectare of grass uth Wales and New . Cheap grain will en- livestock production from

It is a contradition in terms to justify the change in Common Agricultural Policy by saying that European food production must become more market orientated and price competitive and then make rules which limit the output of larger grain and milk and beef producers.

There has been no reference to a phased introduction of this fundamental policy change. Will any farmer have the confidence to make long-term investments in such a climate? I would welcome an in-depth analysis by Mr Dillon of the impact of Mr MacSharry's proposals on Irish agriculture and the Irish economy.

It would be appropriate to present this analysis in *The Irish Times* in order that the urban population fully understand the ramifications these changes will have on them and the whole Irish economy. — Yours, etc.,

EAMON McCULLOUGH,
Elm Grove,
Gormanston,
Co Meath.

"I sometimes think that sea trout fishing is the best of all sport . . . There come times when the angler, who wanders alone after sea trout down glens and over moors, has a sense of physical energy and strength beyond all his experiences in ordinary life . . . I felt conscious only of the strength of a mighty current of life, which swept away all consciousnes of self, and made me part of all that I beheld." Fine purple stuff. But there's also money involved on the other side, if it is the other side. There is a lot invested in salmon farming on the coast. Jobs are involved. The environment also includes these people. It's a knotty problem — but one which can be solved.

Y

Fig . 20

Fig . 21

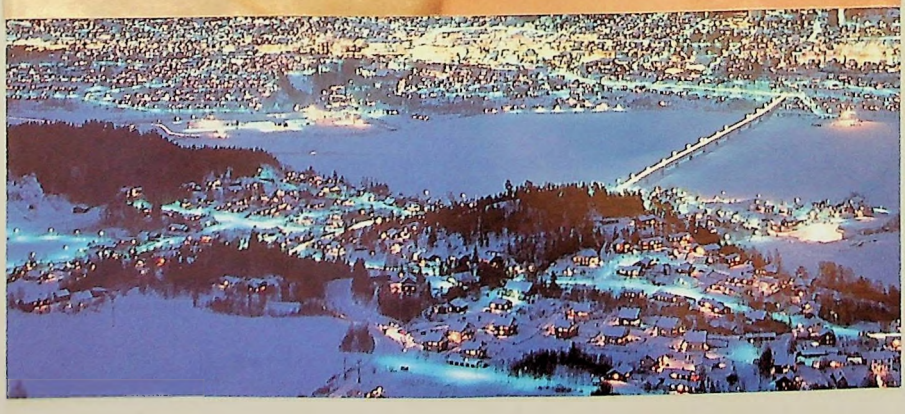


Fig . 22


SQEEZ
PURE
ORANGE
JUICE
SQEEZ
PURE ORANGE JUICE
200ml e
MADE FROM FROZEN CONCENTRATED ORANGE JUICE

Fig . 24

Fig . 25

strong and stiff. This is obtained by adding pigments or by using greater quantities of pulp to produce a thicker sheet of paper.

Many Sanitary products are also made from paper. Disposable paper products are becoming more popular. One fully grown tree makes 500 disposable diapers. (Christensen and Vallely, 1990, p.16) These products need to absorb liquid and the natural wood chemicals and resin acids in unbleached pulp prevent absorption. Hydrogen peroxide can remove the impurities in the wood pulp, without causing as much damage to the environment as chlorine bleaching.

However, due to the lack of a stringent product labelling system, many manufacturers can avoid stating what chemicals were used in bleaching and other processes. Most disposable diapers state that they are 'environmentally-friendly'. Yet when I studied the fluff-pulp inside 3 different brands I noticed that it differed from brand to brand.

Product A : Peaudouce states 'Better for the environment - 100% non - chlorine bleached fluff-pulp'. (Fig.24)

Product B : Ultra Cuddles claim that they 'contain environmentally -friendly fluff pulp.' (Fig. 25)

Product C : Pampers state that they are 'supporting WWF to care for the environment' (Fig. 26)

Despite misleading product labelling, disposable diapers of any kind are not ideal 'environmentally-friendly' products. They are disposable, non-biodegradable products.

However, attempts can be made to ensure that these disposable products cause minimal damage to the environment. This can be done by using non-chlorine bleached pulp in the manufacture of diapers.

'Whiter than white' diapers are by no means necessary for functional purposes.

There is a noticeable difference between Product A compared to Product B or C. The latter products have obviously been bleached to a certain degree, but we are not informed as to what chemicals were used in the bleaching process. While we are not informed that these products *contain* chlorine, we are not informed otherwise. Therefore, the term 'environmentally-friendly' should be accompanied by an adequate description of the production of these products which includes the effects on the environment when they are discarded. The silence of most manufacturers about the ingredients used in their products gives rise to a situation where the consumer can hardly distinguish between harmful products and quite safe products.

Paper is the prime medium for print - which is the dominant form of communication worldwide. In Europe, newsprint, coated and uncoated paper account for half of the total production of paper, while packaging and sanitary products make up the remainder. In America, one third of the total production of paper is designated to print, while two-thirds are related to packaging. (Graphics World, 'Paperwork' p. 52)

The Western countries are the largest users of newsprint, consuming 25 million tonnes in 1989, out of a world total of 32 million tonnes. (Newsprint Today, 1990, p.1.) Coated paper accounts for more than 70 per cent of the paper used in promotional material, such as catalogues, direct mail, brochures, booklets etc. The reason for this is that with the spread of colour printing, notably in advertising, over 90 per cent of coated paper is chosen in favour of other forms of paper. (Graphics World, 'Paperwork', p.52)

The feminine hygiene products industry is increasing extremely rapidly, as is the packaging industry, resulting in many products being over-packaged for consumer manipulation. Black refuse sacks are one of the prime culprits. These sacks are unnecessarily contained within a bag upon the supermarket shelf, and then placed into yet another plastic bag at the checkout, as are many other products.

During the course of this chapter, I have outlined the history of paper along with its' manufacture and use in the modern world. The demand for paper and especially high grade types of paper has risen dramatically. While this rise has been largely useful to mankind, it has had silent detrimental effects such as pollution and deforestation which will soon have to be faced if our environment is to be preserved.

Recycling Paper

Recycling paper is both a necessary and urgent need in order to :

* reduce further annihilation of the natural forests of the world.
* reduce pollution of our air and water.
* reduce the consumption of energy.
* minimize health hazards that are associated with chemically treated paper.
* increase the amount of jobs in the area where it is practiced.

Recycling Paper

Everyone is aware that deforestation is occurring at a rapid rate. Most of this attack is due to the rise in demand for consumer goods. It is estimated that 100 billion trees are felled annually, to provide the paper industries with their vital raw material. We cannot function in society without paper. However, out of a total of 1.1 million tonnes of waste annually in Ireland, 25 per cent of this is paper, amounting to a staggering 270,000 tonnes. (Gormley, 1990, p.146)

This is the equivalent of 4.5 million trees dumped on a rubbish heap. (Gormley, 1990, p.145)

The consumption of paper in Ireland amounts to 315,000 tonnes per year. The quantity of recoverable material is 160,000 tonnes per year, but at present, we recover only 72,000 tonnes per year. A total of £84 million is the value of raw material that is imported into Ireland annually. Unfortunately, only £4.5 million is saved in recovering material. (1977, Institute for Industrial Research and Standards (IIRS) - Earthwatch Recycling Briefing Pack)

An enormous five tonnes of waste are produced per head of population in Ireland annually. (Technology Ireland - Sept.1980) Up to 90 per cent of this waste is dumped in landfills. Less that 2 per cent is reclaimed (Earthwatch Recycling Briefing Pack) Landfills are large holes in the ground, where rubbish is deposited with an *out of sight - out of mind* attitude. Landfills give rise to opposition as people fear that their property will decrease in value. The beauty of our environment is spoiled because of the overflow of landfills. This leads to further problems including litter, flies, maggots and odour problems. Litter is filthy and disgusting. This statement can be justified by the illustrations. (Fig. 27) Over 1.5 million tonnes of household, commercial and industrial waste are deposited in landfills annually in Ireland.

Fig . 27

This adds up to a total of £8 million spent on disposal services by local authorities. (Boyle, 1987, p.29)

Ireland would benefit by £71 million per year, if our waste products were recycled to produce secondary raw materials. But unfortunately, Ireland at present does not have any national policy on recycling. Recycling is important because of its' result in saving money and also the reduction in pollution which it would bring about. Dioxins present in the paper dumped in landfills are released into the ground causing pollution of our soil, water and air, and the subsequent contamination of our food. In a previous chapter, it was estimated that while human daily exposure to dioxins from paper accounts for only 0.7 per cent, the other 99.3 per cent comes from our food, air, soil and water. As dioxin is artificially produced, it must have contaminated our food, air, soil and water by some unnatural means. The large amounts of dumped paper are helping to release this poisonous dioxin into our life-support system. Of course, by simply handling paper, we are not going to suffer any serious effects of dioxin, a mere 0.7 per cent. But we must become more aware of the high levels of dioxin that paper *contains,* and it is only when this paper bio-degrades into our Earth, then we become infected.

Thus, it is plainly obvious that recycling should be adopted where possible for economic and ecological reasons.

The Recycling Process:

Paper is the most used product in society, and fortunately it is ideal for recycling. As recycling restores the life of a product, the production of one tonne of paper from waste paper uses only half as much energy and water as the production of one tonne of paper from virgin pulp. Apart from saving trees, there is a 74 per cent reduction in air pollution, a 35 per cent reduction in water pollution and an increase in jobs in the country where it is carried out. (Earthwatch Recycling Briefing Pack)

However, not all waste paper can be recycled. Heavily coated paper, plasticized juice cartons, fax paper and carbonless paper, all fall into this category. The majority of paper can be recycled and it is collected in bundles according to the characteristics of the paper. At this point, staples, plastic and tinfoil or any other impurities are removed. In order to produce white, recycled paper, it has to be de-inked. This is done by bleaching the pulp with chlorine, (with its consequent irreversible effects on the environment). One limitation of the process is that most of the paper can only be recycled approximately four times because the fibres become weaker after each recycling process.

When using recycled paper, the printer must be aware of the following points :

* lower brightness
* lower strength
* lower rigidity
* lower bulk
* more absorbent
* more dot grain that normal (2-5% increase)
* lacks consistency
* less stable

This leads to slower running speeds, more blanket washes, higher ink consumption and a lower ink lift, throughout the printing process. Recycled graphic papers are generally more expensive due to the demand for dazzling white papers. To obtain this type of paper, it is expensive due to the process of sorting out high quality waste paper and de-inking previous printed waste.

Despite these factors, recycled paper is successful in various printing processes as obvious from the examples given. (Fig. 28) The colour and texture of recycled paper can even enhance the image and add character to the product. Due to the grey colouring of recycled paper, it proves easier to read, as many dazzling, brilliant white papers result in a glaring or straining effort to find them legible.

STATUS
OF WOMEN

16th February 1991
in the
Edmund Burke Theatre,
Trinity College

's beauty for gr

ally grown ingredients
nal testing or cruelty
oitation of the environment
te of natural materials

In Ontario, all levels of government are working together through the GIPPER (Governments Incorporating Procurement Policies to Eliminate Refuse) Committee.

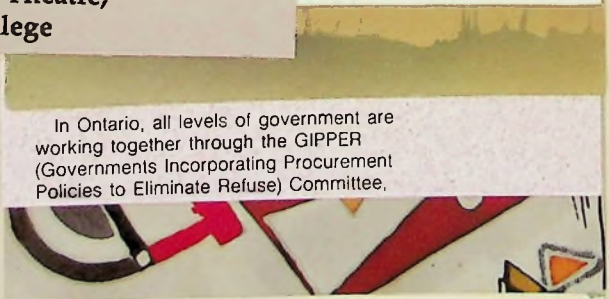


Fig . 28

49.

14 DRUMBIE ROAD
TORNAHAISH
BERWICK BE3 4TX

PROPRIETOR:
M.D. PINE

THE OCEAN TRUST LIMITED

28a Vagary Street, London WC2 Tel: 081-990 7872

THE ENVIRONMENTAL INFORMATION SERVICE
17, ST. ANDREW STREET, DUBLIN 2, IRELAND

TELEPHONE: 01- 6793144 FAX: 01- 6795204

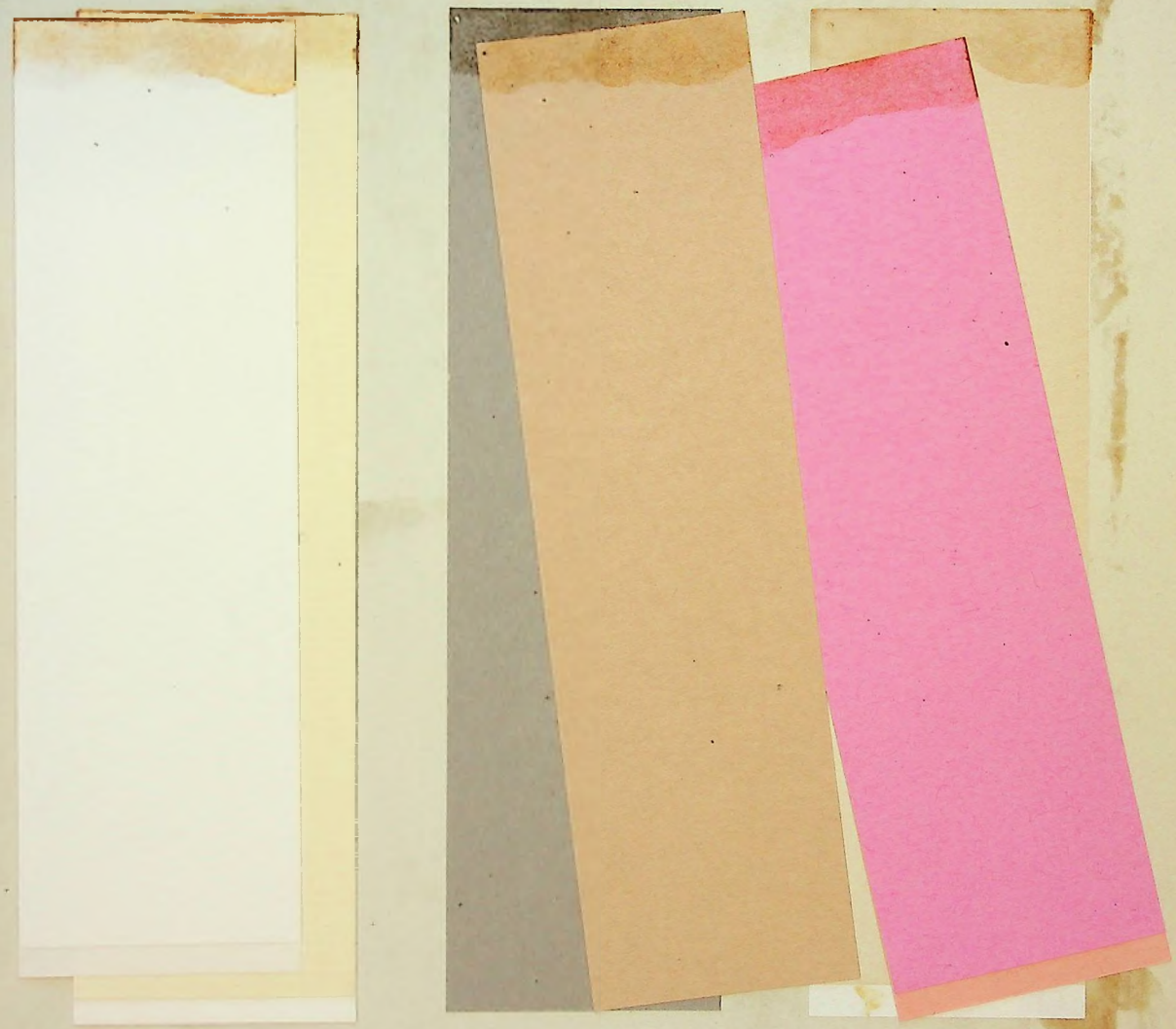
REYNARD CRAFT CENTRE

4 The Quay, Braxton, Dorset DN4 7HE
Tel: 00428-732

Public Awareness :

The year 1989, witnessed an important growth in the recycled paper industry. Customers are slowly opening their eyes to the necessity of using recycled paper. With this increase in public awareness has come a demand for recycled paper of high quality. Increased competition has also helped to upgrade the quality and the economical values of recycled paper.

Unfortunately the supply of recycled paper dramatically exceeds the demand. Fig. 29 depicts the varying quality and range of recycled paper that is currently available.



Businesses and consumers are definitely becoming more aware of our environment. Indeed, they cannot really avoid the issue due to the increase in 'Green Advertising' and the subsequent rise in 'Green Consumerism' . Many people however, have become disillusioned with the entire Green bombardment of society. First it was red meat that was bad for us,- then it was coffee - followed by fat and cholesterol - now the finger is pointed towards paper. (Fig. 30) In a study of consumer attitudes in the United States, 47 per cent of those questioned, said that they believed that *Green* advertising was just a gimmick, initiated by industrialists and advertisers to create more sales. Only 32 per cent of the people questioned believed the Green advertisements and related them to a genuine concern on behalf of the manufacturers over the environment.
(Newsweek, 1990, p.47)

Confusion envelops the entire recycling process. Much of the recycled paper produced has never in fact left the paper mill. It has been made from cut-offs from the original batch produced, and thus should be labelled *pre-consumer* recycled.
This would enable consumers to differentiate between this paper and the paper made from the waste collected from the public, which should be properly labelled *post-consumer* recycled.
An adequate labelling system would eliminate the mental link which the general public make between *recycle* and *second-hand* or even worse *inferior.* Such an attitude is usually based on irrational prejudices, but nevertheless, a special case is made for any paper that is to be in contact with food or drink. Such paper is produced from virgin pulp for hygiene reasons. However, inevitably, there is a continued responsibility on the government and the paper industry to educate the public in the area, as well as making recycled paper a more attractive option.

The year 1989, also witnessed the Department of the Environment allocating £250,000 towards the recycling process within Ireland. However, Ireland still remains at the bottom of the EC graph, as only 21 per cent of paper is recycled within our country. (Earthwatch Recycling Briefing Pack)


I USED TO USE STYROFOAM CUPS, BUT THEY DAMAGE THE OZONE LAYER...


I SWITCHED TO PLASTIC CUPS, BUT THEY'RE NON-BIODEGRADABLE...


NOW I FIND OUT PAPER CUPS MAY CONTAIN DIOXIN...


SO HERE'S MY SOLUTION...
... NOT TOO HOT, PLEASE.
DANGER

Fig . 30

Central Waste Paper Company Limited are a Dublin based company that are involved in the collection of waste paper for further use, namely, recycling. (see *Appendice* for Waste Paper Companies in other areas). The paper is collected, for a small fee, from industries, businesses, shops and households. Central Waste Paper sell 60 per cent of their waste paper to Smurfit Paper Mill, and the remaining 40 per cent is exported to the United Kingdom and / or Europe.

There are approximately 35 different grades of waste paper, ranging from a low grade to a high grade. The high grade waste is recycled into computer print out, photocopying paper and high quality white paper.

The paper mill in Larne buys a large percentage of this paper and tissue paper is made from this waste paper. (Fig. 31) Newsprint is sold to Lorgan Box Company in Northern Ireland and egg cartons are produced. (Fig. 32) Similiarly, newsprint is also sold to Erin Peat in Offaly and the recycled products are peat trays and flower pots.

Smurfit buy low grade paper at a low price. Originally, large bins, similiar to skips, for collecting waste paper were placed in various areas around Dublin.
Smurfit originally paid between £3 and £5 for every tonne of waste paper that was given to them. But soon the supply of waste paper exceeded the amount they could recycle, and soon they had no need to pay for waste paper. Smurfits produce 35,000 tonnes of recycled paper annually. They collect 50,000 tonnes of paper/board annually for recycling. (Fig.33) The machines are in constant operation - 24 hours a day, and seven days a week. The pulper is like a big washing machine, which mixes the paper with water - this is called *stock*. It consists of 98 per cent water and 2 per cent fibre. After it is cleaned, it is laid on a wire mesh that drains most of the water. It is then dyed with a chemical BK35 (Baysenthal) which is a brown dye and makes the pulp more water-resistant. The drying process takes three stages.
Between the second and the third stage, starch is added to the pulp to strengthen it. The drying process continues as the paper is rolled around reels.
Three different grades of paper are produced :

* ***fluting medium*** - which forms the inner corrugated layer of the cardboard box. (Fig.34)
* ***liner*** - which forms the inner and outer layer of a cardboard box. (Fig.35)

Fig . 31

63.

Fig . 32

Fig . 33

Fig . 34

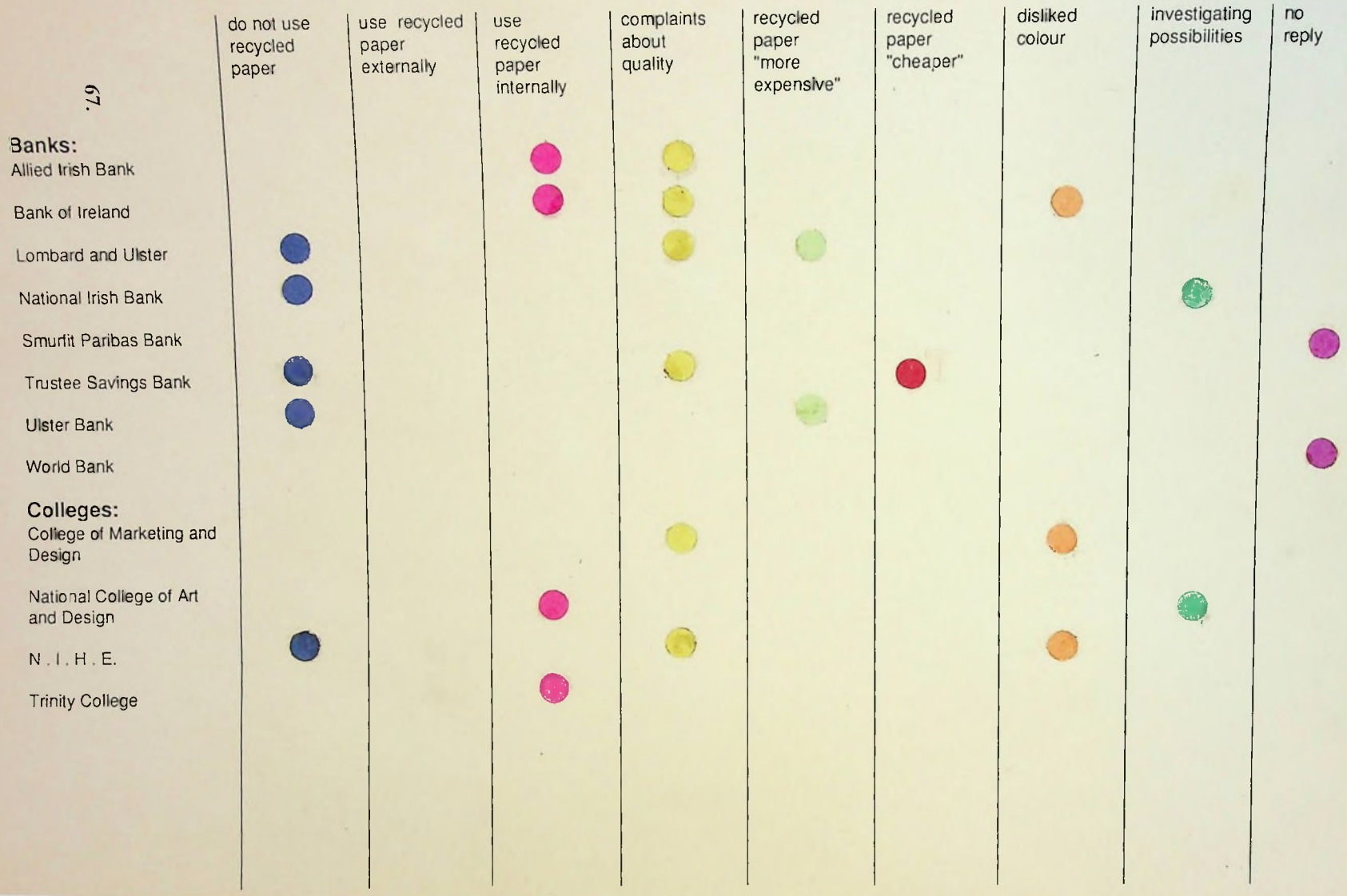
65.

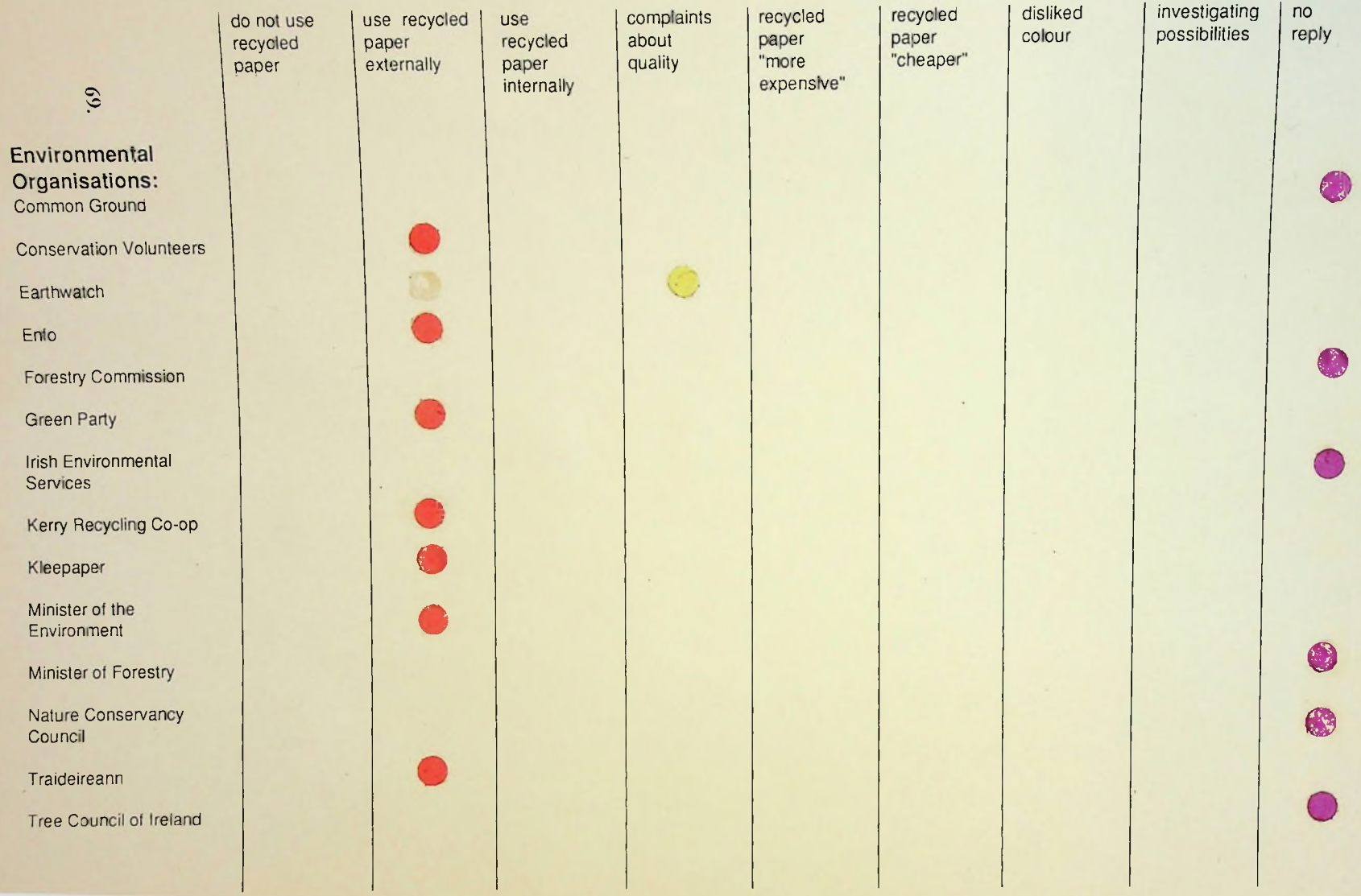
Fig . 35

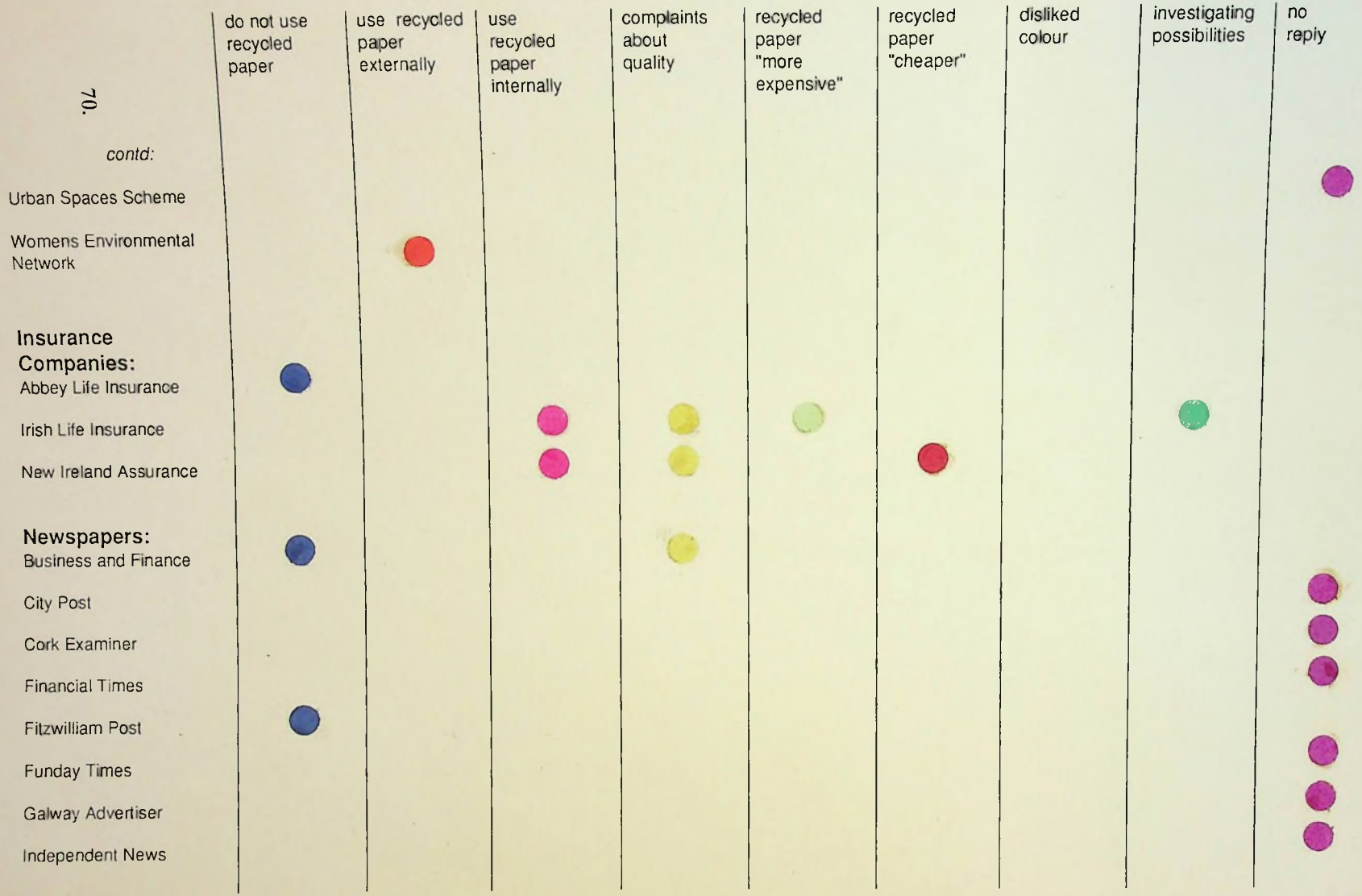
Over the next two years Smurfits hope to increase their annual production from 35,000 tonnes to 45,000 tonnes, which proves that there is a market for recycled products. Smurfits' Paper Mill is an example of how recycling can be both economically viable and ecologically sound.

The following chapter will depict a survey carried out on a number of organisations within Ireland with regard to their use of recycled paper and focusing on their reasons for or against using this paper.

Case Study


do not use recycled paper
use recycled paper externally
use recycled paper internally
complaints about quality
recycled paper "more expensive"
recycled paper "cheaper"
disliked colour
investigating possibilities
no reply
Banks:
Allied Irish Bank
Bank of Ireland
Lombard and Ulster
National Irish Bank
Smurfit Paribas Bank
Trustee Savings Bank
Ulster Bank
World Bank
Colleges:
College of Marketing and Design
National College of Art and Design
N . I . H . E.
Trinity College


do not use recycled paper
use recycled paper externally
use recycled paper internally
complaints about quality
recycled paper "more expensive"
recycled paper "cheaper"
disliked colour
investigating possibilities
no reply
Environmental Organisations:
Common Ground
Conservation Volunteers
Earthwatch
Enfo
Forestry Commission
Green Party
Irish Environmental Services
Kerry Recycling Co-op
Kleepaper
Minister of the Environment
Minister of Forestry
Nature Conservancy Council
Traideireann
Tree Council of Ireland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Urban Spaces Scheme
Womens Environmental Network
Insurance Companies:
Abbey Life Insurance
Irish Life Insurance
New Ireland Assurance
Newspapers:
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City Post
Cork Examiner
Financial Times
Fitzwilliam Post
Funday Times
Galway Advertiser
Independent News

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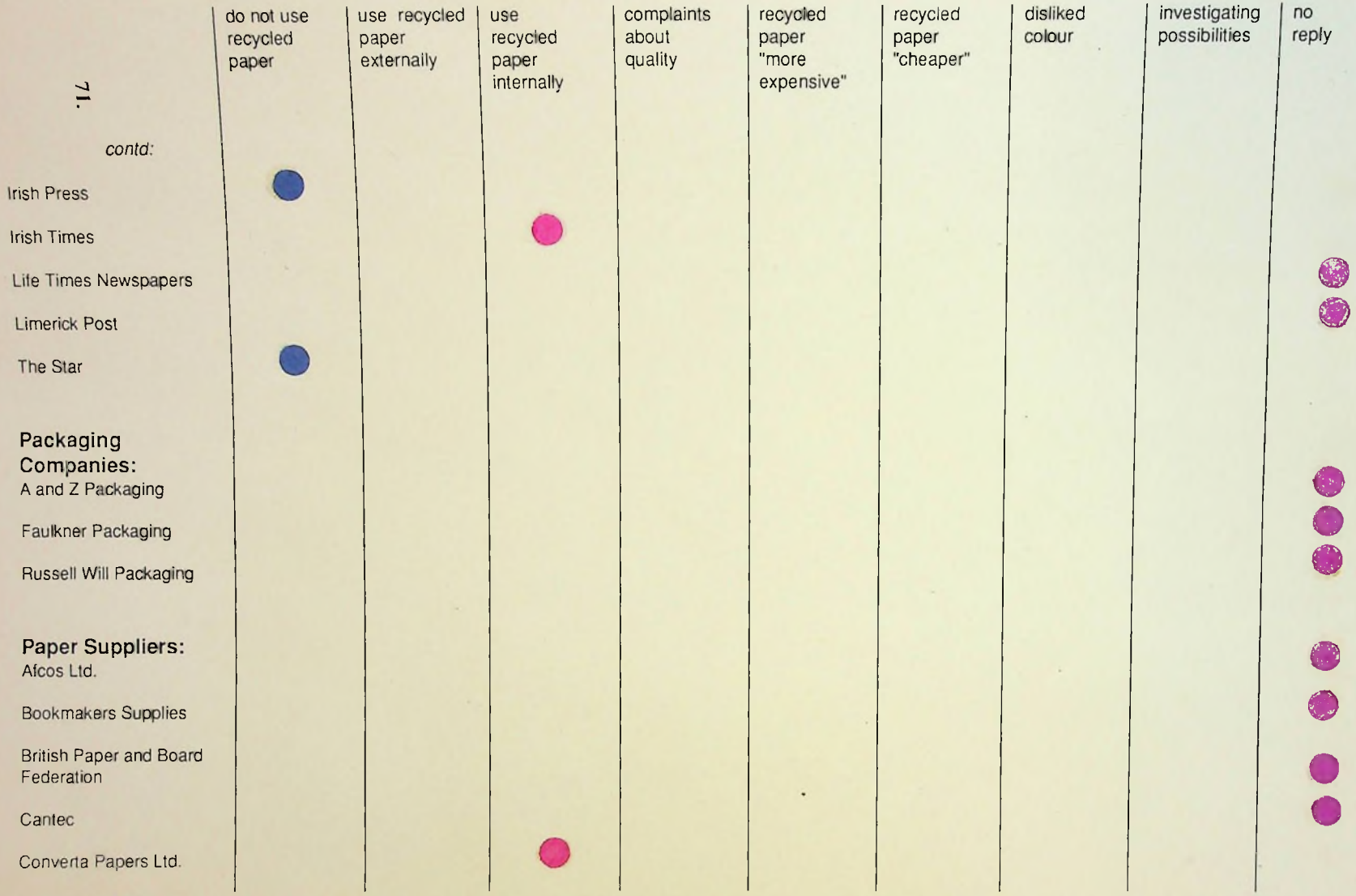
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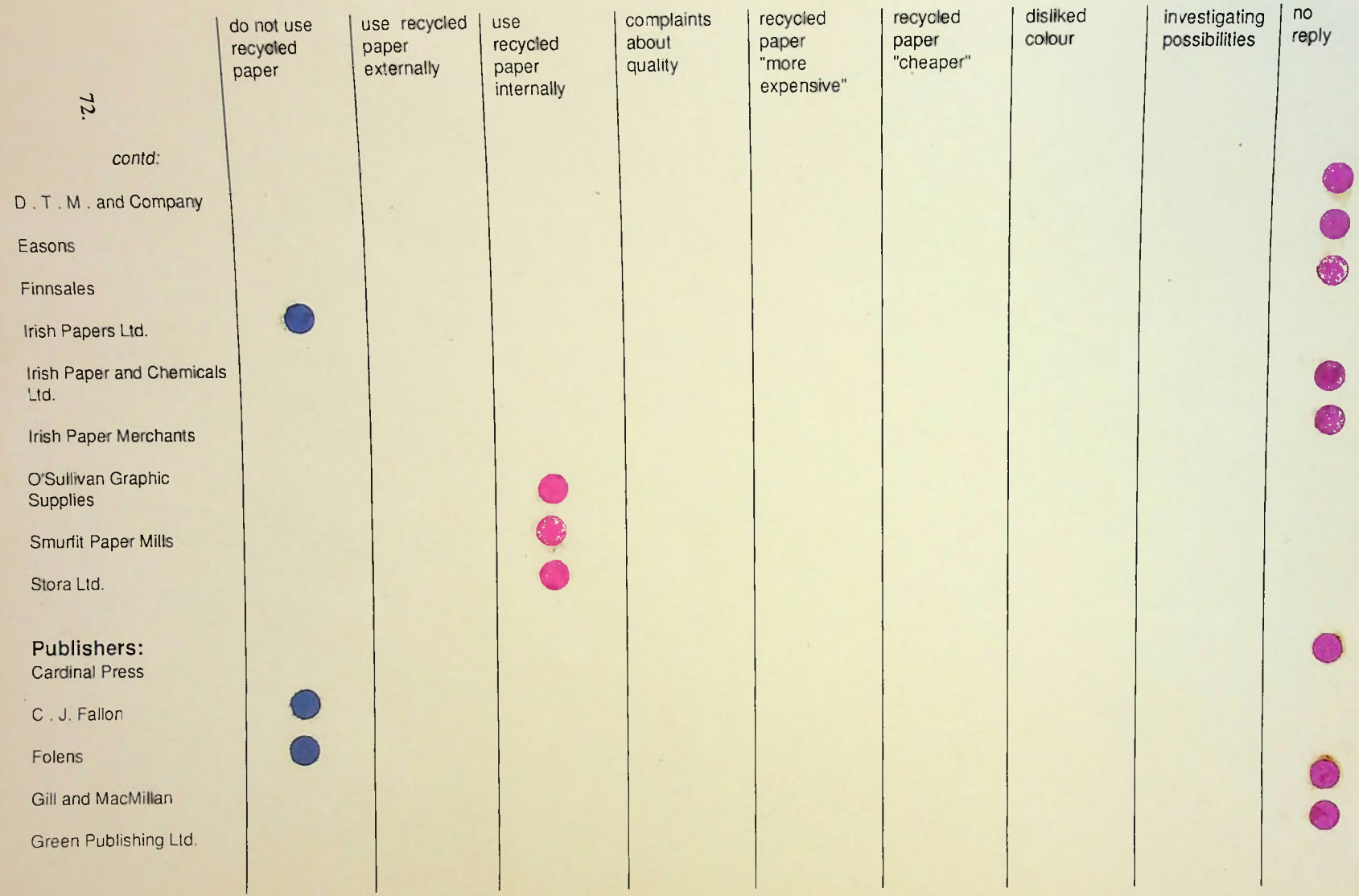
Irish Press
Irish Times
Life Times Newspapers
Limerick Post
The Star
Packaging Companies:
A and Z Packaging
Faulkner Packaging
Russell Will Packaging
Paper Suppliers:
Afcos Ltd.
Bookmakers Supplies
British Paper and Board Federation
Cantec
Converta Papers Ltd.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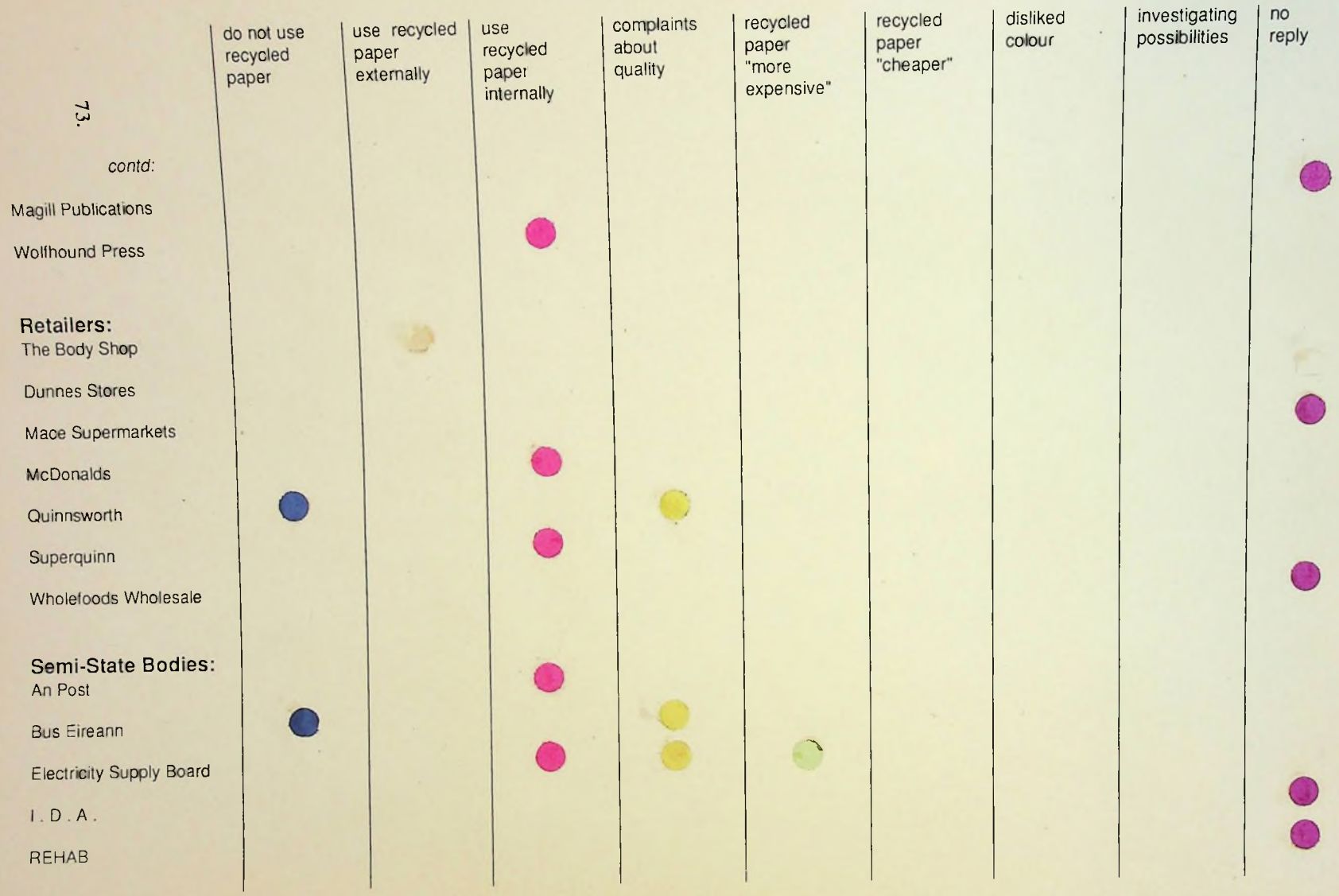
D . T . M . and Company
Easons
Finnsales
Irish Papers Ltd.
Irish Paper and Chemicals Ltd.
Irish Paper Merchants
O'Sullivan Graphic Supplies
Smurfit Paper Mills
Stora Ltd.
Publishers:
Cardinal Press
C . J. Fallon
Folens
Gill and MacMillan
Green Publishing Ltd.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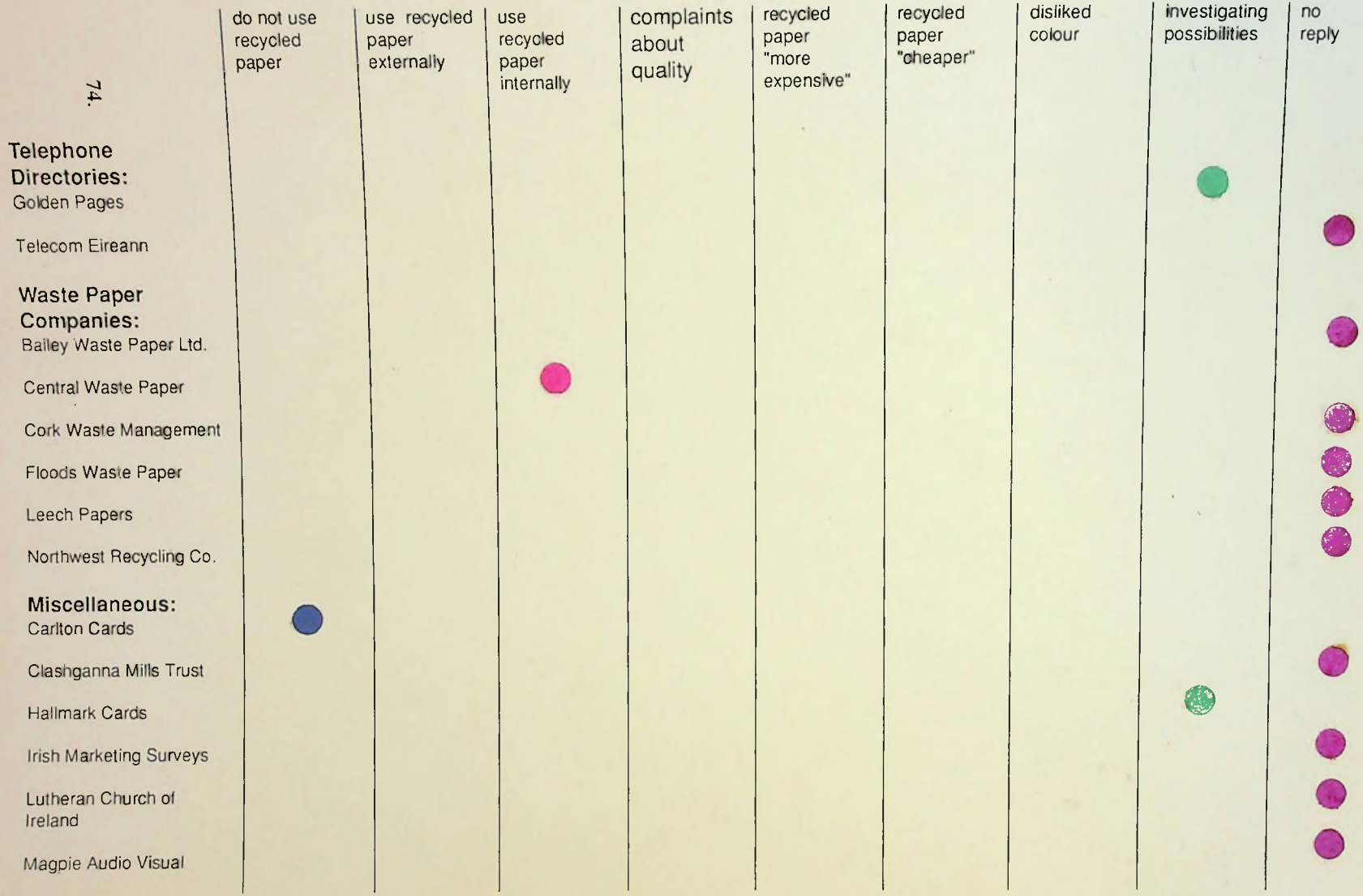
Magill Publications
Wolfhound Press
Retailers:
The Body Shop
Dunnes Stores
Mace Supermarkets
McDonalds
Quinnsworth
Superquinn
Wholefoods Wholesale
Semi-State Bodies:
An Post
Bus Eireann
Electricity Supply Board
I . D . A .
REHAB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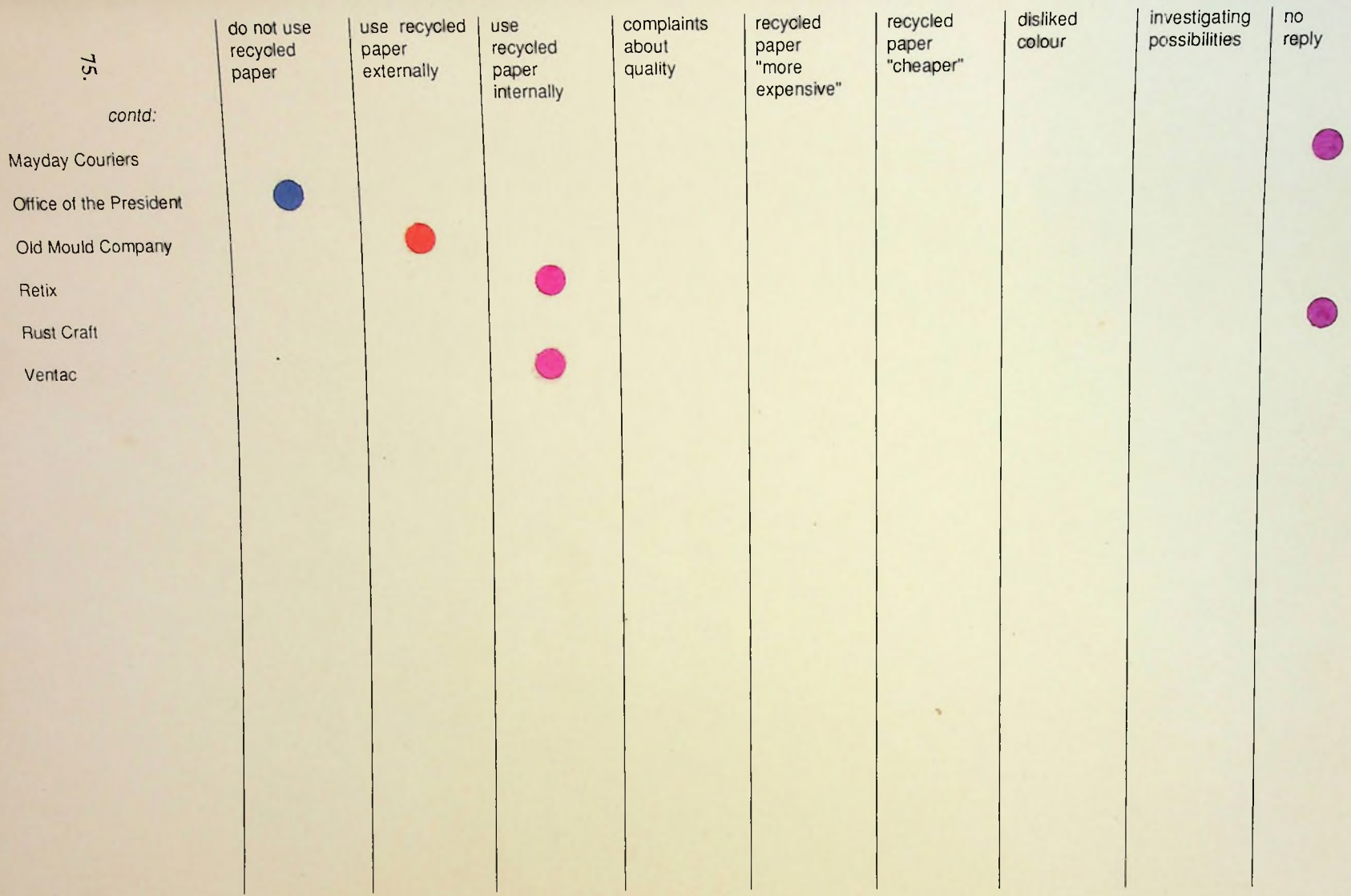
Telephone Directories:
Golden Pages
Telecom Eireann
Waste Paper Companies:
Bailey Waste Paper Ltd.
Central Waste Paper
Cork Waste Management
Floods Waste Paper
Leech Papers
Northwest Recycling Co.
Miscellaneous:
Carlton Cards
Clashganna Mills Trust
Hallmark Cards
Irish Marketing Surveys
Lutheran Church of Ireland
Magpie Audio Visual

contd: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recycled paper "cheaper"
disliked colour
investigating possibilities
no reply
Mayday Couriers
Office of the President
Old Mould Company
Retix
Rust Craft
Ventac

Quality :

As evident from the diagram, the quality of recycled paper appears to be the main reason why this paper is not used in greater quantity. This negative response was due to the unsuitability of recycled paper for any mechanical function e.g. printing or photocopying, as expressed by the following organisations :

* Allied Irish Bank
* Bank of Ireland
* Bus Eireann
* Business and Finance
* College of Marketing & Design
* Earthwatch
* Electricity Supply Board
* Folens
* Golden Pages
* Irish Life Insurance
* Lombard and Ulster
* National College of Art and Design - Administration
* New Ireland Assurance
* Quinnsworth
* Trinity College Student Union
* Trustee Savings Bank

These organisations found recycled paper unsatisfactory and stated that it was suitable only for products such as toilet tissue and hand cleaning paper rolls.

The **Electricity Supply Board** noted that while the quality was improving all the time, it was not possible to use recycled paper in large volume areas such as letterheads and bill forms. they also argued that to improve the quality, it is necessary to increase the use of certain chemicals which are damaging to the environment.

Another complaint expressed by these organisations was that it was difficult to obtain unusual sizes or weights of recycled paper, and inconsistency as to thickness leads to greater mechanical problems.

This was echoed by **Trinity College Student Union** who were also dissatisfied with the quality of recycled paper. For a short period, the Student Union used only recycled paper within their office. They found that it was unsuitable when photocopying 200 or 300 copies, as the photocopier would clog up and often break down due to high dust content within the recycled paper. Trinity College students also found that when taking notes on recycled paper, the biro would often tear the paper.

This happened a number of times to several students that I spoke to, and the Student Union found this a common complaint.

Cost :

The prohibitive cost of recycled paper has also resulted in few organisations responding to this product. To obtain a good quality paper, it will inevitably be more expensive to purchase. The following organisations stated that this was particularly true with regard to the purchasing of recycled paper :

* Design I.D. Consultancy
* Electricity Supply Board
* Irish Life Assurance
* Lombard and Ulster Bank
* National College of Art and Design - Administration
* National Institute of Higher Education - Students Union
* Quinnsworth
* Trinity College - Student Union
* Ulster Bank
* Ventac

The underlying complaint expressed by these organisations was that the quality and price of recycled paper were not compatible. Even organisations that use recycled paper for internal use only state that it is not, in fact cost effective, with the exception of the poorest quality.

Design I.D. Consultancy claimed that they noticed that recycled paper was 10-15 per cent more expensive to purchase due to the lack of demand.

The National College of Art and Design (Administration) have stated that if the quality was satisfactory and the price wasn't too excessive, recycled paper would be chosen in favour of any other form. This was echoed by other organisations also.

The students in **Trinity College** have complained that the price of student notebooks and academy pads were 10-15 pence more expensive.

On a contradictory note, **Bank of Ireland** and the **College of Marketing and Design** haven't noticed any price difference between recycled paper and standard paper. On the other hand, **New Ireland Assurance Company** and the **Trustee Savings Bank** and the **National College of Art and Design (Student Union)** state that recycled paper is actually cheaper. **An Post** shed a new light on the issue and claimed that while the price of recycled paper compares favourably with standard paper, they are still in the early stages of using recycled paper, and cannot state exactly how effective

and economical the use of this paper is to their company.

Colour :

As noted from my survey, very few compaines made a specific reference to the colour of recycled paper. However, some organisations did express a dislike towards the colour grey or found grey recycled paper unsuitable for the company's desired image e.g. **Bank of Ireland.** Some of the students in **Trinity College** have refused to write on grey paper. The Student Union also informed me that a percentage of the tutors in Trinity College would not accept essays on grey paper. Many of them referred to recycled paper as "dirty grey paper". I need not elaborate on this point. The statement in itself, clearly reflects that a manufactured system of programmed education has no place within its' narrow outlook for environmental awareness.

Organisations that currently use recycled paper :

The following organisations use recycled paper for both internal and external use :

* Body Shop
* Conservation Volunteers
* Department of the Environment
* Earthwatch
* ENFO
* Green Party
* Kerry Recycling
* Kleepaper
* Old Mould Company
* Traideireann
* Womens' Environmental Network

The Conservation Volunteers proudly admit that it is their policy to use recycled paper. Their reasons for doing so are as follows :

(i) "Economy and ecology are two sides of the same coin;

(ii) If we are not part of the solution to waste reduction and rational use of natural resources then we're still part of the problem

(iii) It is good for our public image to be seen to practice what we preach!"

The Department of the Environment also use recycled paper as close to 100 per cent as possible. This department is in the process of trying to encourage the other

Government Departments to use recycled paper also. They hope that the Government will give an example to the remainder of the country and subsequently create a demand for recycled products.

Kleepaper distribute and use environmentally-friendly recycled paper. Their recycled paper, imported from Germany, is entirely suitable for photocopying and laser printing. They offer a range of sizes from A4 to RA2, and are capable of supplying 'Environment - Careful' white paper, as used by **Greenpeace.**

The organisations listed above have found recycled paper both effective and economical, and have also noted that the quality and availability of recycled paper is increasing all the time.

The following are organisations that use recycled paper internally or where feasible:

Many organisations use recycled paper for internal use only, as either the colour, cost or quality of this paper is inadequate for the companies' desired image. The organisations that fall into this category are listed below :

* Allied Irish Bank
* An Post
* Bank of Ireland
* Electricity Supply Board
* Irish Life Insurance Company
* Irish Times
* Mc Donalds
* National College of Art and Design (Administration)
* New Ireland Assurance Company
* O'Sullivan Graphic Supplies
* Retix
* Smurfit Paper Mills
* Superquinn
* Ventac

McDonalds use recycled paper where possible and are at present working on converting as much of the paper they use to fully or partially recycled paper. This recycled paper is used in their stationary, printed materials and 'Happy Meal Boxes'. They are unable to use fully recycled paper for their paper packaging (such as bags), for hygiene reasons, as only virgin white paper is allowed in contact with food. The

outer packaging however, contains 50 per cent recycled paper and McDonald's are at present working on increasing this amount to 72 per cent recycled paper.

The Irish Times use a percentage of recycled paper within their newsprint. They obtain their newsprint from Finland, Sweden, Norway and Bridgewater in England. Both Finland and Sweden use between 30 and 40 per cent of recycled paper, while Bridgewater uses 68 per cent, in the company's' manufacture of newsprint. In contrast to this, Norway's production of newsprint is made entirely from virgin pulp. However, they state that their papermaking process is very environmentally friendly. For every tree that is felled, three trees are planted in it's place. There are more trees in Norway now than ever before. Mr Eddie Higo, from the Irish Times, said that he had seen the papermaking process in Norway. He stated that the acid and ink wastes from the pulp, are skimmed off the surface of the pulp and burned. The vapour that results from the burning process is clean. The remaining water is released back into the river, where the water is drinkable and the river contains plenty of fish. The waste paper produced by the Irish Times is sold and shredded. It is then used as bedding for horses. (While this shredded paper serves a useful purpose, I have discovered that it also causes problems. When this paper gets wet, it sticks to the horses and some of the horses eat the paper and choke). Shredded paper is also used as bedding for other animals. (When used in chicken coops, the ink from the paper can stain the chickens' legs. This takes on the appearance of diseased or infected chickens).

Both **Park Printing** and **City Office Typesetters** use recycled paper when requested by their clients. While they haven't experienced any problems with the printing process on recycled paper, they emphasise that they are not completely satisfied with this paper as the colour is not white enough, it is more expensive to purchase, and the paper contains speckles of black dirt. They also expressed a dislike towards recycled paper, due to the absence of a glossy surface that is required for a high-fashion image.

A wide variety of organisations are currently investigating the possibilities of using recycled paper to a greater extent, whether internally, externally or both.

The following organisations are keeping a close eye on the improvement in quality, in the hope of furthering its' use :

* An Post
* Bus Eireann
* Golden Pages
* Hallmark Cards
* Irish Life Insurance
* Irish Press Newspapers
* National College of Art and Design - Administration
* National Irish Bank
* O'Sullivan Graphic Supplies
* Trustee Savings Bank

On the other hand, **Design I.D. Consultancy, Fitzwilliam Post** and **Kilkenny Design** believe that an increase in market awareness is badly needed, not only to promote the sales of recycled paper, but also to educate the public that such a product does exist and is available.

Design I.D. Consultancy use recycled paper when requested by clients and find it suitable for small jobs, in particular, abstract images or images displaying a natural theme. They have not experienced any problems with ink or printing and would like to use recycled paper in greater quantity.

However, the lack of awareness on the part of their clients prohibits this possibility as many of them are hesitant and very wary about using recycled paper.

Fitzwilliam Design also stated that they would be glad to use recycled newsprint (and ink), but they have not *heard* of a recycled newsprint.

Kilkenny Design expressed a need for a sourcing guide to designers, with a particular reference to packaging design, as they said that they do not use recycled paper due to a lack of supply.

I think that the promotion of recycled paper lies in the hands of the Government. The Government is the only body with the influence, the finance and the capability to extend the usage of recycled paper throughout society. However, the **Government Stationary Office** said they could not reveal the source of their suppliers of recycled paper as they were a competitive company. They supply the Government departments with recycled paper on request only. While they have noticed that the quality has improved greatly, they will not use recycled paper for overseas correspondence as they wish to create 'an impression'.

I disagree strongly with this point, as I feel that by *using* recycled paper they would make a better 'impression'. What has happened to the 'green clean island' in which we live? Ireland is noted for her green pasturelands and breathtaking scenery. Yet we are contributing towards the pollution of our lands and the subsequent destruction of natural beauty on a worldwide scale. It would be desirable to believe that our Government was taking steps to preserve the beauty of Ireland by using recycled paper for all correspondence, both nationally and internationally. The use of recycled paper on an international basis would also help to develop an awareness of the beneficial aspects of recycling.

To quote the words of Christian Shaw, the director of Kilkenny Design Consultancy ;

"If such a product exists, it needs to be promoted more!"

Conclusion

Conclusion:

The gradual elimination of natural forests has been the focus of grave concern for many, in recent years. Immediate needs, particularly for the subsistence farmers, provide the greatest obstacle towards a truly sustainable development programme. However, regeneration programmes practiced in various deforested lands, provide hope for the future of the subsistence farmers and industrialists who benefit from immediate profit. But while regeneration restores the economic value of degraded lands, it brings with it some disadvantages. The planting of monocultures renders them susceptible to diseases. Restoration of any kind is not an adequate solution for deforestation. It is an expensive, time-consuming operation and because of the complexity of the ecosystem, regeneration programmes are unable to replace the splendour and wonderland of vegetation and the wealth of plant and animal life that flourished in these lands originally. Prevention is always better than cure. While attempts for improvement have produced good results, they are in fact not good enough.

To help the Third World countries, we should not only give more financial help but we should aim at taking less from them. It is of little use to them if we give them pennies with one hand and snatch their life and livelihood from them with another. The problems created by deforestation are twofold ; they are ecological and economic. Recent efforts to help economically are to be welcomed, but more will have to be done for the ecology.

The longer we delay in solving this problem, or any other environmental problem, the closer we are coming to an environmental catastrophe and the more irreversible the damage will be. There is a constant threat to people and their activities and we must remember our responsibilities to ourselves and to this planet. We have no right whatsoever to thieve from this earth as it does not belong to us. Our day-to-day lifestyle is creating a slow death for all of us. A radical change is needed to restore respect for our planet Earth.

A new world order is urgently required - one that focuses on care and consideration for all humans and the environment. We must bring to an immediate halt the exploitation of underprivileged peoples and the exploitation of our unique habitat. The ruthless domination by the wealthy Western World in collaboration with the Third World governments over the poorer sectors of society must cease as soon as

possible. The actions of multinational corporations must be curtailed to prevent any further damage to our environment.

The time has come to turn to renewable energy resources, to stablize population and to reduce the colossal amounts of money spent on military activities (such as the recent Gulf War, creating both a major economic and ecological disaster). Furthermore, we must not only encourage conservation and recycling, but most importantly, abolish excessive consumerism and minimize waste.
Recycling paper is widely believed to save the rainforest. This was the idea that promoted the whole recycling issue, but the statement is somewhat misleading. As I mentioned earlier, the percentage of paper extracted from the tropical forests is as little as 0.6 per cent. (though trees planted for paper-production do contribute to rainforest deforestation by displacing indigenous trees) The main reason for the annihilation of these unique regions is for commercial timber. We as members of the developed world, the consumers, must consume less. We must reject tropical timber products, including the mahogany dining table, the mahogany coffin, or worse still the mahogany toilet seat. These materials are by no means necessary for a comfortable life and similiar products made from a different raw material can be easily substituted.

Recycled paper and environmentally-friendly paper are not one and the same thing. Whether recycled paper is produced from 'pre-consumer' waste or 'post consumer' waste, it has already been through the pulper once already and can no longer be referred to as 'virgin' paper. Even though a paper product is recycled, it could still have adverse effects on the environment, and indeed on ourselves, as many recycled papers are bleached with toxic chemicals.

On the other hand, environmentally-friendly paper involves the production of paper with a minimal impact on our environment. Apart from bad logging operations, the process of chlorine bleaching is the most devastating part of paper production. In order to classify paper as 'environmentally-friendly', it is essential to eliminate the chlorine-bleaching process. A number of chlorine-free products are available but they are not ideally 'environmentally-friendly' as many of them are disposable.

Environmentally-friendly products should take into consideration all aspects of the product, from the acquisition of raw materials to the discarding of the product.

Of course, the ideal solution would be the use of recycled, environmentally-friendly paper that would provide both economical and ecological benefits. Unfortunately though, as noted from my survey, this type of paper does not suit the organisations' desired public image.

Among the reasons for bleaching paper, purity, cleanliness and appearance were important. White is associated with virginity and clinical cleanliness. Untouched and unspoiled - white is the essence of purity.
In contrast to this, grey is viewed in the context of dull, bleak and lifeless forms. Grey is classified as the common denominator of depression - and (ironically) pollution e.g. grey stone walls, grey buildings, grey prisons, grey skies, concrete, dust, dirt, smog or smoke. Grey is also perceived as a symbol of age - e.g. grey hair, or viewed in alliance with old and decayed forms or life e.g. Ashes to Ashes, Dust to Dust. Grey is a cold colour of impersonal nature, associated with hard metallic objects. The connotations revolving around this colour could possibly create an unconscious resistance or dislike towards grey paper. An adequate marketing system is needed to create a public awareness and promote the concept that 'grey is green'.

The need for adequate marketing of recycled paper is both a necessity and an urgency. Many people are completely *unaware* of the range of recycled papers that are available. Yet the producers and potential consumers are caught in a vicious circle. Money is needed to promote this product, but the producers haven't got the money until they sell the product. The lack of sales results from the lack of marketing and so on. This situation remains stagnant unless financial aid is given to recycled companies to promote and upgrade their products. Much of the responsibility for improving the statistics relating to paper use and abuse lies with our Government. It is in their hands to :

* implement legislation with regard to product labelling
* provide grants to recycling companies
* encourage and fund local authorities to organise waste separation schemes and collection schemes that operate on a door-to-door basis within the community.
* implement taxes on environmentally damaging goods.
  The money earned by these taxes could be donated towards the recycled paper industry to enable them to promote their sales and upgrade the quality of their product to satisfy the demands of the consumer.

Products should be correctly labelled as to the contents that they contain. An official labelling system should be introduced in each country - or better still, an official labelling system that is identified and recognised throughout Europe. With the 'harmonisation of standards' throughout Europe in 1992, I think that it is most important for us, as consumers, to know exactly *what* we are consuming.

The 'Blue Angel' scheme that was initiated in Germany in 1978, enables the consumer to know exactly what s/he is buying. As a result, the Government Ministry noted a reduction in the amount of carcinogenic and C.F.C. products that are purchased. (Starke, 1990, p.108)

The Supermarkets in Ireland are stacked with a multitude of products, each one of them screaming at us that they are 'environmentally-friendly'.
Many industrialists are, at present, laughing at the entire emergence of 'Green Consumerism' with regard to some products. Toilet rolls have always contained a percentage of recycled paper, unknown to the public. But it is only since the consumer has become aware of the 'Green' issue, that this fact has been advertised to promote sales.

Without the aid of adequate information that can educate us about the life of each product, 'from the cradle to the grave', we are lured into the web that various companies and industrialists weave, in order to sell more products. There is no reason why this information could not be printed on packaging in much the same way as the ingredients of many products are printed. The latter, now standard practice, and yet it was not so a few years ago. However, public demand led to its' introduction, so surely the influence of the public can be decisive once more. After all, the manufacturers are dependent upon us to buy their products. Ignorance plays a major role in the degradation of our environment. The more information supplied to us about our products, the more aware we will be of the impact on the environment and on ourselves, and we will subsequently question ourselves as to whether we really *want* or really *need* these products.

Advertising has played a major role in the growth of consumerism. The pressure that is put on consumers to purchase unnecessary products is, to a large extent due to advertising. Many of these products are wasteful and dangerous pollutants.
A Minimum Packaging Act would succeed in reducing colossal amounts of unnecessary production and pollution of both plastic and paper, among other raw

materials used by the packaging industry. This would have the added benefit of reducing the amount of purchases that are made due to the manipulation of packaging.

We are part of a materialistic world, imprisoned in our artificial creation of wealth. The only exit is to abolish the 'throw away' society in which we live and re-establish more important values within our lives. While recycling of paper and other materials is both a useful and necessary operation, it is not, by any means, the only solution to the problem. The only way to counteract the increasing devastation of our planet is quite simply to consume less. This does not involve a battle between technology and ecology, which would prove a very difficult choice for many, but it is the harmonious balance between the two.
We have benefited from considerable luxuries and comforts as a consequence of Industrialism, yet we constantly overlook its ravaging effects on the environment. We cannot survive on a planet that we continually plunder.

The following points outline the ways in which we could reduce the excessive growth of pollution :

* It is best to produce as little waste as possible and concentrate primarily on waste ***reduction.***
* Every effort should be made to ***reuse*** as much waste as possible.
* ***Recycling*** helps to conserve resources and reduce pollution. But there are economic and environmental costs associated with waste collection and the recycling process. For this reason, recycling should be adopted when waste cannot be reduced or reused.
* We should ***recover*** materials or energy from waste products which cannot be reduced, reused or recycled.

Our present consumption of paper is increasing at an alarming rate, and it is estimated that if the current rate continues over the next few decades, the worlds' forests will disappear completely. (Kroesa, 1990, p.52)

If we gorge ourselves today with over-indulgences, we will undoubtedly face famine tomorrow. We stand at a cross-roads in human history and we are faced with the option to proceed as before, or to attempt to brake the relentless machinery of our consumerist society. The decisions that we make during the next few decades will have lasting consequences for every single life-form on our planet Earth.

The following are waste paper companies in Ireland :

Cork:
Glenamore Waste Paper Ltd., Mallow, Co. Cork.
John O'Connor. Tel: 022-26250

Down:
North Down Amenity Centre,
Rathgael Road, Bangor.
Tel: 08-0247-270371 / 270302

Dublin:
Animal Welfare & Environment Concern
Tel: Mrs. Boland 955472 / Mrs. Mercer: 300102 Leech Paper Ltd.,
Shamrock Place, North Strand, Dublin 1. Tel: 01-740942 / 749499 / 749501

Bailey Waste Paper Limited,
31 Manor Street, Dublin7.
Tel; 01-38600 (office waste paper)

Floods Waste Paper Merchants,
122 Cork Street, Dublin 8.
Tel: 535031

Travellers Resource Warehouse,
Dominican Publications, Granby Lane.
Tel: 01-732802 / 730558 ext: 34

Central Waste Paper Ltd.,
Ballymount Road, Walkinstown, Dublin 12.
Tel: 01-552821

Recycling 2000,
Unit G, Donnelly Centre, Cork Street, Dublin
Brida Hubbard-Tel: 531622 (accepts only high grade paper, cans and glass)

Ms. Monica Alcock / Nora Neavyn, Skerries. Tel: 01-491050

Galway:
Galway Waste Paper Recycling Ltd.,
Doughuisce, Merlyn Park.
John Quinn, Tel: 091-53390

Kerry:
Kerry Recycling Co-Operative,
119 Rock Street, Tralee.
Tel: 066-26260

Laois:
St. Mary's Workforce, Portlaoise. (cardboard)
Tel: 0502-22301 Fr. Tom Dooley

Meath:
Duleek CO-OP, Navan.
James McKenna. Tel: 041-23934

Offaly:
Offaly County Council Tip Head,
Derryclue, Tullamore.
Tel: 0506-21419

Tipperary:
County Council Tip Heads:
Donohill, Carick on Suir, Cahir
Tel: 052-21399 - John O 'Mahony

Wexford:
DesMernagh, Carrigbawn, Pembrokestown, Wexford, Co. Wexford.
(will collect from Waterford, Kilkenny, Carlow, Wicklow)
Tel: 053-22295

County Council Tip Head, Killurin, Enniscorthy - Tel:053-22211

Wicklow:
Southside Waste Paper Ltd.,
1 Brennans Parade, Dublin Road, Bray.
Tel: 01-828467 - John Conroy

Bibliography:
(i) Books:

1. **AGA KHAN,** Sadruddin. The Vanishing Forest. London: Zed Books, 1986.

2. **ALLABY,** Michael. Thinking Green. London: Barrie and Jenkins Ltd., 1989.

3. **BAHRO,** Rudolf. From Red to Green. London: Verso, 1984.

4. **BELLAMY,** David. The Gaia Atlas of Planet Management. London: Pan Books, 1985.

5. **BOYLE,** Owen. Waste Disposal in Ireland. Dublin: An Foras Forbartha, 1987.

6. **BROWN,** Pat. Recycled Paper Making. London: PNL Press, 1987.

7. **BUTTON,** John. The Green Fuse. London: Quartet Books Ltd., 1990.

8. **DEVALL,** Bill and **SESSIONS,** George. Deep Ecology. Salt Lake City, Utah: G.M. Smith, 1985.

9. **DICKSON,** David. Alternative Technology and the Politics of Technical Change. Great Britain: Fontana, 1974.

10. **FOSTER,** Hal. The Anti-Aesthetic: essays on post-modern culture. Washington: Bay Press, 1983.

11. **GOLDSMITH,** Edward. The Great U-Turn. Devon: Green Books, 1988.

12. **GORMLEY,** John. The Green Guide to Ireland. Dublin: Wolfhound Press, 1990.

13. **GORZ,** Andre. Ecology as Politics. London: Pluto, 1983.

14. **GORZ,** Andre. Paths to Paradise: on the liberation from work. London: Pluto, 1985.

15. **GRADWOHL,** Judith and **GREENBERG,** Russell. Saving the Tropical Forests. London: Earthscan, 1988.

16. **GRIBBON,** John. Hothouse Earth. The Greenhouse Effect and Gaia. London: Bantham Press, 1990.

17. **HECHT,** Susanna and **COCKBURN,** Alexander. The Fate of the Forest. London: Verso, 1989.

18. **ILLICH,** Ivan. Tools Conviviality.
London: Caldor and Boyars, 1973.

19. **KEMP,** Penny and **WALL,** Derek. A Green Manifesto for the 1990's.
London: Verso, 1990.

20. **KROESA,** Renate. The Greenpeace Guide to Paper.
Canada: Litra Ltd., 1990.

21. **LONG,** Paulette. Paper - Art and Technology.
San Francisco: World Print Council, 1979.

22. **MCKIBBEN,** Bill. The End of Nature.
Middlesex: Penguin, 1990.

23. **MITCHELL,** Andrew. Vanishing Paradise.
London: Century, 1990.

24. **PORRITT,** Jonathon. Seeing Green.
Oxford: Basil Blackwell Ltd., 1984.

25. **RICKLEFS,** Robert E. Ecology.
New York: W. H. Freeman and Company, 1990.

26. **SEED,** John. Thinking like a Mountain.
London: G.M.P. Publishers, 1988.

27. **STARKE,** Linda. Signs of Hope- working towards our common future.
New York: Oxford University Press, 1990.

28. **STEARNS,** Peter N. European Society in Upheaval- social history since 1750.
New York: Macmillan, 1967.

29. **TURNER,** Silvie and **SKIOLD,** Brigitt. Handmade Paper Today.
London: Lund Humphries, 1983.

30. **WOMEN'S ENVIRONMENTAL NETWORK.** A Tissue of Lies?
Disposable Paper and the Environment
London: W.E.N., 1990.

(ii) Articles in Journals:

1. **ADLER,** Jerry. 'Survival'. Newsweek. January 7 1991. p.30-35

2. **ALDERSEY-WILLIAMS,** Hugh. 'Green Guidelines for the Environment's Grey Area's' Design week. November i980.

3. **BOAG,** Andrew. 'The Greening of BT'. Graphics World. p.19-22

4. **BUTLER,** Paul. 'Down in the Forest Something Stirs'. Earthwatch. Issue no. 13. Summer 1990. p.3

5. **DAVIES,** Gareth. 'Indecent Burial'. The Sunday Time Magazine. December 9 1990. p.36-39

6. **DILLON,** Frank. 'Getting on the Green Bandwagon'. Managament Environment. November 1990. p.29-31

7. **FOX,** Warwick. 'Deep Ecology - a new philosophy of our time'. The Ecologist. Volume 14. No. 5-6. 1984

8. **GOLDSMITH,** Marianne. 'The Greening of Catolog Design'. Step by Step Graphics. Volume 6. No. 7. Nov./Dec. 1990.

9. **GREENE,** Graham. 'Green A-Z - Wrappers Delight'. I.D. Birthday Issue.

10. **HALL,** Carol. 'Cleaning Up'. Newsweek. November 19 1990. p.40-49

11. **HOPKINS,** Dr. Les and **MALONE,** Dr. Dermot. 'What Future forRecycling?' Technology Ireland. September 1980. p.46-49

12. **O'MEARA,** Annette. 'Poor Irish Record on Recycled Paper'. May 1990. p.35-39

13. **PEARSE,** Fred. 'Kill or Cure? Remedies for the Rainforest'. New Scientist. September 16 1989. p.35-39

14. **POWER,** Carol. 'Making Paper into Flower Pots'. Industry and Commerce. October 1990. p.10-13

15. **PUTTNAM,** David. 'Pulp'. Common Ground. Summer 1989.

16. **RYAN,** John, C. 'Sweden says no to polluted paper'. Technological Advances.

17. **SAWYER,** Jacqueline. 'Tropical Forests'. - A Briefing from ENFO.

18. **SAWYER,** Pete. 'Paper- Untangling the Web'. Printing World. p.38

19. **SMYTH,** Angela and **WHEATER,** Caroline. 'The Green Alternatives'. Here's Health-The Green Guide 1990 Hemel Hempstead. p.80-83

20. **SNOW,** Sally. 'Paper, Pollution and Global Warming'. The Ecologist. Volume 21. No.1 Jan/Feb. 1991. p.14-17

21. **TAFF,** John, F.D. 'A Paper Pompeii'. Link. May/June 1990. p.9-42

22. **TAFF,** John, F.D. 'Should "Greens" see red over'. Link. July/August 1990. p.11-43

23. **THOMPSON,** Ian. 'The Bottom of the Heap'. The Sunday Times Magazine. December 9 1990. p.24-35

(iii) Periodicals:

1. **Ambio.**
'Finnish Lake Survey: Present Status of Acidification'.
February 1991. Pergamon Press.

2. **Conservation Papers Ltd.,**
Issue No.3 Summer 1990

3. **Earthwatch.**
'Climate of Change for a change of Climate'. p.3
'If its' grey, its' green'. p.10
Issue No.13 Summer 1990

4. **Earthwatch.**
'Enterprise, Politics and the Environment' p.12-13
Issue No.11 Autumn 1989

5. **Earthwatch Recycling Briefing Pack.**

6. **The Ecologist.**
'Tropical Forests: A plan for Action'. p.129-133
Volume 17 No.4/5 1987

7. **Finpap Bulletin.**
'Paper and the Environment'
1989

8. **Graphics World.**
'Seen to be Green'. p.46-49
'Paperwork'. p.52-57

9. **Green Gauge.**
'Big Photocopier Firms consider Recycled Papers'. p. 4
January 4 1991

10. **Green Living.**- From The Womens' Environmental Network.

11. **The Guardian.**
December 24 1988

12. **New Consumer.**
'Grey Areas in the Green'. p.15-16
Issue No.3 Spring 1990

13. **Newsprint Today.**- Bridgewater Paper Company.
Issue No.2 Winter 1990

14. **Observer.**
September 16 1990

15. **Paper Naturally.**- A Briefing from Hallmark Cards.

16. **Paper- The Environment and Recycling.**
-A Briefing from Golden Pages.

17. **Position Paper by the Greens.**
'Plundering the Rainforest'
'Tearful Tropics'
Published by the Greens in Bundestag. July 1988

18. **'Rainforests- Land use options for Amazonia'.**
Oxford University Press and WWF
United Kingdom in association with Survival International.

19. **Technology Ireland.**
'Waste and Recycling in Ireland'. p.45-51
November 1980

20. **Water and Waste Treatment.**
Issue No. 10 Volume 33 October 1990