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West Europe Report

SCIENCE AND TECHNOLOGY

(FOUO 11/81)

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CONTENTS

BIOTECHNOLOGY

'BIOTECHNOLOGIES' TASK FORCE CREATED AT DGRST

Paris LE PROGRES SCIENTIFIQUE in French Mar-Apr 81 pp 3-5

[Text] The idea of exploiting the power of synthesis of the living cell, a true chemical plant whose programming proves to be modifiable at will, is responsible for the rapid progress of biotechnologies with industrial aims.

The government wants our country to methodically develop the study, research, and applications of biotechnologies in all relevant national activity sectors.

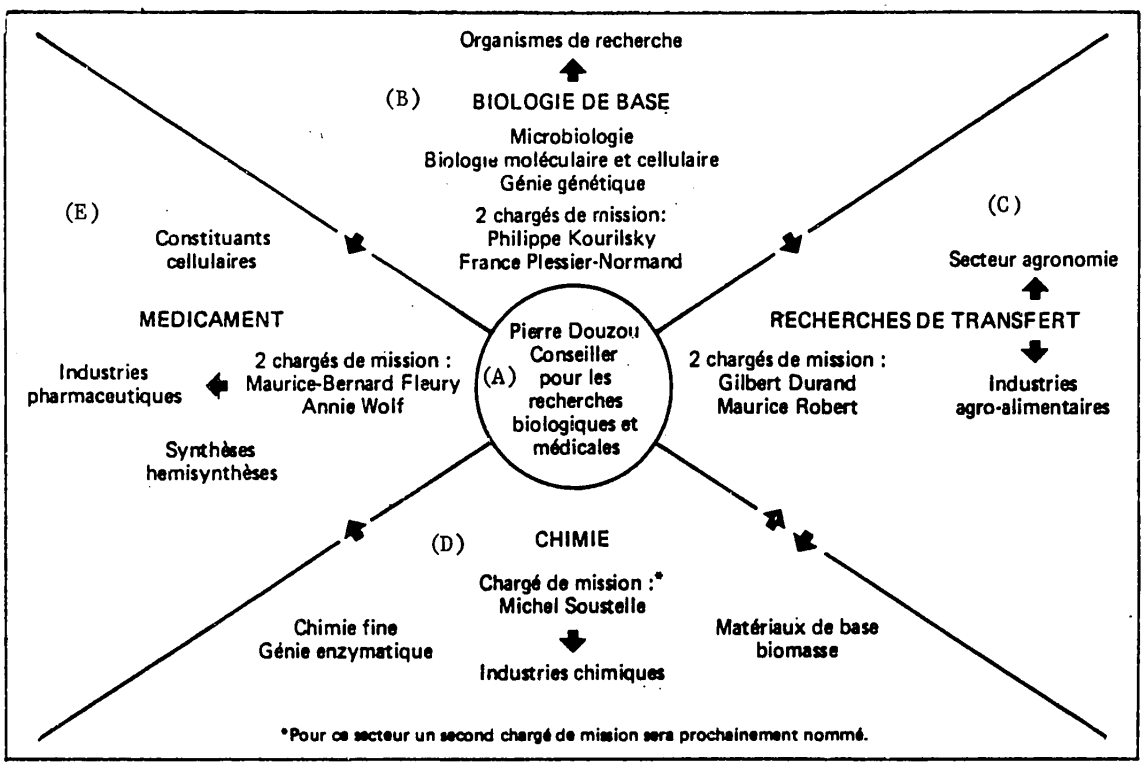
To this end, the state secretary for research has asked DGRST (General Delegation for Scientific and Technical Research) to form a Biotechnologies Task Force capable of making all necessary efforts to develop appropriate research in the public sector, and to bolster the scientific competence of industrial laboratories.

The intensified basic research and its achievements must thus go hand in hand with the transfer of knowledge and know-how from fundamental research to industry, whom the authorities are in fact encouraging to resolutely step on a road which will lead to a bio-industrial revolution.

Organization of the Biotechnologies Task Force

The Biotechnologies Task Force is a group which gathers the four DGRST sectors concerned with upstream research on living cells and with transfer of this research for industrial exploitation. Each sector has an interface with at least two adjacent sectors and is open to the outside, with the goal of dealing with the various occurrences of biotechnologies in association with such interested organs as CNRS (National Center for Scientific Research), INSERM (National Institute for Health and Medical Research), INRA (National Institute for Agronomic Research), universities, and industry.

In addition, for all matters concerning relations with the industry in the areas of chemistry, pharmaceuticals, agronomy, and agricultural food products, this structure is widely open to the Orientation Committee for the Development of Strategic Industries (CODIS) and the National Agency for Research Valorification (ANVAR). This strategic aspect is essential to the extent to which the Biotechnologies Task Force of DGRST is upstream of development and intends to compete in industrial innovation.



Key: (A) Pierre Douzou, counselor for biologic and medical research
(B) Research organs
BASIC BIOLOGY
Microbiology
Molecular and cellular biology
Genetic engineering
Two task-force leaders: Philippe Kourilsky
France Plessier-Normand
(C) Agronomy sector
TRANSFER RESEARCH
Agricultural food industries
Two task-force leaders: Gilbert Durand
Maurice Robert
(D) CHEMISTRY
Task-force leader*: Michel Soustelle
Fine chemistry
Enzymatic engineering
Biomass basic materials
Chemical industries
* A second leader will be named for this sector in the near future
(E) Cellular components
PHARMACEUTICALS
Pharmaceutical industries
Synthesis and semi-synthesis
Two task-force leaders: Maurice-Bernard Fleury
Annie Wolf

These actions are thus conducted jointly with the Ministry of Industry (notably ANVAR) and the State Secretariat for Agricultural and Food Industries, and are deliberately open to the industrial sector.

Tasks: Personnel Training

Through a voluntary policy of training scholarships;

Through the organization of courses and training study programs in laboratories that are already specialized;

Through encouragement to reconvert the methods and study topics of tenured researchers and teams in research organizations and universities.

This policy is carried out in concert with interested research organs and universities.

Basic Biology (Concerted Actions)

Increased effort in advanced molecular and cellular biology, as well as in genetic engineering;

Development of research in basic microbiology;

Transfer of knowledge acquired with micro-organisms, to animal and vegetal cells;

Directed actions on essential components of cells, with a view to making them available for all suitable utilizations (oligonucleotides, hybridomes, interferon, enzymatic systems, and so on).

Transfer and Finalized Research

Primarily concerned with overseeing the development of such "centers of excellence" as the Institut Pasteur and the laboratories of the universities of Compiegne, Strasbourg, and Toulouse, as well as the installation of a center at Grignon.

The finalized research concerns mainly the area of fermentations, and finds its application in agricultural food product problems. Biomass is also considered as interfaced with chemistry.

Chemistry

Obtain basic materials: this means an exploitation of the biomass in its chemical context, rather than exclusively with its energetic potential.

Fine chemistry: as a priority, the use of enzymatic engineering to innovate basic chemical products, as well as products of therapeutic interest, some of which are of a cellular nature.

Pharmaceuticals

In this domain, the Biotechnologies Task Force devotes itself to exploiting the implications of basic biology and chemistry.

Its policy consists of remaining in constant contact with the companies interested in this question, of supplying information, and issuing bilateral contracts.

Logistics

Creation and development of cell banks and their components. Voluntary policy for production, stocking, and distribution of monoclonal antibodies and nucleic components.

These actions will be conducted in coordination with interested organs.

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CSO: 3102/415

ENERGY

FRG, POLAND FOUND JOINT COAL CONVERSION RESEARCH CENTER

Duesseldorf STAHL UND EISEN in German 27 Jul 81

[Text] A joint research center for coal refining has been established by the Alfried Krupp von Bohlen and Halbach Foundation, Essen, and the Ministry for Science, University Curricula and Engineering of the VRP.

The agreement was signed in Essen on May 13, 1981, by Berthold Beitz, chairman of the Board of Curators and member of the Board of Business Management, of the Alfried Krupp von Bohlen and Halback Foundation and by Dr. Habil. Janusz Gorski, Minister of Science, University Curricula and Engineering of the VRP. The Krupp foundation is participating with DM 15 million and the Polish Ministry of Science with 250 million zloty.

The agreement runs until 1990. It controls the joint scientific and scientific-engineering effort in the field of coal refining. The research center will be set up as an independent unit at the Silesian Technical University where good prerequisites already exist for undertaking the research work. The direction of the research is determined by an 8-member council composed of equal numbers of leading scientists and experts from both countries. The research results will be fully available to both the Polish Ministry of Science and the Krupp Foundation.

The initial research work will be focused primarily on the development of a special coal gasification process for producing various gases which will be used for heating in energy production and as a raw material in the chemical industry.

A broad base will be laid for the joint effort through conferences and symposia involving scientists and experts from the two countries. Further, an attempt will be made to exchange researchers between the research facilities of the respective host countries.

9160
CSO: 3102/407

ENERGY

NEW GASIFICATION METHOD PROCESSES ALL TYPES OF COAL

Duesseldorf STAHL UND EISEN in German 27 Jul 81 p 32

[Article: "High-Grade Gas From all Types of Coal"]

[Text] At KHD Humboldt Wedag AG a new coal gasification process is presently being developed to operational maturity. It exhibits special advantages and the facility is relatively simple to build. With this process, which is based on the process known as autotherm coal gasification in an iron bath, a high-grade gas is produced which contains in general only carbon monoxide and hydrogen and is almost free of sulfur components and carbon dioxide. Thus, in many cases it can be used directly without additional washing.

Based on extensive research and development work, a facility will be built for large-scale tests of the Humboldt coal gasification process. It will gasify 10 t of coal per hour at a pressure of 10 bar and a temperature of 1,350 to 1,4000 deg C; this amounts to a volume of about 20,000 m^3 (i.N.)/h. From the operation of this installation, whose start up is planned for the end of 1982, the data and experience required for large-scale application of the process will be acquired. The development project will be completed in 1984 at the latest.

The Humboldt coal gasification process is based on the dissolution of carbon in molten iron with subsequent reaction of the carbon with the gasifying medium. The gasification reactor is a refractory-lined container with a molten-iron bath. Finely powdered coal with a transport gas and lime with oxygen are injected into the iron bath through cooled, complex jets. Yet other gasifying media such as air, steam and carbon dioxide can be introduced at the same time through the complex jets. The gasification process runs on the injected coal, lime and gasifying medium; however, the iron is not consumed in the process. The raw gas is largely freed from dust in a hot-gas particle separator; and the nongasable constituents are continuously extracted from the reactor as carbon-free molten slag which is crushed after cooling.

The Humboldt coal gasification process has several distinct advantages compared to many other processes. All types of coal can be used irrespective of their properties such as cokeability, volatile constituents, ash and sulfur. Since the coal is completely converted in the gasifying process at high temperatures, there are no byproducts.

Because of its favorable composition, the gas is exceptionally well suited as a starting material for various chemical-synthesis processes.

In addition, the raw gas is practically free from oxidizing components such as carbon dioxide, steam and sulfur compounds and can therefore be used for example in direct reduction installations without having to be washed as an intermediate step. Due to the extraordinarily low sulfur content (below 20 ppm), the gas is well suited for use in combined gas-steam turbines for generating electricity.

With over 98 percent carbon conversion, the process exhibits a high specific efficiency in gas production. According to the present state of knowledge, a reactor can generate a gas-volume rate of more than 200,000 m^3 (i.N.)/h.

Additional information can be obtained from KHD Humboldt Wedag AG, Postfach 910457, D-5000 Cologne 91, FRG

9160
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ENERGY

WIND POWER PLANT CONNECTED TO NATIONAL GRID

Milan IL SOLE-24 ORE in Italian 25 Jul 81 p 4

[Article: "The Cagliari Wind Power Plant Inaugurated--The First Sardinia Wind Goes into the ENEL (National Electric Power Agency) Network"]

[Text] Cagliari--For the first time in Italy, the energy produced by a wind generator has been put into the national electric-power network. It is the first step in the ENEL project called "wind-sails for electricity," a vast research program that has involved experimentation and practical application in Sardinia at Santa Caterina, a locality in the commune of San Giovanni Suergiu, close to the southwest coast.

In presenting the wind-power generator, the president of ENEL, Francesco Corbellini, said that the experimental plant represents the first phase in the electric-power company's wind-power strategy and marks an exceptionally important occasion. The program's aim is to arrive, in successive stages, at the building, in Sardinia, of a 500-kilowatt wind power plant composed of 10 FIAT-ENEL windmills of 50 kilowatts each, and subsequently to develop large-size machines (rotor diameter of about 100 meters, power of 4,000 kilowatts).

"Before the end of 1982," Corbellini said, "ENEL will put the 10 windmills into operation in the power plant built in the high Nurra, in the Sassari region."

The "wind-sails" project is the logical outcome of the results achieved through technical-economic studies that demonstrated that at suitable sites, wind power is the most competitive of the renewable energy sources. With regard to costs, the president of ENEL stressed that a kilowatt produced by the use of wind presently costs 100 lire as against 70 lire for gas-oil and 25 lire for nuclear power. Among the renewable sources, the exploitation of wind, even if technical difficulties remain to be overcome as regards the big windmills, is very advantageous--certainly more advantageous than exploitation of colar energy.

"With the photovoltaic system to which ENEL is devoting a lot of attention," Corbellini said, "it would not be possible to get below 250 lire per kilowatthour. The anemological map of Italy shows that Sardinia is in an especially favorable position, having a wind regime particularly well-adapted to exploitation."

11267
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INDUSTRIAL TECHNOLOGY

ITALIAN EXPERTS WORK ON ROBOTS WITH TACTILE CAPABILITY

Milan EUROPEO in Italian 13 Jul 81 p 46

[Article by Carlo Arcari: "Hey, Robot, Let's Shake Hands--Three Italian Experts Are Inventing New Automata, with a Very Human Sense"]

[Text] The "electronic hand" will be covered with a special plastic material full of sensors. This will enable it to recognize objects, and the robots will thus have the sense of touch. Science fiction? No, simply the latest frontier in research on robots.

"The idea came to me while I was watching the workers of Olivetti," says engineer Pier Carlo Pinotti, a specialist in automation and robotics," who for 8 hours at a stretch pick and put together typewriter parts of various kinds, which are all mixed up in the boxes under the cutters. It is work that the workers now do without even looking at the pieces, using touch only."

By touch, we can perceive the state of an object without seeing it: with the hand, we recognize whether an object is hot or cold, hard or soft, of metal or plastic, and we identify shapes. When we touch it, its image appears clearly on our private monitor (the brain), together with all the memories that relate to it.

But touch is all a question of skin: and to widen the sensorial sphere of robots, it is necessary to recreate this sensitivity with an artificial material, combining robotics and bioengineering. This is what, alongside Pinotti, two researchers of the Piaggio Center of the University of Pisa--Danilo De Rossi and Paolo Dario, bioengineers who have been working for some time on "sensors" for biomedical applications--are trying to do.

To achieve the "electronic hand," the three specialists will exploit the properties of PVF2 (polyvinylidene fluoride), a thin film of transparent plastic which, subjected to pressure, can emit an electrical field. This characteristic of PVF2 has already been used in making a catheter which, inserted to reach the aorta, measures flow pressure and cardiac sounds.

A thin covering of PVF2 full of sensors will constitute the palm of the robot's hand. The sensors are electrodes of aluminum or chrome and gold, stamped onto the plastic by a special process, and differ in type depending on the datum to be perceived (pressure, ultrasonic waves, temperature variations, etc). "It is important to emphasize," Pinotti further states, "that these sensitive plastics will make it

possible to recognize objects in far shorter times than with the optical systems with television cameras."

The robots that "see" represent the second generation of the automata and are about to take the place of the "stupid" ones that work in factories today. With their television eyes, these robots can analyze the scene in which they are working and can decide what to do when confronted with occasionally differing situations. But sight is a complicated sense, and the analysis work obtained thourgh a television camera by an artificial intelligence is long and laborious and takes up too much of the computer's time.

The piezoelectric polymers (the sensitive plastics) will not be used only as sensors --that is, as "skin." Some researchers are already thinking of producing real muscle masses with these materials. How? "By working with polyacrylamide 'gel'," replies engineer De Rossi--"a collapsible plastic material that can contract or relax on command."

The idea is to produce with this material capillaries which, once filled with a saline solution and subjected to a field of electrical voltage, can "collapse" (that is, lose pressure) in a controlled manner. "The thinner the capillary is," De Rossi explains, "the faster the contraction is, the values of which can be made similar to those of human muscles."

Today the Pisa bioengineers are working along with the University of Genoa research group that has made an optical system for robots which is very similar to the human one (EUROPEO, No 41, 1980). Thus, with eyes from Genova and skin and muscles from Pisa, will the Cipputi of Duemila be born?

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CSO: 3102/382

TRANSPORTATION

THREE MAIN PARTICIPANTS MEET TO DISCUSS NEW AIRBUS A 320

Paris AIR & COSMOS in French 29 Aug 81 p 8

[Text] The French minister of transport, Mr Charles Fiterman, met with the British secretary of state for industry, Mr Normal Tebbit, and the West German secretary of state for aeronautics cooperation, Mr Martin Gruner, in London on 17 July. The purpose of this meeting was to discuss the Airbus program.

The A 320 program was officially brought up for the first time. Although the French authorities had had the matter referred to them by AEROSPATIALE [National Industrial Aerospace Company], neither the British authorities not the German authorities had been approached regarding it by British Aerospace and MBB [Messerschmitt-Baldow-Blohm] respectively. Following the 17 July meeting, the governments requested the industrialists to submit their proposals. The ministers will meet again before the end of this year specifically to examine customer reactions to the A 320 project, which has already signed up Air France (25 planes on conditioned order, 25 on option).

British Aerospace may already have submitted its A 320 report to the British authorities by the time this article appears in print. It is known that the British company would like to develop the front end of the plane but would also want to take over its assembly at its Filton plant. However, to take 30 percent of the work involved in the program, British Aerospace must invest over 250 million pounds in the project in the near future. Furthermore, from the standpoint of efficiency, it would seem preferable to maintain the present areas of specialization within the Airbus Industrie group, that is, assembly operations at Toulouse and the fabrication of the flying surfaces in Great Britain.

Essentially, the current talks on the A 320 revolve about the availability of the engines and the payload-to-total weight ratio. Exchanges of views are continuing between Airbus Industrie and the airlines. The carriers, however, are manifesting a certain reserve attributable to current difficulties in the air transport situation.

Mr Fiterman's visit to London was discussed at the 30 July meeting of the Council of Ministers. The communique issued at the conclusion of that meeting states that

Mr Fiterman "is gratified to report that the joint intent of developing European cooperation in the field of aeronautics was confirmed and the importance of the 150-passenger A 320 construction project, to which he attaches great interest, was noted. The industrialists concerned will be invited to submit without delay the necessary detailed proposals in this matter."

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CSO: 3102/420

TRANSPORTATION

FIRST A 310 NEARS COMPLETION, A 300 SALES REACH 150

Paris AIR & COSMOS in French 29 Aug 81 p 20

[Article by J.M.]

[Text] The roll-out of the B 767 in Seattle (see preceding pages), which will be in the air in a few weeks, prompts an examination of the status of its competitor, Airbus Industrie's A 310.

The final assembly of the first A 310 is now in progress at Toulouse (the AEROSPATIALE PLANT at Saint-Martin). The first sections of the fuselage, as we know, arrived at Toulouse, fully equipped as a "Super Guppy," on 9 May (forward section 13-14 from VFW [Vereinigte Flugtechnische Werke]), on 15 May (center section 15-21 fabricated by MBB [Messerschmitt-Baldow-Blohm] and AEROSPATIALE [National Industrial Aerospace Company] at Saint-Nazaire and Nantes), and on 29 June (rear section from MBB). Their assembly with sections 11 (cockpit) and 12, fabricated at Toulouse and Nantes, commenced immediately. By the beginning of July, the fuselage of the first A 310 had neared completion at Saint-Martin. The horizontal tail unit has just been put into place. The flying surfaces, the first set of spars for which left British Aerospace's Chester plant on 17 May for VFW's Bremen plant to be equipped there with its moving elements (fabricated in Germany, Belgium, France and the Low Countries), has been shipped to Toulouse in the last few days and will be joined to the fuselage during September. The vertical stabilizer and the landing gear (delivered by Messier-Hispano-Bugatti) will be put in place in October, and the plane will then be visible as a whole, while its final equipment and test instrumentation array is being installed. After checking out all its systems, it will be ready for roll-out (end of October), its first flight still being scheduled for the end of March or the very beginning of April. Prior vibration tests will have begun around mid-December.

The fabrication of the following planes is also well advanced: the second prototype goes into its final assembly stage at the end of this month, that of the joining of the various fuselage sections, the last of which is to be delivered in October. The flying surface spars for this plane left Chester for Bremen on 22 July and the complete wing is to arrive in Toulouse on 1 November. This second A 310 will fly by the end of April 1982, thus some weeks after the first A 310; the third A 310 is to fly by the end of July.

The first operational tests of the flight controls and of the landing gear will be made on the general test bench at Toulouse, which has already been used for the A 300 and which will be used subsequently for the A 300-600.

In view of the decision announced by Kuwait Airways in July to modify its previous order for 11 A 310's with Pratt and Whitney engines by "transforming" three of these A 310's in as many A 300 C4-600 (convertible version), Airbus Industrie, on 31 July, reported the sale of 153 A 310's (79 firm orders and 74 options) to 11 companies. Three of these companies (Air France, Lufthansa and Kuwait Airways) have ordered A 300's as well as A 310's.

Middle East Airlines, whose orders have remained entirely in suspense, could not be included in the official list of orders published by Airbus Industrie, since, although the decision in principle was made to purchase 19 A 310's (5 + 14), the signature of the contracts has been delayed until the end of September; which, however, did not keep Pratt and Whitney from announcing on 7 August an order from MEA for the engines necessary to equip these planes.... Potentially, therefore, the A 310 has been chosen by 12 carriers, totaling 172 A 310 orders (84 + 88). Pratt and Whitney has been chosen by six of these carriers, representing a total of 65 planes (32 + 33) to be so equipped. All the rest will be equipped with General Electric CF6-80A engines.

As regards the A 300, two planes were delivered on 24 July: one on 24 July to Malaysian Airline System (fourth A 300 B4-200), the other on 29 July [as published] to Olympic Airways (sixth A 300 B4-100). As of 31 July 146 A 300's (100 type B4's, 46 type B2's) had been delivered to 28 airline companies.

The 150th Airbus will be delivered in the very near future.

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END