

ParisRegion

CHRONICLE

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Special issue - November 2013

SUSTAINABLE DEVELOPMENT IN THE PARIS REGION

What is the ambition of the Paris Region? To ultimately become Europe's leading eco-region. Succeeding in this challenge requires the city to evolve into a sustainable city, and even a smart city. In achieving this goal, the region can rely on many powerful assets: extensive R&D capabilities, many sustainable development projects and, most importantly, a large number of companies, from leading corporate groups to SMEs, which are market leaders in the disciplines that go to make up the sustainable city.

SYLVIE MIGNARD

The Paris Region is home to nearly 12 million people; that's 19% of the entire population of mainland France. Paris and its inner suburbs alone contain 57% of Paris Region residents, which illustrates the urban density of a region where 80% of the land remains undeveloped. Succeeding in the social, economic, environmental and cultural challenges posed by the sustainable city concept is therefore a priority. The Paris Region's public bodies, local authorities and companies are decisively committed to implementing solutions to reduce the region's eco-footprint and protect or reinstate its natural environments. The focus for this commitment is a single clearly stated goal: to become Europe's leading eco-region. This ambition involves many different projects, with particular focus on eco-technologies, eco-construction and eco-mobility, all of which are sectors in which Paris Region companies, from corporate groups to SMEs, perform particularly strongly.



IssyGrid, the smart power distribution system

IssyGrid adopts a holistic response to the need to save energy in ways that can also be used at district level by combining construction with new technologies. Issy-les-Moulineaux is the first community in France to have begun the process of installing an operational smart grid. The five-year project to develop the IssyGrid smart grid began in 2011. First introduced in the Seine Ouest business center (nearly 10,000 people in an area of 160,000 m²), it was extended this year to the Fort d'Issy digital eco-community, and will continue to be rolled out until it covers all of Issy-les-Moulineaux.

This project, which combines energy generation from renewable sources with an energy

accuracy enables real-time decision-making for traffic management, as well as providing the data needed to inform passengers how long they can expect to wait for the next service, and the time at which they can expect to arrive at their destination.

cutting-edge technological and industrial solutions. "We make a distinction between the sustainable city and the smart city," explains Sophie Donabedian, Business Development Director Smart Cities at Schneider Electric. "In the sustainable city, a number of initiatives are implemented to make the environment more eco-friendly and limit the use of natural resources. This can take the form of constructing low-energy buildings, for example. However, if we connect these buildings to their environment, then they become 'smart'. So we believe that the aim of the smart city is to use new information and communication technologies to move even closer to sustainability by connecting objects together and sharing resources and uses."

Schneider Electric breaks down this approach into three stages. The first of these is optimization, especially in terms of electricity, gas and public transit systems. The second is integration, which interconnects disparate systems. Taking public lighting as an example (public lighting often accounts for 50% of city electricity bills), this means not being content with simply switching lights on or off, but incorporating them into a system that adapts to meet demand in response to traffic, incidents or simply the weather. The third and final

stage is transformation, which goes beyond improving infrastructures to change their uses.

The company has many tools at its disposal to achieve this. "For example, we offer traffic management software tools that enable the self-adaptive coordination of all traffic lights in a city," continues Sophie Donabedian.

"Real-time management of traffic lights on the basis of traffic data can reduce journey times and congestion by between 15% and 20%. In Barcelona, we have installed an IT platform that provides the full range of real-time data for traffic, bus and tram times, parking availability and even electric vehicle recharging points. That's a real benefit for users, because when there are traffic hold-ups, they can choose to leave the car behind and make their journey by other modes of transportation. But it's also beneficial to the city itself, because it reduces traffic congestion and encourages the use of soft transportation options. So it's a real creator of value."



management system, is made possible by the combined expertise of ten companies: project leader Bouygues Immobilier, Alstom, Bouygues Telecom, EDF, ERDF, ETDE, Bouygues Energies 1 Services, Microsoft, Schneider Electric, Steria and Total. Its development began with measuring the combined power consumption of offices, homes, retailers and public amenities, followed by the installation of renewable energy generating and storage resources, and lastly, network management. Ultimately, electric vehicle recharging points will also be integrated into the project.



The Paris Region does everything possible to facilitate the use of public transportation. As part of that commitment, the management of public transportation systems uses the very latest technologies available: for example, RATP (the City of Paris public transit authority) has developed a vehicle location unit that can pinpoint the position of every bus in its fleet to the nearest 10 meters. This degree of ac-

curacy enables real-time decision-making for traffic management, as well as providing the data needed to inform passengers how long they can expect to wait for the next service, and the time at which they can expect to arrive at their destination.

From sustainable city to smart city

Building a sustainable city requires the implementation of



Key points

Advancity, the Sustainable City and Mobility competitiveness cluster, is devoted to sustainable urban innovation. The majority of its members (160 SME and midsize companies, 18 leading corporate groups, 31 higher education and research institutions, and 31 regional authorities) are based in the Paris Region, and explore the following fields of research as contributors to strategy focus committees:

- Eco-technologies: urban technologies (water, waste, air, etc.) and renewable energies
- Eco-construction: sustainable buildings and infrastructures
- Eco-mobility: transportation, accessibility and mobility
- Eco-cities: cities, organization, management and decision support



The initiatives implemented by the Advancity competitiveness cluster cover:

- Help with putting together sustainable city R&D projects to develop products or urban services to be marketed in the medium term
- The submission of these projects to public-sector and private-sector funding bodies
- The networking of industrial, academic and regional contributors to the sustainable city development sector
- The management and coordination of the Paris Region eco-business sector plan
- Involvement in formulating a range of French sustainable city products and services to be marketed internationally



More eco-friendly buildings

As a major consumer of energy, the construction industry is a key contributor to building the sustainable cities of the future. The challenges are massive, since buildings currently consume 40% of the world's primary energy. In many cases, the greenhouse gas emissions they generate exceed those of transportation and industry. Across all types of construction, buildings consume an annual average of nearly 400 kWh of primary energy for every square meter of floor space heated. The increasing attention paid to sustainable development criteria is an underlying trend in the construction market, and one that is being encouraged by changes in regulations and the opportunities created by many aspects of the Grand Paris project. The leading construction companies are in no doubt about it. Bouygues, Vinci and the others are firmly focused on sustainable construction and renovation. Their sights are set on energy consumption, with the priority aim of offering buildings that go beyond energy saving to become energy positive, without neglecting other important issues, such as reducing construction

site noise, introducing more natural environments into developments and saving water. Bouygues Bâtiment Ile-de-France has embraced the opportunity presented by the renovation of its Challenger head office building to showcase important techniques for the future, including deep geothermal technology, photovoltaic solar panels, filtering gardens to clean wastewater and rainwater, and software to monitor water and energy consumption in real time, as well as workspace and leisure space temperatures. Naturally, this approach is supported by materials manufacturers with the introduction of many innovations, from new types of insulation (wood fiber, rockwool, etc.) to new ranges of finishes (paint, terracotta and synthetic bricks, etc.), ever-thicker insulation, the use of recycled clothing as insulation, newsprint shredded and used for floors, straw-based thermal insulation solutions, sprayed flexible foam... And more new projects are appearing all the time.

The emergence of eco-communities

The Paris Region is also seeing an increasing number of eco-community projects. The

54-hectare Clichy-Batignolles project in Paris incorporates 10 hectares of landscaped spaces, 3,400 homes and 38,000 m² of public amenities, including schools, a gym, a childcare center, a leisure center and parking. Designed around low-energy buildings and local generation of energy from renewable sources, this eco-construction project puts the emphasis on thermal insulation, sun protection and natural ventilation to improve summertime thermal comfort and limit energy demand. The photovoltaic panels installed on all appropriately oriented roofs will generate around 4,500 MWh of electricity per year, and 85% of the community's total heat demand will be met from renewable energy sources, led by geothermal technology.

There can be no doubt that the approach adopted by construction companies has evolved considerably. "Our approach has developed beyond energy optimization, and has led to the introduction of our UrbanEra concept, which is designed to act at every stage, from initial analysis to operational management, by optimizing every sustainable community parameter in innovative ways," explains Christelle Capdupuy, Head of Sustainable Development at Bouygues Immobilier. SM



Vivapolis, the French Sustainable City brand



At the end of September this year, the French Ministry for International Trade launched the Vivapolis brand to unite all the country's sustainable city players and provide companies with a shared presence in international markets and at inter-

national trade fairs. The aim of this umbrella brand is to position the French sustainable city concept as a brand showcase that can adapt to individual situations; a productive custom-made city in which all French specialists - from large and small companies to public bodies, local authorities and non-profit organizations - have the ability to deliver innovative solutions.

The Vivapolis website at www.vivapolis.fr provides information in French and English for public-sector and private-sector decision-makers worldwide. It lists French companies involved in the sustainable cities movement - 80 currently, with a target of at least 200 in the future - and presents their expertise by illustrating their achievements in France and internationally.

Easy to access and use, this website has a central theme that begins with the French sustainable city vision, followed by the six strategically important priorities on which that vision is based, in the form of responses to the needs of the sustainable cities of today and tomorrow:

- structuring urban growth
- ensuring the resilience of urban communities
- addressing the needs of residents
- designing sustainable economic models
- developing sustainable mobility
- making cities more efficient

Each priority is illustrated by achievements and projects in France and around the world that showcase French expertise. There is also a search function to find individual companies.

INTERVIEW

Jean-Louis Marchand, Chairman of Advancity



"Every urban situation has its own special features"

What are the challenges facing sustainable urban development in the Paris Region?

At the Advancity competitiveness cluster, we see urban sustainability as integral to two fundamental challenges that structure our vision of the city. The first is 'decarbonation', that is to say the systematic reduction of greenhouse gas emissions. The second is how well it meets the basic needs of the men, women and children who live in it. So increasing housing availability must be reconciled with the ever-increasing demand for a better quality of life in cities. Meeting these three challenges requires cities to be:

- competitive, that is to say capable of producing goods and services under conditions at least equivalent to those of other cities or regions
- creative, through the availability of training, education and research facilities and a recognized cultural scene
- convivial, that is to say offering public spaces that encourage human interaction and communication, and facilitate mobility
- consensual, that is to say having created the right conditions for appropriate governance, and with the ability to take account of citizens' demands regarding its organizational structure, functioning and co-construction."

How are the members of Advancity responding to the challenges posed by the sustainable city concept? What are their strengths?

Cluster members intend to respond in three different ways: the first is innovation, the second is demonstration, and the last is the marketing of urban products and services developed out of the most promising collaborative R&D projects.

To achieve this, Advancity can rely on a series of impressive strengths, including a portfolio of 135 projects backed by €400 million of investment, which, since the cluster was created in 2005, has enabled the progressive formation of a network of French and international experts and partners, within which the expertise and experience of Advancity are recognized and appreciated, especially in terms of its ability to understand the complexity of the problems posed by the sustainable city concept.

Could you give us some examples of recent projects that illustrate these approaches?

The first example I would point to is the AIRCITY project, which has led to the development of a revolutionary 3D simulation

system that can display and predict atmospheric pollution to an accuracy of a few yards at any point in a very large city. This innovation has been developed out of an exemplary level of collaboration between leading laboratories (CEA, Airparif, the small specialist company Leosphere and ARIA Technologies, which is coordinating the project and exhibited it at FIMAI 2013. Another good example is APR2, which has enabled the design of an ultra-efficient electrostatic separator for sorting plastics in urban waste sorting centers: it achieves 99% accuracy, compared with the usual 80%.

Whether technologies or innovative services for improving the quality of life in cities, these new solutions are no use unless they are implemented in the context of efficient urban management. So our members are working with the leaders of major cities on the joint development of decision-support systems that will, for example, make cities more resilient to natural, technical and organizational risks.

How are these solutions actually implemented in practice?

Amongst the wealth of innovative solutions that continue to emerge as cluster members collaborate, we have a number of products, services and processes that can be marketed directly to public-sector prime contractors and leading urban service providers. Nevertheless, many innovations require full-scale



experimentation to demonstrate their true effectiveness. So Advancity supports these innovators in their efforts to test their results under conditions that are as close as possible to those under which they will be used in the future. It also assists Paris Region communities that want to incorporate these innovations as part of increasing their appeal to business (especially in the context of the Grand Paris project). This commitment to experimentation (urban living labs, experi-

ments, demonstrators, etc.) is an essential part of putting in place the first practical applications that will be vital to successful marketing.

With this in mind, Paris Region communities have already implemented a series of initiatives to facilitate this type of demonstration and operation. This is precisely what is happening with the Paris Region itself, which is involved in an ambitious policy of experimentation via calls for interest for in-situ and in-vivo experiments, with the key goal of supporting SME projects through to practical trials and market promotion. In this approach, the region is working with the City of Paris as part of the PRIL (Paris Region Innovation Lab) calls for interest program, which is designed to involve a large number of Paris Region communities in embracing urban innovations.

Are these models and approaches exportable? What position do French companies currently hold in the international market?

Although the major challenges are shared by all cities, every urban situation has its own special features requiring different priorities and levels of urgency. So if there is a model, it must be one that can deliver tailor-made responses to the ambitions and plans of the world's leading cities. With this in mind, France in general, and the Paris Region in particular, can offer the expertise and skills of companies operating in every discipline

(architecture, design, manufacturing, services, etc.), many of which are international champions in their field. To bring together and offer the most integrated Sustainable City offer possible, Advancity and its members have been part of the French Vivapolis Sustainable City brand (see inset) from its inception, with the result that the labeling scheme benefits from the potential and achievements of our Paris Region members to export French sustainable city expertise.

Strengthening the long-term strategic position of the city

In France, 80% of the population lives in cities. Worldwide, more than half of all the people on the planet have lived in cities since 2008. Recent UN forecasts suggest that two-thirds of us will be urban citizens by 2050. "The powerful attraction exerted by cities is leading to the emergence of true 'world cities', which, like the Paris urban community, become the focus for cultural and intellectual opportunities, key infrastructures, business and decision-making power," explains Jean-Louis Marchand, Chairman of Advancity, the Paris Region sustainable city

competitiveness cluster. "These cities are crucial for dynamic countries and even entire continents. For example, Paris is the production center of national wealth, generating around 30% of French GDP! Against that background, maintaining and strengthening the strategic position of a city over the long term requires us to resolve a series of problems in terms of urban eco-technologies and the process of adapting and transforming cities." The economic impacts of these issues for employment and international competitiveness may be considerable.



Atmospheric Environment

Advancity, the Sustainable City and Mobility ARIA Technologies is an SME and specialist developer of software that models and simulates airflows in the environment. It markets its software as stand-alone packages or as part of broader systems, and also offers a range of design services. Operating at the cutting edge of innovation, it develops highly accurate products capable of faithfully reproducing reality in the form of simulations. The majority of its customers are public authorities with a need to use powerful modeling systems to plan for, forecast or respond to major crises and/or risks. It also serves companies with a regulatory duty to conduct impact and/or risk studies. ARIA Technologies also supplies applications directly related to new energy sources (solar and wind power), industrial risk management (fire, chemical hazards, etc.) and military applications to detect terrorist events.

www.aria.fr



Soil and groundwater remediation

VALGO is an independent company on the market of soil and groundwater remediation as well as the asbestos removal since 2004. It controls the entire value chain, from risk assessment to delivery of a rehabilitated site. From conception to realization, key services of the company are carried out by its own resources. Aware of the requirements of its business, VALGO invests on its own Research and Development Laboratory and is positioned as an expert in the field of remediation market. VALGO penetrates the South American market by setting up a first subsidiary in Brazil in partnership with a local remediation company, in the field of rehabilitation of polluted sites (buildings, soil and groundwater). The services are offered for industrials and public administrations for remediation, decontamination (asbestos removal) and dismantling of sites presenting depollution needs.

www.valgo.com



Delivering sustainable performance

Cloud Software Company

Verteego is the 'CSR Cloud' for company and local authority Corporate Social Responsibility issues. Its platform provides three types of service: CSR Reporting (from data gathering to the generation and monitoring of decision-support management indicators), traceability of chemicals (REACH) in the industrial supply chain, and eco-socio-design simulators. Verteego serves three markets.

- The Sustainable City, where its clients are local authorities, engineering design offices and construction companies
- The Sustainable Supply Chain, with clients in aerospace, electronics, logistics, transportation, manufacturing industry and mass retailing
- Sustainable consumption, with clients in the food industry, chemicals textiles and consumer products

www.verteego.com

Mobility at the heart of the sustainable city

Mobility is a priority focus for the sustainable city. Transportation and accessibility are essential issues, not only because they have a direct impact on environmental quality, but also because of their economic and social effects.

The Paris Region Urban Travel Plan adopted by the Regional Council in February 2012 sets out ambitious environmental targets. For example... *"To reduce greenhouse gas emissions by 20% between now and 2020, the aim is to reduce the use of private cars, trucks, motorcycles, scooters and mopeds significantly, thereby substantially increasing the use made of public transit systems, active transportation methods – walking and cycling – and, for goods, the use of more eco-friendly vehicles, river and canal transportation and rail freight."*

With the emergence of the Grand Paris project, for example, the range of public transportation options available in the Paris Region will be considerably expanded. The Region has an annual budget in excess of €1 billion for public transit, to which the Grand Paris Express project was added this year, accompanied by an additional €30 billion of investment between now and 2030. This plan introduces a series of projects designed to upgrade and develop the network. There are also many initiatives being introduced to prioritize more eco-friendly vehicles and alternative methods of personal and collective travel, such as car sharing, walking and cycling.

The success of Vélib' and Autolib'

When it comes to innovation in travel, Paris is very much the pioneer, thanks to the success of its Vélib' and Autolib' bike and car sharing schemes. In 2012, Vélib' recorded more than 34 million journeys, which equates to an average of 93,500 rentals every day. Managed by JCDecaux, Vélib' offers its users a fleet avera-



© ARD/Gilles Coulon/Tendance Floue

ging more than 18,000 bikes at 1,600 collection and return points in Paris and its 29 surrounding communities. A new plan to promote this mode of travel was adopted in 2010 with the aim of creating 700 km of cycle paths by 2014. The City of Paris will continue to open new cycle paths in the period to 2020, as well as creating bike parking facilities and encouraging companies to build bike storage facilities for their employees. Cycling, which currently accounts for only 2% of journeys, is also being promoted by the introduction of a dozen secure bike storage points at Paris Region rail stations. These storage points are designed to encourage passengers to cycle between home and public transit stations, and are likely to be introduced much more widely as time goes on. The total scheme cost of €1.6 million is being funded 50% by the Region, 47% by the Paris Region transit authority (STIF) and 2% by the national rail operator SNCF. The eventual aim, as part of the Paris Region Urban Travel Plan, is

to offer more than 20,000 secure storage places; five times the number currently available.

The use of electric cars is also encouraged in the Paris Region. Managed by Bolloré, Autolib' operates 1,740 vehicles from 835 collection and return points (500 of them in central Paris), and is the first 100% electric car sharing network in the world, operating in the capital and the 53 other communities of the Paris Region. The scheme's four-seat electric Bluecars are powered by rechargeable lithium-metal-polymer batteries that can cover 200,000 kilometers before they need to be replaced. These batteries can store five times more energy than a conventional lithium battery. They are manufactured using only nonpolluting materials, and when the car reaches the end of its useful life, it is dismantled and all its components can be either recycled or reused. Since its user launch in December 2011, Autolib' has recorded more than 2.7 million rentals.

Electric cars are all the rage in Seine Aval

Between March 2011 and December 2012, 65 Renault-Nissan electric vehicles were a regular sight on the roads of Seine Aval.

The Seine Aval Project of National Interest (OIN) brings together central government, the Paris Regional Council, the Yvelines departmental authority, and the 51 local authorities and 5 joint authorities that border the River Seine to the north of Yvelines. It contains the highest density and variety of electric vehicle recharging points in France. Known as SAVE,

this experiment involves many companies, including the Renault-Nissan Alliance, EDF, Schneider Electric and Total. A total of 130 recharging points - 48 of them open to the public - were installed as part of this experiment. On completion of the project, 45 of those charging points open to the public were retained and upgraded to incorporate the latest technical developments. A further nine recharging points are planned by the end of this year. They are located at the roadside and in shopping center car parks, public car parks and filling stations. Wherever you are in Seine Aval, you are never further than 15 kilometers from a public electric vehicle recharging point.

SAVE has therefore provided all the companies involved with the opportunity to address many of the issues involved in installing a complete ecosystem for 100% electric mobility. All the technical and financial data required for the deployment of charging points of every type has been collected and analyzed. The lessons learnt cover the cost and problems involved in installing recharging points, network interoperability and the charging points and vehicles themselves, as well as requirements in terms of energy management systems and the systems and services needed to supervise and operate recharging point networks. All these lessons will be invaluable in developing a high-efficiency electric vehicle infrastructure for France.

Rationalizing the transportation of goods

When it comes to pollution, goods transportation is responsible for half of all particulate emissions, a third of NOx and SO2 emissions and a quarter of CO2 emissions. In order to improve a situation that also affects every other part of the world, the region has introduced a series of public and private initiatives to rationalize the transportation of goods, especially in urban centers (final mile logistics). A plan for goods transportation and logistics in the period to 2025 was launched at the beginning of 2012 as part of the future Grand Paris project. At the same time, central government has adopted a plan to create a specialist sustainable urban logistics cluster with a mission to experiment with developing new solutions for transporting goods into and within the communities of this dense urban environment. In practical terms, its aim is to create an intermodal system capable of reducing the environmental impact imposed by goods transportation through the development of innovative delivery solutions that create wealth for every ecosystem contributor, from logistics and transportation operators to user industries, local stakeholders, wholesalers and retailers.

Solutions like these are made even more essential by the growth of e-commerce, which will generate much higher volumes of deliveries to individual citizens in the future. The result is experiments like TramFret, which was tested at the end of 2011 by the Atelier Parisien d'Urbanisme (APUR) and involved the month-long testing of a goods-only tram unit. The outcome of the test demonstrated the relevance of this idea, causing no impact on passenger tram services or road traffic, and receiving a positive reaction from tramway users and goods transportation operators. The goal set for 2014 is to introduce a service whose attraction is obvious, when you realize that one tram can deliver the same volume as three trailer trucks



© Geodis / Baillieu Cyril

Improving final mile logistics

Geodis, the logistics arm of SNCF, has been offering a distribution solution for packages weighing between 50g and 800kg in Paris for the past year. The system is structured into three parts: bulk forwarding of goods to the Paris-Bercy rail hub, which are then broken down between eight urban logistics bases near the business centers of Paris, and finally, the delivery of small packages and pallets using electric trikes and electric vans. Deliveries over 200 kg are made by trucks meeting the Euro 5 standard, with plans to upgrade to Euro 6 compliance or hybrid vehicles at a future time.

Initiatives of this kind are becoming increasingly common, reflecting the energy invested by Paris Region companies in finding eco-friendly solutions for final mile logistics. On September 18 this year, a Sustainable Urban Logistics Charter for Paris was signed by the City of Paris and 80 institutional and private logistics industry signatories, signaling their commitment to develop a policy of sustainable development and innovation for goods transportation and delivery in Paris. The ultimate purpose of this charter is to introduce diversity into the industry by making greater use of river and rail transportation. To achieve its aims, the charter is broken down into a series of practical projects, which include the creation of new logistics areas in car parks, the installation of electric vehicle recharging points in delivery areas and a labeling scheme for silent nighttime deliveries.



© Ports de Paris

Encouraging river transportation

This charter also focuses heavily on river transportation. The Ports de Paris authority is responsible for managing an initiative to develop urban river logistics, given that a substantial proportion of supplies already arrive in the capital via this route. In 2010, around a million metric tons of goods were carried on the canals of Paris (the Canal Saint-Denis, and the wider Canal de l'Ourcq), reflecting a 30% increase on 2009. Ports de Paris plans to introduce a number of different solutions between now and 2015, including pallet and container unloading facilities at a number of Paris river ports.

Lastly, a large number of projects are currently under development to reduce the environmental impact of transportation by bringing forward solutions for managing the transit of people and goods, with particular emphasis on monitoring and controlling flows more efficiently, and real-time information systems for users. In 2012, Advancity provided €83.5 million in funding for 28 e-mobility projects, €34 million of that funding took the form of subsidies.

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ParisRegion is a publication
CHRONICLE from Paris Region
Economic Development Agency (PREDA),
3 rue des Saussaies, 75008 Paris. France.
Tel.: +33 (0)1 58 18 69 00.
Registration of copyright: February 2011.
ISSN number : 2114-8481
Editorial Director: **Frédérique de BAST**,
Chief Marketing Officer.
Editorial Office: **Catherine VANIERE**,
Communication Manager.
Art Director: Studio Anney.
Editorial Consultancy: Agence Paradigme
Translation: Tagline. Printed in France.