

**OLYMPIC BICYCLE***LotusSport*

At the 1992 Birmingham Motor Show, Lotus Engineering is displaying the revolutionary LotusSport 'superbike' with which Chris Boardman took a Gold Medal at the Barcelona Olympics and subsequently set a new 5km world record.

The black and gold monocoque bicycle and its rider set the world buzzing in July as, in the space of just four days, they together smashed world records and dominated the 4000m pursuit event. Never before had a cyclist and his machine made so many headlines world-wide.

Since then, Lotus has built a limited number of replica Olympic bicycles for the rarified world of pursuit racing and true enthusiasts. At the same time, the Company is developing the business and manufacturing plans for a 'roadgoing' version, and for other business opportunities in the cycling market.

Meanwhile the LotusSport bicycle is still taking the limelight all over the world — at shows, exhibitions, charity events, educational displays and so on. It is estimated that by the end of 1992 the LotusSport bicycle will have made over fifty appearances world-wide — perhaps an overture to many more appearances in high streets next year?

**TIMETABLE TO SUCCESS:****Feb 1992:**

Initial wind tunnel tests on original prototype show potential. Lotus decide to develop bicycle further.

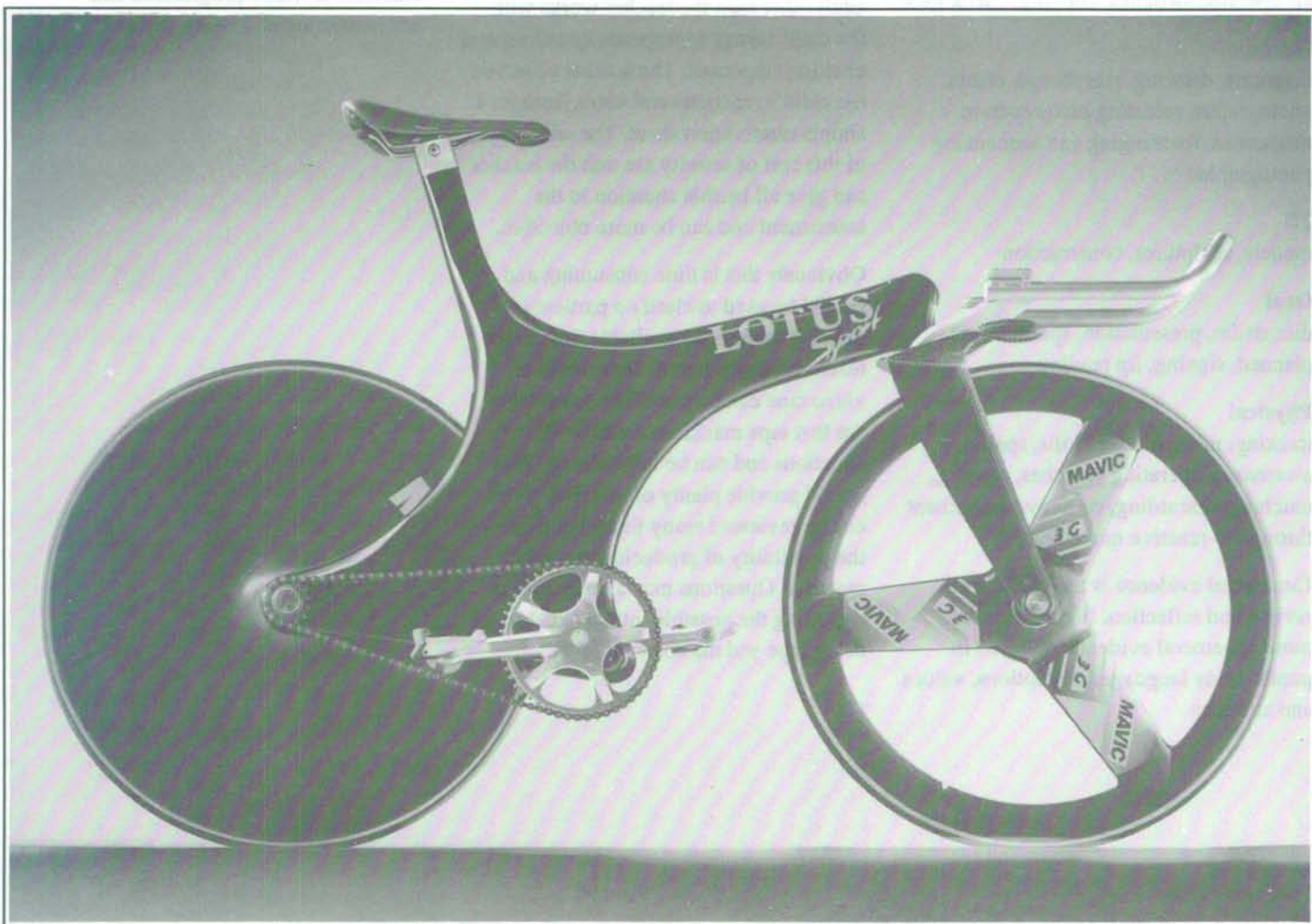
**Feb-April 1992:**

Windtunnel and track development and improve aerodynamics and increase stiffness & strength on the monocoque, monoblade, wheels & drive.

**May 16 1992:**

LotusSport debut at international race meeting at Leicester. Rider Bryan Steel improves his previous best by 5 seconds over 2km race distance, confirming

## Notes and News





windtunnel predictions. The British Cycling Federation decide they want the LotusSport bicycle for the Olympics.

#### June 6-7 1992:

Bryan Steel continues to improve his time at the World Cup International Meeting at Hyeres in France.

#### June/July 1992:

Further development and refinement of LotusSport design

#### July 27-29 1992:

##### Barcelona Olympic Games

Chris Boardman is selected to ride LotusSport bicycle. Breaks unofficial 4000m World record twice on consecutive days in heats. Wins the Gold medal in final, catching and passing his opponent.

#### Aug 22 1992:

Chris Boardman knocks 8 seconds off previous world record for 5000m, setting new time of 5 mins 38 secs.

#### September 1992:

World authorities ratify Chris Boardman's best time in the Olympics of 4 mins 24.496 secs as an Official World Record for the 4000m individual pursuit event.

### TECHNICAL SPECIFICATION:

#### Body:

All-composite monocoque with aerofoil cross-section, formed with unidirectional and stitched carbon fibre in epoxy resin matrix on polyurethane moulded foam core with Kevlar inserts, manufactured using modified Lotus-patented Vacuum Assisted Resin Injection (VARI) process.

#### Front Suspension:

Monoblade with aerofoil cross-section, formed with unidirectional carbon fibre over p.u. foam core as monocoque.

#### Steering column:

Titanium, fitted with aero bars

#### Rear Suspension:

Integral with monocoque

#### Brakes:

Not required

#### Drive:

Steel/titanium fixed-ratio chainset, pedals & rear sprocket to suit rider

#### Wheels:

Front: Flush composite disc, supplied by Mavic

#### Tyres:

High-performance 'Olympic' 110g tubulars, supplied by Continental Tyres.

### BACKGROUND:

The Lotus definition of a true monocoque ('single cell'):

'A completely-closed, thin wall, unitary load-bearing shell structure which cannot be analysed as individual load-bearing members.'

Compare this with a structure which *can* be sub-divided and analysed as individual load-bearing members — eg. a conventional frame.

The LotusSport monocoque could be represented by deforming a spherical shell, therefore it is a true monocoque.

### HISTORY:

The first reference to a bicycle with a cantilevered monoblade is dated 1889. The first true monocoque bicycle was built by Alex Moulton in 1959.

Lotus was responsible for the successful development of the monocoque for motorsport with the revolutionary Lotus 25 Formula One racing car designed by Colin Chapman. First raced by Jim Clark in 1962, it won the World Championship in 1963.

The LotusSport bicycle is derived from the Burrows 'Windcheetah' to which Lotus Engineering acquired the rights in February 1992. Since then, considerable design and development work has been carried out on the structure and shape to optimise the performance and minimise weight. The pursuit racer is the third-generation design in as many months, with considerable midnight oil being burned to achieve the required performance within incredibly short timescales to meet the BCF's schedules.

### FUTURE:

The LotusSport competition pursuit bicycle is seen as the forerunner for a series of track and road derivatives for both competition and leisure use. Lotus Engineering is engaging in early negotiations for manufacturing the distribution for the road/leisure model.

### LotusSport

The 'LotusSport' trademark for competition and leisure markets was introduced three years ago with the entry of the Lotus Esprit to circuit racing in the USA. Since then, the popularity and success of the 'LotusSport' Esprits has grown dramatically; factory supported cars are now racing in the USA, the Netherlands, and in Italy, with a Belgian car to enter competition shortly. It is a long-term goal of Lotus to stimulate sportscar racing in *all its major markets*. The 'LotusSport' trademark is owned by Group Lotus plc.

### PURSUIT RACING:

Run over 4000m on a closed course (in a 'velodrom'), the two competitors start on opposite sides of the track and try to gain an advantage on the other rider. It is regarded as the purest form of track competition. Chris Boardman's new world record now stands at 4 mins 24.496 secs, set in Barcelona this year.

### MIKE BURROWS:

One of the leading human-powered vehicles and bicycle designers, he is actively involved in all aspects of cycle design, competition and everyday use. He took out a copyright on his original monocoque concept in December '82. However, the resulting bicycle was banned by the international authorities (the U.C.I) in October 1986. The ban was finally lifted in November 1990. During 1991, Mike was contacted by Lotus Engineering to enquire about possible developments of the monocoque concept. The rest is...



EFM's adjustable height workstations for children with special educational needs look almost identical to its existing range of D&T furniture.

### EFM MAKES INTEGRATION EASIER

To ease the integration into mainstream schools of pupils who have special educational needs, EFM have designed a range of special needs workstations with adjustable height, which look almost identical to its existing design and technology workstations.

The innovation responds to the 1988 Education Reform Act which states that all children are entitled to a broad, balanced, differentiated and relevant curriculum. EFM's wide range of adjustable height workstations results in an appropriately furnished and resourced environment to help meet this objective.

The workstations are based on EFM's Powerbase 3 range of furniture for D&T thus allowing the incorporation of various specialised worktops including electronics, information technology, design and technology.

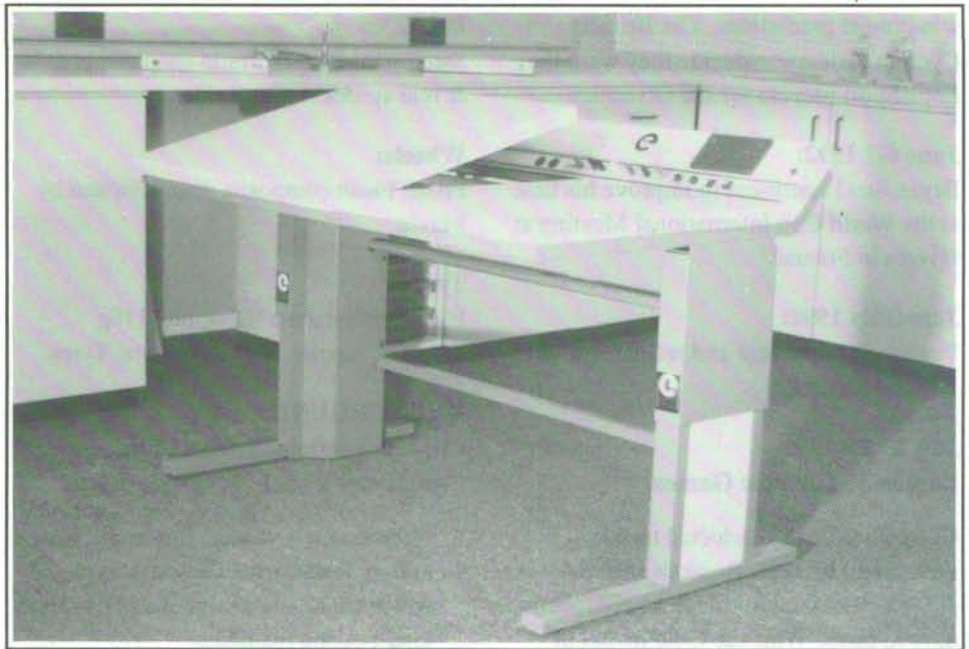
They can also incorporate an adjustable Corian or stainless steel worktop and sink unit to fit into science laboratories or home economics rooms.

The worktop allows for a height adjustment of 200mm using two standard bench widths of 1200 and 1500mm. The table top is raised or lowered with two electro-mechanical linear actuators which each lift a load of 200kg. Designed for ease of use, the actuators are remotely controlled by a push button hand-set which complies with the Nordic standard for equipment for the disabled. The push-button has an integrated rubber seal attached to the outer casing for waterproofing.

As with EFM's standard range of furniture, the special needs workstations have been designed to conform with BS5873 in the static condition.

Issued by Mike Serridge, EFM Ltd, tel. 061 793 9333

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### TSB ATTENDS DESIGN & TECHNOLOGY EXHIBITION FOR THE FIRST TIME

TSB supported the D&T Design & Technology Education Exhibition (Birmingham NEC, 12-14 November 1992) for the first time this year, and promoted its 'Banking on Education' programme on stand C9.

Design and Technology teachers visiting the show were particularly attracted by the project work demonstrated on the TSB stand by pupils from Nunnery Wood High School, Worcester. The school had selected two Design & Technology projects from TSB's major curriculum resource pack for 14-16 year olds.

As part of TSB's on-going commitment to education, one copy of the resource pack is available on request free of charge to all secondary schools in England, Wales and Scotland. This initiative has proved highly popular with schools and 75% already have their copy.

Written by practising teachers, the comprehensive pack brings a 'real-life' angle to the curriculum areas of Design & Technology and Economic & Industrial Understanding.

On the stand, the pupils worked on 'TOGS,' a corporate uniform design project, and 'INTERIORS,' a study of the interior design of a bank branch and the function of a retail outlet. Both projects encourage pupils to explore basic research

methods, use information in a systematic manner, develop ordered and logical design sheets and evaluate their finished work.

For the 'TOGS' project, the pupils addressed different design tasks over the three days of the exhibition. On day one they designed branded trainers; on day two watches and badges; and on day three corporate uniform and leisurewear.

The 'INTERIORS' work was based on a real-life project with TSB's Worcester branch. Pupils had carried out market research among the Bank's customers before producing their proposed interior design plans.

The TSB 'Banking on Education' programme is supported by a national network of TSB School Liaison Officers who are able to assist teachers in the classroom or co-ordinate pupil visit to their local TSB branch.

TSB Banking on Education staff were at the Exhibition to offer advice. Visitors to the stand were able to take part in a prize draw and order their copy of the curriculum resource pack.

For further information: Contact Laura O'Connell, tel. 021 600 6337/9, fax. 6341, or Mary Radcliffe, tel. 0202 669993, fax. 679326





Above left: Helen Loynes and Kelly Weston of Nunnery Wood High School, Worcester, work on their interior design project.

Above right: Darren Fisher and Lewis Hall of Nunnery Wood High School, Worcester, design branded trainers as part of the 'TOGS' project.

TSB's 'Banking on Education' stand at the Design & Technology Education Exhibition, Birmingham NEC, 12-14 November 1992.



### THE BRITISH STEEL CHALLENGE

Across the country, there are huge numbers of children of all ages who are following The British Steel Challenge round the world yacht race with great enthusiasm. Their ways of turning the adventure of the crews into 'their own adventure' are varied and imaginative.

#### School activities:

1. One primary school in Southampton spent time chalking out the exact dimensions of the yacht on the school playground, and each class spent one play time in this area, appreciating what it must be like to live in an area smaller than a cricket pitch.
2. An Exeter school ate dehydrated food for a day to see what the crews will sample. Another school is having a competition to try to make different meals.
3. Many schools are tracking the progress of the boats. They have drawn pictures of the crew, the boats and the ocean creatures they will see as they go round

the world. Using published wall maps of the world and daily updated from Race Headquarters, different classes have 'adopted' different boats.

4. A secondary school in Hereford is having a competition to make 1' models of the boats. Made from card, wire and rags, the boats have to be painted in the correct colours.
5. Another secondary school is having a Challenge General knowledge quiz to test children on their knowledge of the world. Following the boats on leg 1 has brought the Southampton to Rio region to life, giving an understanding of storms in the Bay of Biscay & calms in the Doldrums.
6. Many crew volunteers all over the country have been talking about the race and demonstrating food, clothing and equipment they will be taking.
7. Pupils in a school in Middlesex dressed their headmistress in oilskins, (foul weather gear) and doused her with water to test the water-proof claims, and enjoyed the experience enormously!



8. Many children of all ages have been keeping in touch with the boats, either by e-mail, Campus 2000, the fax Retrieval database and letters. School initiatives have looked at writing a diary, preparing a report on weather conditions and a letter home from abroad.

9. Schools in Manchester and Chesterfield have a number of competitions for poems and paintings about the Challenge.

10. Getting on with your team mates is a major part of the challenge. Some teachers have asked their classes to think about what is important for building teams, and how they would choose their own British Steel Challenge crew.

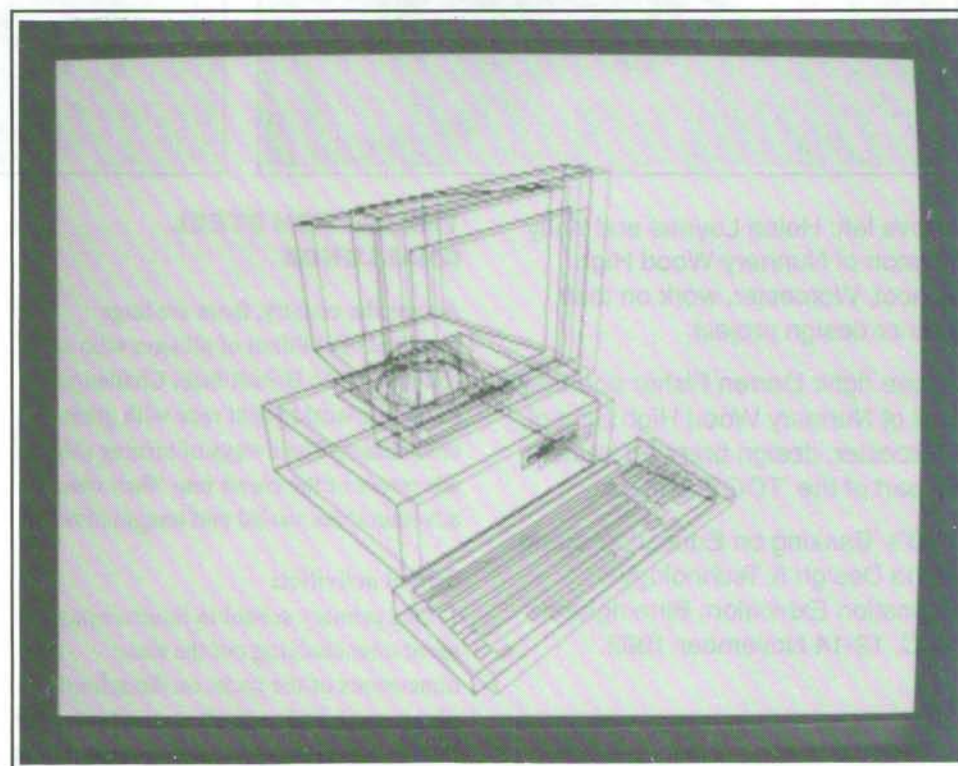
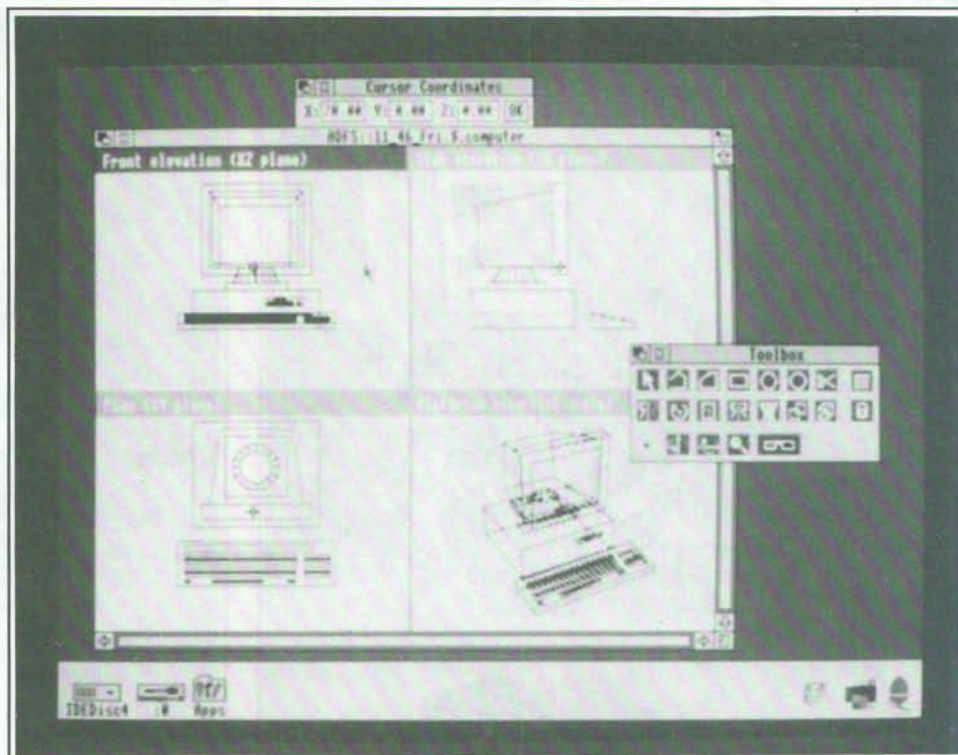
11. The science department of a West London girls comprehensive school are working on a floating and sinking project, while the Technology department are trying to design an electrical or mechanical device for the boats.

12. Ten schools in the Corby area got together at the start of the race to organise a joint trip to Ocean Village, Southampton to see the boats leave.

13. A class of 36 in a school in Dorset, have divided themselves into groups of four and are taking it in turns to be the skipper of their adopted yacht.

### PERSPECTIVES — NEW 3D SOFTWARE FOR THE ARCHIMEDES FROM TECHNSOFT

TechSoft have released a new 3D design package called PERSPECTIVES, for the Archimedes range of computers. PERSPECTIVES allows wire frame drawings to be created in any of three orthographic windows, the result being displayed in a fourth pictorial window. PERSPECTIVES can instantly change from 1st and 3rd angle. The pictorial view may be changed from isometric to oblique, or to a perspective view. The perspective view may be rotated and zoomed, so that the object may be seen from any view point. Output (via Risc Os printer driver, plotter, or Draw file) may be taken at any time, thus allowing many different views of the same object to be



saved. Once an object has been created, a special stereo mode may be selected. This created a truly spectacular two tone stereo 3D image (when viewed through the glasses provided). The image may be rotated in space to help with visualisation.

Perspectives is primarily designed to help provide the 3D element of the National Curriculum. It is simple to use, thus helping students master the concepts of

design in three dimensions as painlessly as possible.

PERSPECTIVES is available from TechSoft at £45 + VAT for a single copy, or £75 + VAT with site licence.



## CNC EMBROIDERY FOR THE ARCHIMEDES

TechSoft have released a system which breaks new ground on the Archimedes — a combination of the POEM 500 computer controlled embroidery machine, and TechSoft's own ARC EMBROIDERY software. The system allows images created as Draw files to be embroidered directly onto material.

The POEM 500 has been designed from scratch as a computer peripheral, and is simplicity itself to operate. There are no buttons or dials, all control is done automatically from the computer. It has a working area of 90x90mm, and will sew onto a wide range of materials, eg. cotton cloth, felt, denim, jersey, etc.

The ARC EMBROIDERY software allows user defined styles to be created, controlling such factors as stitch pattern (satin, ribbed, zig-zag, etc.) pattern size, stitch length, fill density, fill direction, etc. Styles may then be simply assigned to the colours in the Draw file. ARC EMBROIDERY does the rest, controlling the machine and prompting for thread changes, etc.

The POEM 500 and ARC EMBROIDERY software are available from TechSoft at a combined cost of £749.95 + VAT.



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## Book Reviews

### Conservation 2000 Rain Forest

Joy Palmer

Batsford, ISBN 071346573 5 Price £12.99

Reviewed by Norman Casson

Rain Forest is one book from four which make up the Conservation 2000 series which examines environmental questions from a global view point. The book begins by stressing the beauty and values of the world's tropical forests. Key features such as climate and renewal are looked at, followed by the problems of deforestation and the consequent effects on endangered plants and animals, climatic changes, social and economic disruption, loss of products and the displacement of indigenous cultures. Throughout the book facts and arguments are presented for discussion but, as could be expected from the title of the series, tend to be biased on the side of conservation. Perhaps more could have been made by presenting opinions of those people responsible for the changing state of the world's rain forests. This is a slight criticism of what I thought to be an informative and enlightening text which I enjoyed reading.

Well illustrated with some stunning coloured photographs and presented in short up-to-date chapters but at 64 pages long and a price of £12.99 possibly a bit expensive, however, I will be recommending that one set be bought for my school library.

### Conservation 2000 The Greenhouse Effect

Philip Neal

Batford Ltd, ISBN 07134 6500X Price £12.99

Reviewed by Norman Casson

The Greenhouse Effect is another of the books which make up the Conservation 2000 series looking at global environmental problems.

The same format for the book is used as with Rain Forests. The number of pages and quality colour pictures complement short factual chapters.

The nature of the greenhouse effect is well explained and the possible effect of global warming are speculated on. The author is careful to point out that instances of extraordinary climatic occurrence are not proof in themselves of global warming but indicate a pattern of change which are exemplified in different scenarios. Three of the fourteen chapters are titled *What might happen?* — and another three start with *What can we do?* —. The question *is there really a Greenhouse Effect* is asked at the end of the book and lends support to scientific belief.

The Conservation 2000 series would be a useful source text suitable for use in any Secondary school library or as Geography or Science reference material.

### The Complete Desktop Publisher

Mike Purdie

British Gas, ISBN 0 9519701 0 Price £21.95

Reviewed by Ian Buchanan

This is one of the best books we have encountered on Desk Top Publishing. It is written in a straightforward manner, simple to understand and in the jargon, user friendly.

When one considers the sophisticated software and hardware at the disposal of those of us involved in producing written text it is surprising how often the same sophistication is lacking in the finished product. Most of us are aware of work sheets, publications or even magazines that appear to be difficult to read or are not aesthetically pleasing. Few know why this is so; this book explains all. The author suggests that with no greater effort you can move from amateur to, if not professional, at least professional looking, easily read, documents.

