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SCIENCE AND TECHNOLOGY

No. 163

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BIOTECHNOLOGY

GERMAN GOVERNMENT PROMOTING BIOTECH INDUSTRY

Duesseldorf VDI NACHRICHTEN in German 8 Apr 83 p 36

[Text] In view of the increasing importance of procedures in genetic engineering for the future of industry, the senate of the Max Planck Society (MPG), in its latest session in Stuttgart, encouraged Prof Reimar Luest, MPG president, to continue the current efforts for cooperative projects in genetic engineering and to intensify the development of new personnel in this area. Industrial cooperation is being sought.

The rapid progress in the area of genetic engineering has recently shown that there are already possible applications of substantial economic importance here or can be developed in the foreseeable future. Accordingly, there has been a steady increase in the interest shown by industry in an economic exploitation of the knowledge gained in this area and in its application on an industrial scale. It is thereby clear that the path from basic research here to industrial application is relatively short in comparison with other technological developments.

On the other hand, at numerous Max Planck institutes there are work groups that are directly or indirectly involved with genetic engineering, usually embedded in molecular biological, molecular genetic or biochemical work. The spectrum ranges from the institutes for biochemistry in Martinsried, for biology in Tuebingen and for molecular genetics in Berlin to the institutes for immune biology in Freiburg, for experimental medicine in Gottingen and for virus research in Tuebingen and including the institutes for cell biology in Ladenburg, for breeding research in Cologne and for biophysical chemistry in Goettingen. As early as last year, a contract for cooperation in the area of genetic engineering between the Bayer Company in Leverkusen and the Max Planck Institute for Breeding Research in Cologne made headlines.

Meanwhile, the Federal Ministry for Research and Technology (BMFT) is considering expanding its "biotechnology" support program. Also, some Lands have become involved in these activities with their universities. There are signs of increased cooperation and areas of emphasis--such as in

Munich between the Max Planck Institute for Biochemistry and a university group, possibly with the support of the Hoechst Company; in Cologne, where the university's Institute for Genetics is taking part in the cooperation of the Max Planck Institute for Breeding Research with the Bayer Company; and finally, cooperation of the University of Heiderberg with the BASF [Badische Anilin-und Soda Fabrik-Chemical Company]. The Berlin Senate and the Schering Company want to establish an institute for genetic engineering in the immediate vicinity of the Max Planck Institute for Molecular Genetics in Berlin-Dahlem and including parts of that institute. For the MPG, the overall question, therefore, is whether and how it should intensify its efforts in this area even further and in what way cooperation with the universities on the one hand and with industry on the other hand can be strengthened.

The discussion in the senate of the MPG, with the participation of the therein represented notables from the Federal Government, lands, economy, university research and the MPG groups, made clear that for the FRG a central problem of these trends is the lack of qualified scientists. Special importance is therefore attached to the development of trainees and this should be carried out energetically in agreement with the efforts of the BMFT. The MPG is thereby giving particular consideration to the establishment of additional trainee groups.

In the opinion of the MPF senate, the application of the scientific findings and the new methods should be the task of industry. Also, it is important to establish the closest possible contact between basic research and industry. In the future, scientists and their colleagues in industry should, through cooperation in the institutes, become familiar with the work and methods in the initial stage. This is already happening in the Max Planck Institute for Breeding Research in Cologne. The spokesmen of the economy made clear in the MPF senate that their primary concern is the learning of new methods. The state agencies for promoting research, especially the BMFT, were requested not to establish their own large research installation for genetic engineering.

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BIOELECTRONICS DISCUSSED AT STR SYMPOSIUM

Solothurn CHEMISCHE RUNDSCHAU in German 10 Aug 83 p 1

> [Text] For the fourth time now the STR symposium was carried out on 15 June in the large auditorium of the ETH [Swiss Federal Institute of Technology] in Zurich. This year, the meeting organized by Standard Telephone and Radio AG was marked by new opportunities in research and development: man, who heretofore has used technology as a "dead" tool, is beginning to take nature's complex systems as a model.

Based on their research work, scientists from the United States, Japan, Germany and Switzerland presented the possible followup-technologies for microprocessors. The fact that even very simple biological systems can organize, repair and reproduce themselves explains the intensive research into a future application in industrial equipment and systems.

Future of Electronics?

Under the title "Biomolecules--Future of Electronics," Prof Hans Frauenfelder from the University of Illinois gave an overview of the tremendous number of molecular systems, of which still far too few are known to allow one to hope to apply them soon as carriers of bioelectronic components. But based on his research, he suspects that here lies a tremendous potential, because even the simplest biological systems can organize, repair and reproduce themselves. "Qualities not possessed by any solid, glass or chip."

In a summary of integration in semiconductor technology, Prof Hans Reiner, SEL Stuttgart, pointed out the limits to conventional electronics. In his opinion, the technical problems of large-scale integration are shifting from technology to production and examination of the structure. This is probably a result of the fact that integrated circuits, as opposed to biological systems, lack any ability to structure or repair themselves.

Prof Masuo Aizawa, University of Tschukuba, was of the opinion that increasing insight into the complexity of living systems is encouraging researchers to set out for new horizons in bioelectronics. It is possible that biosensors will be the first commercially applicable bioelectronic modules. Through increasec cooperation of biotechnology and micro-electronics, a second generation of integrated and intelligent biosensors is in the realm of possibility.

Artificial Intelligence

Prof Klaus Mesbach, ETH Zurich, stated in his report on his research on new sorts of biosensors, for example the enzyme electrode, which, to be sure, are still not industrially applicable--there are still too many problems to solve, for example in process engineering--but which give reason for the justified hope that "living" protein molecules can be used as electronic components.

"Artificial" intelligence seems, after the construction of the first computer, to be a nearer goal for research. The problems to be solved here, however, still exceed the capacity of natural, human intelligence.

In his report, Prof Harry E. Pople from the University of Pittsburg gave a brief introduction into the area of artificial intelligence, in which he pointed out methods and difficulties in its development. He illustrated his statements by means of a decision-finding system for medical science, a system (CADUCEUS) that he developed.

Neurological Prosthesis

Klaus Hepp, ETH Zurich, is researching quite different problems. They, however, are likewise related to biological systems, namely those of the human body. In his report, he sought to show the possibilities for the application of biological microprocessors from the point of view of neurophysiology. In basic medical research as well, the application of biological microprocessors as a "neurobiological prosthesis" is being followed with great interest, whereby the central, still unsolved problem seems to be the functional linking of the nerve cells of the implanted bioprocessors with the central nervous system. "Possibly as early as the next century," he says, "interesting hybrid structures and man-machine interactions can be realized in biotechnology as well."

Summarizing the fourth STR symposium, it can be said that the most important aspect of all the lectures must be that in the future application of technologies--be it computers or biotechnologies--no special field can stand alone. Biologists will not be able to get along without engineers and engineers will not be able to manage without physicians, physicists or mathematicians.

Here seems to be an urgent need to develop more understanding for inter-disciplinary work.

This first public attempt by specialists of different scientific fields to express themselves on a common subject could well signal the beginning of a new era as was mentioned in the title of the symposium [New Era: Bioelectronics].

But certainly the most important result of this purpose of the STR is that here at the very beginning of new trends dialog was sought, clarification was pursued and prospects that initially appeared sinister were made less mysterious--all things that were once neglected in the use of nuclear energy today in the use of microprocessors.

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DUTCH BUSINESS STUDYING DNA TECHNOLOGY

Amsterdam ELSEVIERS MAGAZINE in Dutch 24 Sep 83 pp 31-34

[Article by W. G. B. Bavelaar: "DNA Technology Arrears Possibly To Be Made Up. Green Light for Industry"; passages enclosed in slantlines printed in italics]

> [Text] The novelty has worn off somewhat. Science-fiction or horrible stories about fiddling with hereditary material are hardly ever dished up anymore. A "broad commission" judged that further DNA research is allowed.

Controllable and acceptable. That roughly sums up the findings of the /broad DNA commission/ which advised Minister Deetman of Education and Science on the progress of the DNA recombination research in this country. Mid-August the media reported rather prominently on the final report of this commission; notirious opponents got the opportunity to express their doubts somewhat sputtering and after that it became almost quiet around the phenomenon of the DNA recombination technique. Science and industry saw that the findings on the application of this revolutionary technique were only confirmed by these reports: the risks allegedly connected to the present DNA research can be estimated for the present state of affairs concerning /genetic manipulation/. Therefore the minister was given to understand that there is no reason to stop such research in the Netherlands. This was a relief to scientists and industry who already feared a wider gap between the developments abroad and here because of the more reserved point of view of the DNA commission. Put differently: the arrears already incurred in our country would have become larger and possibly could never be made up again. "We are now ready to take-off. Let us hope that we will get off the ground," a firm like Gist-Brocades says, a leading Dutch firm for industrial application of the much promising biotechnology.

We "lost" several years in the Netherlands. Whereas in the United States small, most eminent firms mushroomed on Californian soil, in the Netherlands a controversial debate started on the permissibility of the pioneering techniques which were opening new worlds. We had action groups turning out; environmental groups demanded an explanation of ethical and social aspects of the DNA recombination research; first, risks had to be carefully studied. Somewhat analogous to nuclear energy, the need arose to first talk at length about all the ins and outs. In May of 1981 the then minister of science, Van

Trier, set up the broad DNA commission which gave its final report a few weeks ago: DNA research is allowed. By the way, it was not a unanimous recommendation. A representative of the unions thinks that the risk analysis of the commission was too limited and the spokesman of the Association of Scientific Employees let it be known in a minority recommendation that the commission clarified the risks too one-sidedly and therefore underestimated them.

The debate here lasted a long time, a typical Dutch phenomenon. People concerned about the environment, ethicists and DNA freaks could cross swords about the consequences of "tinkering with life." After all, almost 10 years ago prominent American researchers in this field themselves argued for postponement, suspension of the experiments. But after new research showed that the risks remained limited, American directives were relaxed.

In our country industry did not sit still during the debate phase. Necessary experiments which could not be done here because there were no clear directives or because of legal proceedings by environmental groups resulting in delays, were done in laboratories abroad. A few highly specialized molecular biologists took refuge abroad where, according to these reports, the views on the risk factors were more realistic.

Are the Netherlands going to miss the boat for the DNA recombination technique? Can the incurred arrears still be made up? Elsevier put these questions to industry and learned that the Netherlands indeed do not lead the way and that especially in the field of medicine legal obstacles cause extreme difficulties for an alert and competing firm. It also became clear that there were no exaggerated illusions about the application possibilities. It is a long road to master the extraordinarily completed technical procedures. When progress has been made with these procedures, it certainly will still take 10 years before commercially successful products which can possibly be used to fight diseases (cancer) and to trace and if possible correct hereditary defects, will appear on the market.

Since a few years some three firms are actually engaged in the DNA recombination research: Gist-Brocades in Delft, Unilever in Vlaardingen and Organon (Akzo Pharma) in Oss. A few other firms are considering to start with this technique. "In the Netherlands we started later than in the United States where it all began. That is an efficiently operating country. After discussing the risks, rules were established enabling them to start smoothly. We needed more time. We never tend to follow fashions very quickly anyway. The fact that we are lagging behind the United States, is not only due to these debates. The manner of enterprise is completely different. Small firms with much capital to back them and eminent personnel plunged into a part and sometimes scored large successes," says Ir [title for engineer with M.S.] J. J. Kooreman, director of research development at Gist-Brocades. In the Netherlands research has gradually been fitted into the research program of large multinationals which already were engaged in the application of biotechnology. Ir R. Keuning, member of the board of Unilever Research Laboratory in Vlaardingen, thinks that his firm rightly entered the DNA recombination technique. "But it is too early to say that it will be indispensable."

Yet Unilever was the first one to build a so-called C-II laboratory to carry out research. Actually up to now only C-I work has been done, research requiring few safety precautions. TNO [Netherlands Central Organization for Applied Natural Scientific Research0 in Rijswijk is building a C-III laboratory where strict regulations will have to be met for safety and for retaining material. TNO is industriously looking for methods to improve purification of effluent water by way of micro-organisms for instance. There are legal proceedings against its construction.

"The political debate on safety has now become somewhat more realistic. Science has established that the dangers were always overestimated. The debate has almost come to a halt because from tens of thousands of experiments it appeared that there is no danger. American researchers even tried to make a risk real, concrete. That did not succeed," according to Ir Keuning of Unilever.

Organon in Oss also encountered delays because of lengthy permit procedures. There is still a case against the C-I laboratory instituted by the Brabant [Dutch province] Environmental Federation. "The DNA recombination research encountered more criticism in our country on a social level than in other countries. We encountered much distrust here," says Dr K. Wiedhaup, research director at Organon International. The present course of events teaches us that the horror stories about escaping micro-organisms as well as the promises of triumphant saviors in medicine are exaggerated. We have returned to a /back-to-earth/ mentality. In the United States the first gene firms are already dead and gone. It appears that the money-lenders cannot be convinced by nice stories alone anymore. In the Netherlands the universities as well as industry have taken a more modest position. "We know that the techniques have a gigantic potential but phantasy has led people too far," according to Dr Widehaup.

Nevertheless it was a very sister firm of Organon in Boxmeer, Intervet International (manufacturer of veterinary medicine), which in cooperation with the DNA research group of Organon was in a position to be the first in the world to market a commercial recombinant DNA product in 1982, a vaccine to prevent infectious diarrhea in pigs and calves. Since that time the Akzo Pharma companies are steadily continuing their work and concentrate mainly on hormones and vaccines. They use the DNA recombination technique particularly for improving existing products and production methods. Thus Gist-Brocades succeeded in doubling the production of raw materials for penicillin over the past 10 years practically without installing new machines.

In many cases the new technique will still have to compete with alternatives like chemical synthesis and extractions from natural resources. It is clear however that recombinant DNA can speed up and improve the production process while manufacturing medicine using bacteria and fungi (this happens in 20 percent of the medicine). And it can also provide medicine with a more specific effect so that some annoying side-effects can be decreased and even banished.

At a later stage the acquired knowledge can be applied in the development of new medicine. But here Organon mentions other obstacles, not so much of a

technological as of a national-political nature. The company sells 95 percent of its products abroad but while manufacturing them it is "bound hand and feet" to the Dutch pharmaceutical legislation. "We are getting far behind; we have not been able to do anything about some research for 2 years," is the complaint.

Safety requirements, sometimes called extreme, and experiments which had to be repeated many times for other countries cause delays dampening the desire to undertake things. Because of all the legal regulations the pay-back period for a patented remedy sometimes appears to be no more than 5 years. After the patent period is over other manufacturers are allowed to plunge into marketing /imitations/, sometimes called /loços/. That spoils the fun a bit. There is a chance that in that way less and less basic research will be done and large markets will only be aimed at while fighting rarer syndromes will receive little attention. Meanwhile in the United States a decision has already been made to provide producers of such "orphan-medicine" with tax facilities. Some thought is also given to extending the patent period. "In Europe we would also need such a patent policy," Dr Wiedhaup thinks.

Unilever is very reluctant to make announcements concerning application possibilities of the DNA recombination technique. It appears that competition considerations play the largest role here. It is obvious that research is mainly aimed at improving production processes and effect of laundry products (in particular the biological ones) and of food, the foundations on which the company is based. "Recombinant DNA can play a role, can be a tool to improve the biotechnological processes," is all Ir Keuning says.

At Gist-Brocades they say that they have the knowledge and the technique in the house. "We do not expect big developments within 2 to 3 years; at the end of the '80's we can expect applications. Now DNA is particularly important to find out how things are put together," says Ir Kooreman. The universities can play an important role in this and should mainly occupy themselves with basic research. The government would want research aimed more at concrete applications; something has to be produced. "We are saying: No, universities, you do the basic research and we will see what we can do with it."

PHOTO CAPTIONS

1. p 31 Left: Dr Ir Oele presents Minister Deetman the final report of the broad DNA commission.

2. p 31 Right: cultivation of recombined bacteria.

3. p 33 Dr K. Wiedhaup

4. p 33 Ir H. J. Kooreman

5. p 33 Ir R. Keuning

6. p 33 Interior of fermentat-on tank (Gist-Brocades)

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SWISS RESEARCHERS DESCRIBE AGRICULTURAL APPLICATIONS

Solothurn CHEMISCHE RUNDSCHAU in German 16 Mar 83 pp 1, 5

[Article by Eleonore Baumberger: "Gene Technology in Plant Breeding"]

> [Excerpts] A new green revolution lies ahead: by linking plant cell-culture techniques and molecular biology with agricultural research, an enormous innovative leap will be produced. This is forecast by scientists of the Plant Cultivation Institute of the ETH [Swiss Federal Institute of Technology] in Zurich, who at the Eschikon Experimental Station reported on new methods of plant breeding and possible practical applications.

Research in plant cultivation not only guarantees the bases of the production of foodstuffs but with the help of plants it is also possible to produce renewable raw materials, including raw materials that are now based on crude oil. In the EEC and in the United States, energy production through plants is already considered so important that in the long term one must expect competition between plant cultivation for the production of foodstuffs and cultivation to extract energy. That is why researchers ask if we are approaching the biological limits to plant productivity and what are the possibilities that plant breeding can extend these limits.

By using the sun's energy, carbon dioxide, water and nutrients, plants can build complex organic molecules, which directly or indirectly form the bases of foodstuffs or renewable raw materials.

Genetic Modification of Plant Cells

A critical step for plant breeding was the isolation of protoplasts, bare single cells, whose cell walls were removed through enzamatic decomposition. As Dr Christian T. Harns explained, these protoplasts can be obtained from nearly all plant tissues and cell cultures. They facilitate experimental intervention into the genetic material of the individual cells. In this way, individual plants valuable for plant breeding can be reproduced more rapidly, and through mutation they develop new qualities.

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DANISH ROVSING SUPPLIES COMPUTER CENTER TO CNES KOUROU BASE

Copenhagen BERLINGSKE TIDENDE in Danish 13 Oct 83 Sec III p 3

[Text] At this time a computer order worth 70 million kroner is being shipped from Christian Rovsing International in Ballerup to the French space administration, Centre National d'Etudes Spatiales--CNES--which is in charge of building the new missile-launching facilities at the launching base in French Guyana.

In 1981, CNES decided to let Christian Rovsing develop and deliver a computer-guided fuel and missile-launching system and the project has now reached the point at Rovsing that delivery can occur as planned sometime in the month of October. The system is one of the biggest control systems ever developed. As mentioned above, the bottom line of the order is 70 million kroner, some of which represents subcontracts to Christian Rovsing, whose share of the delivery is 40 million kroner. CNES chose the Danish firm instead of a number of Belgian and French firms that presented bids.

The shipment consists of Christian Rovsing's standard products, the CR80 computer, the TDX data communications system and a newly-developed process guidance system. In connection with this system, the firm has developed a general process guidance system, CR Pronos, which is intended for a variety of areas such as glass, paper, chemical and pharmaceutical production.

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BRIEFS

DUTCH-NORWEGIAN COMPUTER COOPERATION--Dutch Oce has just launched a computer-aided design and manufacturing (CAD/CAM) system--which uses machines from Norsk Data. Oce is known in Norway as a supplier of everything in the way of copying machines. But a sizable share of the market is potential consumers of the CAD/CAM system--and in this part of the market, Oce already has a good footing; for one thing most people here already use Oce's copying equipment to copy drawings. They want to reach this market with a total offer. The offer includes machine products and basic programs for Norsk Data as well as programs for CAD/CAM systems developed by Dietz Computer Systems in West Germany. Dietz also markets Norsk Data's systems in West Germany. [Text] [Oslo POLYTEKNISK REVUE in Norwegian May 83 p 31] 6578

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JAPAN-WEST EUROPE ROBOTICS CONTRACTS LISTED

Paris ROBOTS in French May 83 pp 4, 5

[Text] The major agreements signed between Japan and its American and European partners in the field of robotics continue to show that the majority of them are marketing contracts--only 20 percent of these agreements deal with transfer of know-how.

But in coming years and as the technological and commercial capability of some Japanese enterprises asserts itself, sales of know-how will increase. A good indication of things to come is the contract by which Hitachi will supply General Electric with know-how to manufacture three models of robots and in exchange the Japanese company will benefit from the experience and large size of the U.S. market.

In the last 5 years, the Japanese have had dealings both with the Europeans and with the Americans and in the case of the EEC its member countries have served as "a Trojan Horse" for the marketing of Japanese goods throughout Europe. It will be noticed (see table below) that France, with four agreements, ranks alongside Sweden. The FRG with seven agreements, Great Britain with eight and, above all, the United States (16 contracts) are far ahead of our country in terms of Japanese commercial considerations. Finally, there is only one contract with an East European country. It was signed with Bulgaria.

This document is extracted from the Report No 2 issued by the CPE [Prospects and Evaluation Center] which appeared at the beginning of 1983.

Robotics: Analysis of Technical and Trade Agreements Between Japan and 16 Countries

Country	Company	Field of Activity	Agreement with Japanese Firm	Date
South Africa	Ballos Engineering	welding machines	Yaskawa	August 80
Australia	ANI Perkins	welding machines	Yaskawa	October 80
Austria	Voest Alpine	heavy machinery	Mitsubishi Heavy industry	October 81
Bulgaria	Bulgarian Government		Fanuc	October 79
Korea	Samsung Precision	precision engineering	Dainichi Kiko	October 81
United States	Adiral Equipment	moulding machines	Yaskawa	October 80
	Advanced Robotics	robotics	Fujikoshi	August 81
	Automatix	robotics	Hitachi	December 80
	Bendix	mechanical engineering	Yashawa	1983
	Cincinnati Milacron	machine-tools	Dainichi Kiko	February 82
	Fared Robot Systems	engineering company	Yashawa	October 80
	GCA Corporation	machines for electronic industry	Dainichi Kiko	January 82
	Generac	welding machines	Shin Meiwa Industry	December 81
	General Electric	Electrical equipment	Hitachi	August 81
	GMF	subsidiary of General Motors and Fanuc	Fanuc	June 81
	Hobart Brothers	welding machines	Yashawa	August 80
	IBM	computer equipment	Sankyo Seiki MFG	February 82
	Machine Intelligence	robotics	Yaskawa	1982
	Prab Robots	robotics	Murata Machinery	September 81
	Prat Saco Royal	textile machines	Okamura Corp	April 82
	Robotics	sheathing treatment of surfaces	Taiyo	September 82
	Unimation	building robots	Kawasaki Heavy Industries	1968
	Wamac Machinery	printing machines	Dainichi Kiko	February 80
	Westinghouse	small electrical equipment	Mitsubishi Electric	1982

Type of Agreement, items involved and countries

Marketing of the Series Motoman L 10, L 3 (South Africa)

Marketing of the Series Motoman L 10, L 3 (Australia and New Zealand)

Transfer of know-how for the series Robitus (Europe)

Transfer of know-how (Bulgaria)

Marketing of all models except for Baraman and Hosman (Korea)

Marketing Motoman L 10, L3 (throughout the world)
Marketing Uniman 7000 (United States, Canada)
Marketing Motoman L 10, L3 (North and South America)
Marketing advanced robots (United States)
Joint development of all models except Baraman and Hosman (United States)
Marketing Motoman L 10, L 3 (United States)
Marketing of all models except for Baraman and Hosman (United States and Canada)

Marketing of all models (United States)
Marketing of painting robots and advanced robots (throughout the world)
Joint development of all models (United States and Oceania)

Marketing of Motoman L 10, L 3 (United States and Canada)
Marketing of the Series Skilam (United States)
Joint development
Marketing of the Series FEP (Asia and Oceania)
Technological know-how models RC-04, 07-AR, 08-AR (United States and Canada)
Marketing of the Series Tofky (United States and Canada)
Marketing Unimate 700,500, 2000, 4000 (throughout the world)

Marketing of the Series Babot (United States)

Marketing Melfa RW 1A (United States)

Type of Agreement, Items Involved and Countries

Marketing Skilam (France)
Marketing all models (France and Benelux)
Marketing Baraman (France, Italy, Switzerland, Spain, Holland)

Marketing all models (Great Britain)
Marketing Motoman L 10, L 3 (Great Britain and Ireland)
Technological know-how series Minitran
Marketing advanced robots (Great Britain)
Marketing series Baraman (Great Britain and Ireland)
Technological know-how all models (Europe)
Technological know-how all models (Great Britain)
Marketing advanced robots (Great Britain)
Marketing Motoman L 10, L 3 (Italy)
Technological know-how and marketing
Marketing series Baraman (Italy)
Technological know-how (Southeast Asia and Australia)
Marketing series Baraman (Holland)
Technological know-how all models except Baraman and Hosman (Europe)

Marketing Baraman and Hosman (FRG)
Marketing all models (East Europe and FRG)
Marketing series Uniman (Europe)
Marketing Motoman L 10, L 3 (FRG and France)
Technological know-how all models (Western Europe except Great Britain)
Technological know-how Almart

Technological know-how series Part Time (Asia except Taiwan)
Technological know-how (Scandinavian countries)
Marketing Baraman (Scandinavian countries)
Marketing Babot (Scandinavian countries)
Marketing advanced robots (Europe)
Marketing all models (Taiwan)
Marketing all models (Taiwan

Country	Company	Field of Activity	Agreement With Japanese Firm	Date
France	CGMS-Alsthom	industrial group	Sankyo Seiki MPG	Oct 81
	Commercy Soudure	welding machines	Shin Meiwa Industry	Sep 78
	Fenwick	fork-lift truck & machine-tools	Dainichi Kiko	Apr 78
	Nauder	retailer	Hitachi	Oct 81
Great Britain	Blundy & Partner	robotics	Shin Meiwa Industry	Oct 79
	GKN Electric	welding machines	Yaskawa	Jun 80
	Hawker Siddeley	aeronautics	Daido Steel	1970
	Lansing	mechanical engineering	Hitachi	May 81
	Russel & Sons	machine-tools	Dainichi Kiko	Jan 79
	Sykes Group	petroleum engineering	Dainichi Kiko	Jun 81
	The 600 Group	machine-tools	Fanuc	Dec 81
	UK General Electric	electrical equipment	Hitachi	1983
Italy	Autom Arcos	welding machines	Yaskawa	Jan 80
	DEA	robot maker	Amada	1983
	Vega	retailer	Dainichi Kiko	Feb 77
Norway	Trallfa	household appliances	Kobe Steel	1973
Netherlands	Buiscar	retailer	Dainichi Kiko	Feb 78
	Robot Technology Systems	robotics	Dainichi Kiko	Oct 81
FRG	Bartel	retailer	Dainichi Kiko	Jan 78
	Kopper Schmidt	painting materials	Tokico	Jul 82
	Kuka	welding machines	Fukikoshi	Dec 73
	Messer Griesheim	welding equipment	Yaskawa	May 79
	Seimens	electrical equipment	Fanuc	Dec 75
	VWF	aircraft industry	Shoku	1969
	Zeppelin-Etallwerke	mechanical engineering	Hitachi	Oct 81
Singapore	Chartered	mechanical engineering	Dainichi Kiko	Jun 82
Sweden	Aritmos	shipbuilding	Dainichi Kiko	Nov 81
	Personer	retailer	Dainichi Kiko	Jan 78
	Trosteknik	welding machines	Yaskawa	Apr 78
	Wamac Machinery	printing machines	Dainichi Kiko	Feb 80

(Table continued on following page)

Country	Company	Field of Activity	Agreement With Japanese Firm	Date
Switzerland	Oerlikon	mechanical engineering	Hitachi	Oct 81
Taiwan	Sin Sin	retailer	Dainichi Kiko	Jan 77
	Tatung	electrical engineering	Fanuc	Jan 82

8796
CSO: 3698/20

GERMAN FIRM'S WAY TO MAKE TITANIUM-BASED LARGE PARTS NOTED

Duesseldorf VDI NACHRICHTEN in German 3 Jun 83 p 20

[Article by Franz Gremm: "Powder Metallurgy in Place of Forging: Hot Isostatic Press Manufactures Complex Formed Parts"]

> [Text] Trend-setting requirements for titanium-based powder-metallurgical parts are coming from aeronautics and astronautics. Here, the requirements are frequently so high and space and (especially) weight constraints so critical that only this material offers a sure and satisfactory solution. That, however, offers challenge enough for conventional manufacturing methods.

The development work for powder-metallurgical parts made from titanium alloys has reached a new level at the Krupp Research Institute in Essen. On a market-oriented technological scale, large and complex formed parts for machines, installations and equipment building can now be produced, in some cases as substitutes for parts which were forged in the past. Leading out was the development of appropriate small steps to ensure the correct functioning of process operations. Following this, a flexible encapsulation method based on ceramics was developed during a long series of tests. Finally, a large hot isostatic press was installed in Essen, an investment of over DM 3 million.

With the new hot isostatic press and the available encapsulation method, components having major dimensions on the order of 500 by 1,000 mm can now be manufactured.

At this stage of development, what concrete ideas have been formulated at Krupp concerning broad application of the process? In answering this, Dr-engineer J. Hartwig, business manager of the research institute, comments, "Ahead lies the objective of making alloyed parts which cannot be made by melt metallurgy. This means that completely new material classes will be opened up for practical utilization.

"Second, known forging and casting alloys can achieve extremely high homogeneity in parts made by powder metallurgy. A key word in this regard is segregation. Alloys which have a propensity to segregate can be formed into

homogenous parts using powder metallurgy. This leads to very uniform, isotropic properties and mechanical characteristics under both static and dynamic stress conditions.

"To put it simply, with powder metallurgy, the properties of forged parts will always be achieved. An advantage in this regard is the fact that parts manufactured by powder metallurgical methods do not exhibit differences in strength as a function of forming direction. This is not true for forged parts."

A part which can be easily made by forging cannot, according to J. Hartwig, be economically manufactured by powder metallurgy. "Our tasks are thus related to achieving the most cost-favorable production of complex components wherein the powder-metallurgical method saves material costs as well as time and cost in the manufacturing steps," he relates. "We achieve with the powder-metallurgical method near-net-shape parts, of course."

For a typical part which has been manufactured for a considerable time at Krupp, Dr-engineer Hartwig lists the following specifics: "The starting weight for a forged design using titanium alloys was 7.8 kg. The finished part weighed only 1.7 kg. About 80 percent of the material--with a current cost of about DM 100 per kg--falls victim to machining operations. When using conventional powder metallurgy, the same part weighed 3.2 kg, so that only 1.5 kg, in this case 47 percent of the raw weight, had to be removed by machining. But even this loss is presently being reduced further," observes Hartwig.

At Krupp an analysis of the powder properties resulting from various methods of production was conducted; following this the institute developed its own method. The resulting facility, which has been in operation at the institute for some time, produces about 30 kg of high-grade titanium powder per hour in continuous operation.

The second basic manufacturing step consists of making suitable capsules. Controlling the complex shrinking process of capsule and powder charge during hot isostatic pressing is a critical issue and is complicated by the wide variation in capsule shapes associated with a broad spectrum of parts.

There is an art to making capsules. For parts with complex shapes, ceramic capsules developed specifically for the purpose are used in most cases. For simple geometries appropriately welded plate capsules are used.

In some cases, theory offers a sufficient basis for computing the shape of a capsule; in other cases the shape must be determined empirically.

Concerning this point, Dr E. Hillnhagen, director of the Materials Research Section of the Krupp Research Institute, explains: "At first the idea grows intuitively--on the basis of broad expert knowledge, of course. As the development progresses, intuition is augmented and replaced by systematically worked out and theoretically founded design parameters. This holds especially for critical geometric features like corners, holes, edges and changes

in cross section. A generally applicable design method for arbitrary geometries remains a worthy but difficult-to-attain development objective."

The finished capsules, filled and evacuated with special care, are placed in the hot isostatic press. The goal is a fully dense material. Required for this is a temperature of 930 degrees centigrade, a presssure of 1,500 bar and a pressing time of 1 to 3 hours. The cycle time, which includes heating up and cooling down, requires 6 to 7 hours. The number of parts which can be made at the same time depends on the volumes of the part and the press cavity. The usable volume of the new Krupp installation is 0.9 cubic meters--a diameter of 600 mm and a height of 1,500 mm.

The required fundamentals are in hand for widespread introduction of the method. Also, the basis for developing the practice is not lacking. What is lacking is a focused marketing effort designed to convince potential customers of the economic feasibility of this manufacturing process. In each individual case, the specific constraints such as number of parts required, geometry and size are of critical importance.

At least conceptual support for the new methodology is expected from other results from the Materials Research Section of the Krupp Institute. Presently, alloys are being developed for orthopedic implants, particularly on the basis of "memory" materials. In the area of abradable parts, compound samples are being tested which have the cutting capability of hard metals on the one hand and the weldability of steel on the other.

The Krupp Research Institute works primarily on in-house tasks. But to a certain extent it also does research and development work under contract to government agencies and other industrial firms. Also, the new hot isostatic press will be used to do postcompression work for other firms under contract.

Photograph Caption:

The new hot isostatic press in the Krupp Research Institute in Essen has usable cavity dimensions of 600 mm diameter and 1,500 mm height. Not just the institute's own titanium-powder parts will be compressed at 930 degrees centigrade and 1,500 bar, but the facility will also postcompress other alloys under contract for other establishments.

9130
CSO: 3698/29

TELEFUNKEN, EUROSIL, UTC/MOSTEK JOIN IN SEMICONDUCTOR ACTIVITIES

Wuerzburg ELEKTROTECHNIK in German 29 Apr 83 p 8

[Article: "Together in the Future--Telefunken, Eurosil and UTC/Mostek"]

[Text] "We believe that Telefunken Electronics and Eurosil Electronics will be provided with a healthy financial and technical base and that they will have a real chance in the future." This prognosis of Walter Birkhan, board member of AEG-Telefunken AG, expressed during a press conference is based on the collective know-how and strengths of the Telefunken-Eurosil-UTC/Mostek partnership contributed in the ratios indicated in Figure 1. The agreement calls for very close cooperation both in research and development and in the manufacturing and tailoring of the product catalogue. The technological capability of each partner shall in all cases be fully available to the others.

Thus, for example, know-how in the MOS and VLSI areas will flow from Mostek to the two German partner companies, but in the case of individual custom semiconductors, bipolar ICs and sensors the flow will be from Europe to the United States. An example of the state of technology at Mostek is the mass production of laser-redundant 64K memories. In this process extra memory cells are grown on the chip which can be connected to the 64K array with a laser beam to replace faulty cells. The process significantly improves production yield. Figure 2 points to the future. It shows a laboratory sample from the technology for producing 256K memories by linear reduction of the 64K structure by 50 percent.

A focal point at Telefunken in addition to the areas mentioned above is optoelectronics. Figure 3 shows a product from this area, the V-nut semiconductor laser, in various mountings for special purposes such as for photographic plates.

With a production goal for 1983 of 100 million circuits, Eurosil Electronics is demonstrating its performance capability in the field of CMOS watch circuits, wherein the company has a market fraction of about 40 percent in the Far East, Japan excepted. Here gate arrays and custom circuits--in the program since 1980--are completed.

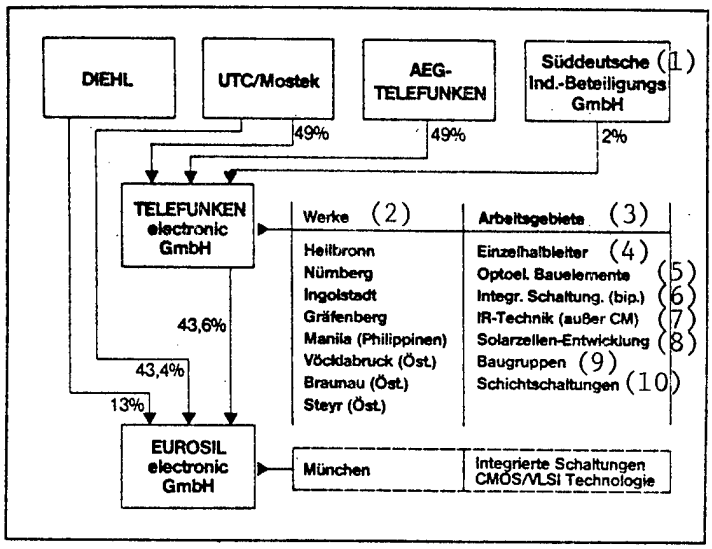

Figure 1. Since 1 March, UTC/Mostek and Telefunken Electronics have been participating in Eurosil Electronics under a close-cooperation agreement.

Key:

1. South German Industrial Participation GmbH
2. Factory [location]
3. Specialty
4. Individual semiconductors
5. Optoelectronic components
6. Integrated circuits (bipolar)
7. Infrared technology (excluding CM)
8. Solar-cell development
9. Subsystems
10. Film circuits

With the recently adopted cooperation agreement, the chances for all three partner firms to win a larger share of the sharply contested semiconductor market are greatly increased. Larger production quantities of several products are to be expected due to broader marketing and in-house consumption of the partner companies. Externally, a common catalogue of products demonstrates the combined delivery capability of the group, and internally the good financial footing will provide for a high potential in research and development. For the time being, the answer appears to lie in the silicon factories in the Far East and the United States.

9160
CSO: 3698/29

MATRA, THOMSON LOSE IN COMPONENTS ACTIVITIES IN 1982

Paris ELECTRONIQUE ACTUALITES in French 23 Sep 83 p 17

[Article by JPDM: "Results of MATRA and Thomson-CSF Components Activities in 1982]

[Text] The reports released by MATRA [Mechanics, Aviation and Traction Company] and Thomson-CSF [Thomson-General Wireless Company] on their 1982 activities show substantial losses for their 1982 components operations even though revenues were up. It should be noted, however, that these losses represent net results, that is, in fact, loss and investment sums that are sometimes quite considerable.

Thus, for MATRA, the "aggregate" revenue of its Components Branch rose by 49 percent over that of the preceding year, despite a drop in COMELIM [expansion unknown] revenue owing to a transfer of "composite materials" activities to the MELCO firm, a subsidiary of MATRA Electronique.
But all its subsidiaries lost money, and these losses are growing at an accelerated rate, except in the case of COMELIM, which has divested itself of a costly activity (total revenue 194 MF [million francs]; net result: a loss of 75 MF).

MHS [MATRA Harris Semiconductors] revenue rose from 27.7 MF in 1981 to 83.8 MF in 1982, while its net loss increased from 39.5 MF to 58.9 MF. Its activities report discloses that, in 1982, MHS built, at a cost of 45 MF, a pilot facility that enables the testing of new processes without perturbing normal manufacturing operations. It attributes these losses to the research effort involved. Rather curiously, the report does not cite a major cause, which was the greater than expected upward pressure exerted by the Japanese firms in Europe on the prices of CMOS [complementary metal-oxide semiconductor] devices.

EUROMASK's revenue rose from 0 in 1981 to 5.1 MF in 1982
(that is, the price of one stepping photoreducer), while its net losses increased from 0.2 MF to 0.4 MF.

COMELIM saw its revenue drop from 99.5 MF to 78.6 MF during this period, for the reason cited above, but cut its net losses from 6.5 MF to 0.3 MF.

LTIS [expansion unknown] increased its revenue from 7.7 MF to 26.4 MF in 1982 and captured, in the latter year, 30 percent of the French market for stacked multichip microcircuits. Its net losses went from 13.4 MF in 1981 to 15.3 MF in 1982. The report explains that these losses are in part the result of the price freeze, and in part the result of the difficulties encountered during the first half of 1982 while developing the process.

Overall, the revenue of Thomson-CSF's Components Branch rose from 2,926 MF in 1981 to 3,467 MF in 1982 (+18.6 percent). Order bookings rose from 1,645 MF in 1981 to 2,250 MF in 1982 (+36.8 percent) and investments from 333 MF to 404 MF (+21.3 percent). Thomson-EFCIS [Company for the Design and Manufacture of Special-Purpose Integrated Circuits] revenue was up 25 percent and that of the Discrete Semiconductors Division up 40 percent "for the most featured products in their catalog."

As for EFCIS alone, which until the end of 1982 was still only 65-percent owned by Thomson-CSF, its revenue before taxes, as given in its activities report, was 410.451 MF, with a loss of 63.919 MF. However, in a recent press conference, Thomson-EFCIS had disclosed that its 1982 revenue had been 570 MF, 59 percent of which was attributable to bipolar components (formerly Thomson integrated circuits) and 41 percent to MOS [metal-oxide semiconductor] components and systems (EFCIS), which would indicate an EFCIS revenue of 234 MF. Perhaps the difference between 410 MF and 234 MF represents direct governmental subsidies, which would indicate that the sum of the company's investments and losses in 1982 was 239 MF (we were unable to obtain an explanation).

It will be recalled that we had already reported a revenue on the order of 530 MF for the Discrete Semiconductors Division, the losses of this Division being on the order of 10 percent. The activities report furnishes only the results of its subsidiary SSC [expansion unknown], which are included in those of the Discrete Semiconductors Division: Revenue of 260.721 MF, losses of 12.495 MF.

The Thomson-CSF report discloses that SOCAPEX [expansion unknown] had revenue totaling 424.301 MF and losses of 41.543 MF.

9238
CSO: 3698/27

PRICE, CAPABILITIES OF PHILIPS' NEW ELECTRONIC FILING SYSTEM

Paris ELECTRONIQUE ACTUALITES in French 9 Sep 83 pp 1, 2

[Article by RV: "Philips All-Electronic Filing System"]

[Text] Apeldoorn--On 30 August, at a preview of the forthcoming SICOB [Exposition of Office and Business Supply Industries and Office Organization], PDS [Philips Data Systems], at the world headquarters of this division of Philips at Apeldoorn (Netherlands), unveiled for the first time to the French press its Megadoc electronic filing and document retrieval system.

Megadoc claims to be "the world's first electronic, high-capacity, fast-access filing system." Depending on configurations, the price of a Megadoc system can range from 1.5 MF [million francs] to over 10 MF. PDS plans to sell "some few tens" of Megadoc systems in Europe over the next 2 years. As of now, several systems have been sold and are scheduled to be put in service during 1984, particularly in a Dutch government ministry and in a West German press group. Some systems may also be installed in France in the near future, specifically in the banking and insurance sectors.

Megadoc, "in 1 second," can record and automatically classify documents "in extenso" (mail, articles, handwritten notes, diagrams, etc) on a laser read/write, digital optical disk [DOD]. These documents are digitized, stored and retrieved in their original form on a black and white screen or on a printer, with a high degree of resolution (200 points per inch). The system as a whole is managed by a Philips P 4000 "mini." It takes only a few seconds to retrieve a filed document.

Each document can be processed either in the alphanumeric mode or in the graphics mode. PDS explains that Megadoc can record documents "either after digitization by an optical analyzer, or based on text processing documents incorporated into the system." In other words, documents (A4 maximum format) can be stored in the form of digitized images or as character strings.

The DOD, which like all the other components of Megadoc was developed by Philips, has a capacity of 1 billion usable bytes (that is, 30,000 images of pages, or 500,000 pages if the document has been generated by a word processing machine) per side.

Its mean access time is 150 ms [milliseconds]. PDS points out that the data recorded on a DOD is nonerasable and remains readable "at least 10 years."

An automatic DOD feeder, called the "juke box" and having a capacity of 64 DOD's, provides access to all stored pages "in less than 20 seconds." Three "juke boxes" can be operated in a single Megadoc configuration. However, a single read/write platter can also be used, but in this case the loading of the DOD is manual instead of automatic.

The DOD: A Competitor of the Magnetic Tape?

The price of a DOD is 4,000 francs, but PDS estimates it will be 1,000 francs by around 1986. The diameter of a DOD is 30 cm, but Philips plans to launch other formats in the future, particularly a "compact disk" type. The Philips group also plans to bring out erasable DOD's by around 1990. Philips also foresees an increase in storage capacity of the DOD within the next few years: "We are now only at the beginning of this new technology," it points out.

A Megadoc configuration always includes a magnetic disk for temporary input/output storage. For an "average" configuration, the maximum number of work positions is around 12. These are "screen-and-keyboard" positions that permit dialoguing with the system and, in particular, typing in the key words associated with each document. A document can be consulted from several positions simultaneously.

For document management (indexing, retrieval by key words), Megadoc can use either the P 4000 system's ISR [expansion unknown] software or "any other system" the user may already have in operation. Security and access-authorization procedures can also be incorporated into a Megadoc system. It is to be noted also that remote retrieval is possible; equipment is available for connecting Megadoc to local networks or to the public telephone or public remote data processing networks.

Lastly, with regard to the DOD's, these disks can also be used simply as computer peripheral memories. PDS deems that the DOD can be a formidable competitor of the magnetic tape: Greater compactibility, longer life, shorter access time. Philips expects to sell DOD,s and corresponding readers as OEM,s.

PDS, which employs 11,600 persons in all, has installed 170,000 units worldwide (as of year-end 1982), 60,000 of which are banking terminals. With a presence in 30 countries and an annual revenue of around 5.3 billion francs, PDS represents about 4.5 percent of the Philips group's total revenue.

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CSO: 3698/27

BRIEFS

PHILIPS-ASM MICROLITHOGRAPHY CONTRACT--Philips and the Dutch firm ASM [Associated Semiconductor Materials] International are considering entering into a joint venture for the development, production and marketing of microlithographic equipment for the semiconductor industry. The first product to be marketed could be the Model PAS-2000 5:1 stepping photoreducer which is currently being produced and used by Philips, and which has a capacity of sixty 4-inch wafers per hour with a resolution limited to 1 micron. ASM International's subsidiaries in the United States, Japan, Asia and Europe could serve as points of sale and post-sale services. The formation of a separate company to produce the photoreducer for the world market and to develop new generations of advanced microlithographic equipment is also being considered. This company could have its headquarters at Eidhoven (Netherlands). ASM International is a Dutch firm with head office in Bildhoven. It specializes in the manufacture of equipment for the manufacture of semiconductors (particularly for the processing of wafers by the APCVD [expansion unknown] method--see ELECTRONIQUE ACTUALITES of 18 March 1983--assembly and encapsulation). In 1982, it had revenues totaling 140 million guilders, and is projecting a total revenue of 200 million guilders for this year. [Text] [Paris ELECTRONIQUE ACTUALITES in French 16 Sep 83 p 18] 9238

CSO: 3698/27

FRENCH 1984 R & D BUDGET INCREASES, PROVIDES FOR NEW JOBS

Paris AFP SCIENCES in French 29 Sep 83 pp 1-6

[Text] The 1984 research budget will total 36.8 billion francs, plus another 750 million francs in research tax credits. This is a 15.5-percent increase over 1983 in terms of value or an increase of 8.3 percent in volume (excluding inflation). It will permit the net creation of 710 new jobs, including 334 research workers and 266 engineers, technicians and administrative personnel.

For Laurent Fabius, minister of industry and research, the situation reserved for research in the government's general budget for 1984 emphasizes the priorities defined by the government for the sector.

"Research is in a somewhat paradoxical situation: Its budget is actually growing, but within an extremely harsh budget," the minister said, while admitting that certain allocations will not totally respond to what was expected, but he stressed the fact that the budget "expresses a dual effort of continuity and selectivity."

In terms of the choices made by the government, 1984 will allow: a substantial increase in the means of the civilian research-development budget; implementation of the reform of research personnel status; and new procedures or organizations.

Funds reserved for basic research will increase by 12.8 percent; those for the four promotional programs by 32 percent for electronics and biotechnologies, 41 percent for employment and working conditions, and 18 percent for cooperation.

Under technological development programs, the space budget will go up 35 percent and nuclear power plants by 16.3 percent.

In its content, the 1984 budget reflects a dual effort of continuity and selectivity: continuity with respect to funding, first of all: The frontiers of the research allocation defined last year by Parliament are not modified. Continuity is shown in the major options: restoration of support for programs and operational means of laboratories, up 13.3 percent (in value); an increase of 16.6 percent (in value) of incentives to enterprises; implementation of

(1) Base de programmation

(en millions de francs) (2)	1983						1984					
	D O (3)	(4) Autorisations de Programmes S.P. (5)	Actions Incit. (6)	Autres A.P. (7)	Total A.P.	Total DO + AP	D O	Autorisations de Programmes S.P.	Actions Incit.	Autres A.P.	Total A.P.	Total DO + AP
PROGRAMMES MOBILISATEURS (8)												
Energie	337,6	48,0	376,9	67,9	492,8	830,4	374,6	58,0	405,5	69,8	533,3	907,9
Biotechnologies	585,1	86,6	115,5	101,1	303,2	888,3	650,2	108,4	147,1	145,0	400,5	1 050,7
Filière électronique (9)	417,4	48,4	299,9	1 919,8	2 268,1	2 685,5	476,1	61,4	332,5	2 600,2	2 994,1	3 470,2
Tiers Monde (10)	1 037,9	204,9	70,7	62,7	338,3	1 376,2	1 166,2	230,9	93,1	77,4	401,4	1 567,6
Emploi - Conditions de travail (11)	85,1	7,9	42,7	3,8	54,4	139,5	93,5	10,4	61,5	5,0	76,9	170,4
Français-Culture scientifique (12)	104,7	5,8	83,2	1 030,5	1 119,5	1 224,2	146,3	10,8	89,4	1 728,1	1 828,3	974,6
Tissu industriel (13)	236,4	36,2	1 152,4	5,6	1 194,2	1 430,6	288,6	40,0	1 215,6	7,9	1 263,5	1 552,1
Total Programmes mobilisateurs (14)	2 804,2	437,8	2 141,3	3 191,4	5 770,5	8 574,7	3 195,5	519,9	2 344,7	4 633,4	7 498,0	10 693,5
Taux de progression 83 -84 (15)							+ 13,9%				+ 29,9%	+ 24,7 %
RECHERCHE FONDAMENTALE (16)	4 968,0	836,1	254,4	1 307,6	2 398,1	7 366,1	5 516,1	907,8	311,4	1 471,2	2 690,4	8 206,5
Taux de progression 83-84 (17)							+ 11,0 %				+ 12,2%	+ 11,4%
RECHERCHES FINALISEES (Total) (18)	2 714,2	398,7	831,0	203,1	1 432,8	4 147,0	3 036,0	451,2	960,5	207,6	1 619,3	4 655,3
Matières premières et transformation (19)	618,8				346,2	965,0	687,6				399,0	1 086,6
Mécanique, productique, électronique, informatique (20)	44,1				119,5	163,6	50,7				138,9	189,5
Agronomie et ressources vivantes (21)	807,0				241,6	1 048,6	918,0				287,5	1 205,5
Santé-améliorations conditions de vie (22)	993,1				320,4	1 313,5	1110,5				328,9	1 439,4
Habitat, génie civil, transports aménagement, environnement (23)	217,1				285,2	502,3	245,0				328,3	573,3
Culture, éducation, organisation (24)	34,1				119,9	154,0	24,2				136,7	160,9
Taux de progession 83-84 (25)							+ 11,9 %				+ 13,0%	+ 12,3%

PROGRAMME DE DEVELOPPEMENT TECHNOLOGIQUE (Total) (26)	1 914,2	10,2	382,7	5 702,8	6 095,7	8 009,9	2 073,4	11,1	614,1	5 724,3	6 349,5	8 422,9
Electronucléaire (27)	1 662,7			1 127,7	1 127,7	2 790,4	1782,0			1 312,0	1312,0	3 094,0
Espace (28)	219,8	2,3		1 968,2	1 970,5	2 190,3	256,7	2,6		2 660,1	2662,7	2 919,4
Aéronautique (29)			343,0	2 569,0	2 912,0	2 912,0			544,0	1 743,0	2 287,0	2 287,0
Océans	31,7	7,9	39,7	37,9	85,5	117,2	34,7	8,5	70,1	9,2	87,8	122,5
Taux de progression 83-84 (30)							+ 8,3%				+ 4,2%	+ 5,2%
MOYENS INDIRECTS (31)	2 815,2	898,7	59,7	655,2	1 613,6	4 428,8	3 156,9	928,4	47,8	702,8	1679,0	4 835,9
Taux de progression 83-84							+ 12,1%				+ 4 %	+ 9 %
TOTAL GENERAL	15 215,8	2 581,5	3 669,1	11 060,1	17310,7	32526,5	16977,9 (%)	2818,4 (%)	4 278,5	12739,3	19836,1 (%)	36 814,2
Taux de progression 83-84							+ 11,6%				+14,6%	+ 13,2 %
(32) dont : musée des sciences et des techniques, et informatisation (fonds propres) (cf. programmes mobilisateurs)	(80,5)	-	-	(1 520,0)			(120,0)	-	-	(2 720,0)	(2720,0)	

(33) (%) compte non tenu du reclassement de 94,2 MF de DO en soutien des programmes (frais de déplacement/EPST)

[JPRS note: The above charts are reproduced from the French source. English usage would call for periods rather than commas: thus 337,6 million (Fr) would be 337.6 million (US).]

[Key on following page]

Key to tables:

1. Basis for programming
2. In millions of francs
3. DO = Operating expenses
4. Program authorizations (AP)
5. SP = Program support
6. Incentives
7. Other Program authorizations
8. Promotional programs
9. Electronics channel
10. Third World
11. Employment, working conditions
12. Industrial fabric
14. Total promotional programs
15. Rate of progression 1983-1984
16. Basic research
17. Rate of progression 1983-1984
18. Finalized research
18. Raw materials and processing
20. Engineering, production, electronics, data processing
21. Agronomy and living resources
22. Health, improvements in living conditions
23. Housing, civil engineering, transportation, development, environment
24. Culture, education, organization
25. Rate of progression 1983-1984
26. Technological development program
27. Nuclear power plants
28. Space
29. Aeronautics
30. Rate of progression 1983-1984
31. Indirect means
32. Including: Museum of Science and Technology, computerization (own funds) (see: promotional programs)
33. (M) Not considering reclassification of 94.2 million francs in DO in program support (moving costs/EPST [possibly Public Scientific and Technological Establishment])

the research tax credit; and financing of the research personnel status, which will be implemented effective 1 January 1984.

Finally, there will be selectivity with respect to certain allocations: fewer studies and more operational credits; the creation of posts for research workers (334 more, up 1.9 percent), ITA [engineers, technicians, administrative personnel] (266 more, up .6 percent); concentration of new operation measures on training through research (increase in the annual influx of research allocations, which will be increased to 1,800 at the start of the 1984 fiscal year; and the creation of an additional scholarships for engineering doctorate candidates).

In terms of programming, net priorities emerge in favor of: basic research, which shows an increase of 12.8 percent (or 5.7 percent in volume); four promotional programs (electronics, up 32 percent; biotechnologies, up 32 percent; employment and working conditions, up 41 percent; and cooperation, up 18 percent); two technological development programs (space, up 35 percent; nuclear power plants, up 16.3 percent); and two groups of finalized research (agro-food industries; transportation and housing).

Reform of Research Professions

1 -- The law of 15 July 1982, concerning orientation and programming, provided for the appointment of personnel associated with research organizations and the upgrading of careers. Such orientations still had to be carried out.

"As soon as I took office, I went about carrying out that important reform," Fabius said.

"Negotiations with trade union organizations were undertaken at the beginning of July concerning the basis for the government arbitration that I had requested."

The movement is already well underway. Nine working meetings have already been held with trade union representatives.

The issue is an important one:

First of all, it is a question of finding a proper balance between implementation of the principle of civil service appointment and the continuation of waivers preserving the specificity of research work.

Second, it is a matter of achieving the objective of upgrading careers without compromising the balance of the civil service.

Finally, it is a matter of outlining common rules for all personnel (the only guarantee of real mobility between agencies and organizations), without banning certain adaptations in terms of the individual characteristics of organizations.

2 -- The following have been achieved:

1) official civil service status by 1984 of all personnel wishing it;
2) opening of the reform to all EPST personnel, but also to personnel in government research departments; 3) the establishment of a revised and simplified salary scale; and recognition of waivers preserving the flexibility of operations.

"Current negotiations with trade unions and the different ministries involved aim to improve and complete provisions. All of this is difficult and naturally deserves reflection and discussion, but I am optimistic about keeping to the schedule I have set: putting through the reform before the end of the year."

Structural Reforms

1 -- Two new research poles will be set up: on the one hand, IFREMER [presumably French Ocean Research and Studies Institute], which will join together the ISTPM [Scientific and Technical Institute of Maritime Fishing] and the CNEXO [National Ocean Development Center]; and on the other hand, CIRAD (International Center of Agronomic Research for Development), which will bring together all organizations with the most diverse status dealing in tropical agronomy.

2 -- The main public research administration establishments will be set up as the EPST. This new framework will permit two noteworthy improvements in procedures: reduced financial control; and the grouping of operating credits.

Heads of research units will be able to use their overall allotment without previous consent and proceed themselves to make decisions necessary regarding the support of programs themselves, projects and the purchase of major and minor equipment. In this way, greater flexibility of management will be achieved, as provided by the law.

3 -- The establishment of GIP [public interest groups] will make it possible to develop combined action of research activities and industrial development. Several possibilities are now being studied: the "time frequency" GIP; the GEMONOD GIP between the CNEXO and the CEA [Atomic Energy Commission]; the "cloistered" GIP in Montpellier; the "effects of physical exercise" GIP grouping the CNRS [National Center for Scientific Research], INSERM [National Institute of Health and Medical Research] and the university.

Budgets of Major Research Organizations (in millions of francs) (as they appear in the civilian research and development budget of the Ministry of Industry and Research)

CNRS and national institutes	7,436.4
CEA	6,001.9
CNES [National Center for Space Studies]	3,623.6
INRA [French National Institute of Agronomic Research]	1,873.3
INSERM [National	1,371.7
Pasteur Institute, Paris	194.2
Pasteur Institute, overseas	20.7
Pasteur Institute, Lille	9.6
IFREMER (CNEXO, ISTPM)	618.0
AFME [French Energy Management Agency]	274.7
ADI [Data Processing Agency]	31.8
INRIA [National Data Processing and Automation Research Institute]	198.2
ORSTOM [Overseas Science and Technology Research Office]	576.8
GERDAT (CIRAD)	388.7
ANVAR [National Agency for the Implementation of Research]	972.5

To this one should add funds allocated to the BRGM [Bureau of Geological and Mining Exploration] (155.6 million francs), primary metrology laboratories (24.9 million francs) and studies on mineral resources of the oceans (29.1 million francs).

The CNRS and the national institutes are the main beneficiaries of the net creations of new jobs. They will divide up 375 new posts. Following them, based on the number of jobs created, are: the Villette Museum and the National Consumers Institute (110), INSERM (93), INRA (76), national education (67), the CNES (50), the CEA (33), ORSTOM (20), CIRAD (formerly GERDAT) (14), the Mining School (12), and finally, the CNEXO and INRIA (10 each).

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ERICSSON INFORMATION SYSTEMS OUTLINES NORTH AMERICAN STRATEGY

Copenhagen NORDISK DATA-NYTT in Swedish 25 Apr 83 p 39

[Interview with Ericsson Information Systems Vice President Hakon Ledin by Erik Mansson; date and place not given]

[Text] The first year went better than expected for Ericsson Information Systems (EIS). So said Vice President Hakon Ledin in an interview with NORDISK DATA-NYTT.

Now they are putting a strong emphasis on the export market: West Europe--but also the United States.

"We have to be there," said Ledin. In this interview he reveals the plans for Ericsson's strategy for the U.S. market.

But there are also dark clouds for Ericsson. One of them is the wage-earner fund proposal.

"Unfortunately that puts a damper on investments."

At this moment Hakon Ledin is happy about EIS gains in England. An order for 100 Alfascopes from Hitachi will be one of Ericsson's most important references in the sales efforts there.

"We are now about to break through in England in the Alfascope area."

But it is no easy task to break into new markets.

[Question] How does one break into the English market?

[Answer] The Alfascope is plug-compatible. And of course it is also based on the fact that there is a big IBM market and we can go in and price ourselves lower than IBM.

We must also compete with features. One advantage we have is that we are not tied to main frames.

The third factor is biotechnology. We are not as unique there as we were just a few years ago, but we have a leading position when it comes to biotechnology.

[Question] When you say that you must reduce prices, does this mean that one has to pay the cost to get an introduction?

[Answer] Yes, that is obvious. To build up a sales apparatus and a service system that functions well also takes a large bite. It takes a basic investment in order to be able to go in and sell anything.

(Hakon Ledin became head of EIS on 1 January of last year. That was when the new division within Ericsson was formed, among other things through the acquisition of DataSaab.)

(And Hakon Ledin thinks that the new amalgamation has done well. DataSaab was, despite losses, on the right course when the purchase was made. And with Ericsson behind it, the firm has achieved a stability that has given it a push.)

(The fact that Ericsson now stands behind the Alfascope has given the product a considerably greater credibility on the market. So now Alfascope is going well.)

(Last year EIS had sales of 7.1 billion kronor, 27 percent of Ericsson's total sales.)

(Since DataSaab got backing from Ericsson, the emphasis on exports has increased. Ericsson is accustomed to working in an international environment.)

[Ledin] DataSaab was established in the Nordic region and stumbled around in Europe. We have managed to correct that and put a stop to it. Now things really look as if they are under control in Europe.

(The same is true of Facit, which Ericsson also took over.)

[Ledin] The Nordic region is our home market. The next step is to make sure that we become strong in western Europe, although we also have a strategy for the United States.

U. S. Campaign

[Question] What does your U.S. campaign look like? Are you planning new cooperation partners in connection with that or will Anaconda-Ericsson be the base for the U.S. campaign?

[Answer] No, it is the base. And we simply must be in the United States. Partly because the market is big and partly because it is so dynamic. Deregulation of the telephone market there also gives us better opportunities, of course.

[Question] But how are you going to handle the entire United States?

[Answer] We will concentrate our activities, both geographically and with regard to our product assortment! Private communications units in which the MD 110 and Eripax are the cornerstones, but also bank terminals.

[Question] And geographically?

[Answer] The New York area. We are trying out the market for Alfascope and we have been concentrating on New York for 6 months now. The dramatic change in the exchange rate of the dollar has given us a competitive advantage we did not have before.

[Question] And what about cooperation with others?

[Answer] The United States is such a big market. We cannot build up a sales network on that market covering all areas. If we can find others who want to market our products, for example, we must be open to cooperation.

We have a fairly open attitude. But at the same time we are well aware that we have neither the energy nor the means to take on something that might require too many rearrangements.

(The former DataSaab effort to emphasize exports to the East has been scrubbed entirely.)

Eastern Europe is totally without interest. It really would not pay to put our resources into that.

Our chances of expanding in western Europe and the United States are so very much larger.

[Question] When EIS was formed, did you have market and market share projections? On which points have you had to adjust them?

[Answer] Any adjustments would have to be upward. We were talking about 15 percent growth per year and we have exceeded that. It is true that this includes the acquisition of Facit, but that was part of our plans.

Our volume this year is between 6 and 7 billion--and that is where we were planning to be sometime in 1985-86.

[Question] So the acquisition of Facit was part of your plans from the very beginning?

[Answer] No. But when we were planning our strategy around 1980, we were well aware that we could have to complement our expertise through co-operation or the acquisition of other firms.

DataSaab was a very natural potential partner. But we were relatively cool toward Facit.

But when we saw the Ericsson and Facit could fit in together quite well, and at the same time the merger with DataSaab went more quickly than expected, the idea was born.

Developments so far this year indicate that we did the right thing.

Cooperation with Telecommunications Agency

[Question] How is the cooperation with the Telecommunications Agency going?

[Answer] It is not quite as simple to cooperate as it was before, because there are conflicts on the market that we did not have before. At the same time we do have a very close cooperation, for example the MD 110.

The market picture changes all the time. We are out on the market with the Teletex 10. The monopoly on teletext ends on 1 November and one can very easily foresee an Alfascope that can communicate in a teletext system.

(It can be difficult for Ericsson at times to sell products on the export market when they do not have them in functioning systems in Sweden. The Telecommunications Agency and Ericsson quite simply have different strategies!)

But that is not a conflict, it is more like a balancing act.

Wage-Earner Funds and Uncertainty

(Ericsson, which is a profitable enterprise, also has to ponder over the limitations imposed by politicians.)

[Question] What does it mean for a company like Ericsson, which has to invest a lot, that they propose wage-earner funds, provisional profit funds and so on?

[Answer] It reduces our opportunities to develop our business. That is taxing, quite simply. It erodes our resources.

This is one of the biggest problems we have! Evaluating where this thing with wage-earner funds is heading. I feel it is an element of enormous uncertainty.

[Question] Does it affect investment interest?

[Answer] It reduces investment interest. Investments, after all, are a summation of risk evaluations balanced against an economic calculation. In such calculations, wage-earner funds are included as an element of risk.

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FINNO-SOVIET R & D FOR FLEXIBLE MANUFACTURING SYSTEMS

Helsinki UUSI SUOMI in Finnish 21 Sep 83 p 21

[Article: "Long-Term Joint-Collaboration Agreement With the Soviet Union for Valmet"]

[Text] Valmet has concluded a large-scale joint-collaboration agreement with the Soviet Ministry of Machine Tool and Tool Building Industry and Stankoimport on production systems based on so-called flexible manufacturing technology. They said at Valmet that the agreement among other things includes automatic shipping systems, automatic storage facilities, special machine tools and special work centers.

According to Valmet, the agreement is aiming for far-reaching collaboration between the two partners in production and marketing. It will be in effect for 8 years at first and thereafter it can be extended far into the future in 5-year terms.

Behind the agreement is collaboration aiming at a long-term program between the two countries, one important aspect of which is the development of efficient production and systems relating to it as cooperation between the two partners.

In the field of marketing Valmet will be responsible for the marketing of jointly produced systems in Finland and Scandinavia and Stankoimport in the Soviet Union and the CEMA countries.

Flexible manufacturing system technology is one of the machine tool industry's newest directions of development. As both a system developer and equipment manufacturer, Valmet has been one of the pioneers in this manufacturing technique and the company's Linnavuori plant is the leading manufacturer of special machine tools in the Nordic countries.

At Valmet they said that commercial cooperation will begin immediately on the basis of the collaboration agreement.

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