

***BUILDING
FOR THE
TWENTY-FIRST
CENTURY***



World Meteorological Organization



Foreword

The inauguration of the new Headquarters of the World Meteorological Organization (WMO) is an important landmark in the Organization's effort to acquire the necessary infrastructure to reinforce its scientific and technical programmes for the benefit of its Member countries. This building is a symbol of the growing importance of WMO as a vital instrument available to its Members in addressing the ever-increasing environmental matters of concern to humanity. We are therefore thankful to all those who have, in one way or another, contributed to the construction of the building and in particular the Swiss Confederation and the Geneva authorities for their diverse support including a loan on generous terms and a plot of land.

Utilizing both innovative and time-honoured techniques of energy conservation, the elegant structure bears testimony to the commitment of WMO to the protection of the environment and the rational and economical use of energy. It is designed to improve the working environment with its modern facilities. Its design will also facilitate the expansion of the information system of WMO to serve its Member countries and the international community in a more cost-effective manner.

The capital costs of the building will be recovered over time through reduced overheads, increased productivity and the operational efficiency of the Secretariat. WMO has shown, with the completion of its landmark Headquarters, that it can manage its resources effectively so as to undertake new programme initiatives in the service of the national Meteorological and Hydrological Services of its Members.

This is a building for the twenty-first century. It will enhance WMO's capability to continue to address new challenges in matters related to weather, climate and water. Its construction crowns cooperative efforts and the faith among Member governments in WMO and stands as a triumph of international will to commit itself for the betterment and well-being of life on this planet.

*(G. O. P. Obasi)
Secretary-General*

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NOTE

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Message of Madame Ruth Dreifuss, President of the Swiss Confederation

The World Meteorological Organization was founded on 23 March 1950. Over the half century since then, WMO has provided indispensable services. Today, weather and climate forecasts are of major importance. Thanks to WMO, it is possible to plan harvesting better; anticipate possible natural disasters more accurately, improve the safety of passenger and freight transport and promote the protection of the environment.

In Geneva, WMO collaborates with many of the international organizations. It is thus perfectly in tune with the spirit of the place, where exchanges and encounters are the prime goal.

When the Organization wanted to construct a new Headquarters building, the Confederation immediately made financial commitments to support the project. The result: a building with an elegant contemporary look, whose pure lines enclose many technological innovations. Its "big blue ship" silhouette will stand out in Geneva's landscape from now on. I hope that WMO, its staff and its Members will find that this new environment gives them the necessary scope for fulfilling their important work and I extend to them all my best wishes for success in the future.



Message of Madame Martine Brunschwig Graf, President of the State Council of the Republic and Canton of Geneva

Throughout history, meteorology has played a major role in the existence of all the inhabitants of the planet, whether in their daily lives, in fields such as agriculture and today certain leisure activities, or in the prediction of natural disasters such as earthquakes, floods and so on.

Current affairs in the environmental, political or humanitarian fields as well as present-day scientific, aeronautical or touristic requirements show that an understanding of climatic phenomena has become essential to the functioning of our societies.

The presence of the World Meteorological Organization in Geneva, which is attached to the principles of security and humanity, reinforces the city's vocation and universal ideals.

On the occasion of the Thirteenth World Meteorological Congress, which brings together all the representatives of the WMO Member countries, the official inauguration of the Organization's new Headquarters building is taking place in this year of the 50th anniversary of the four Geneva Conventions.

"The building is meteorological, a creature of the wind" according to the designers; may this new building help improve our measurement, if not our mastery, of the weather, and enable the principles which are so dear to the city of Geneva to be better realized.



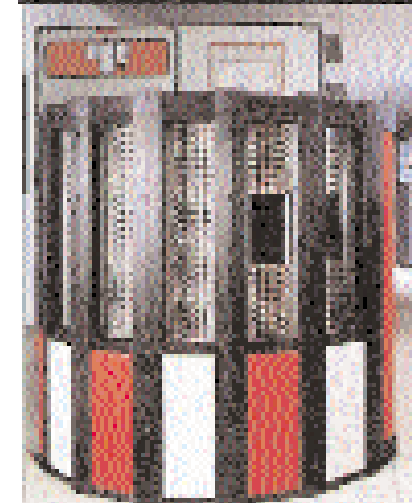
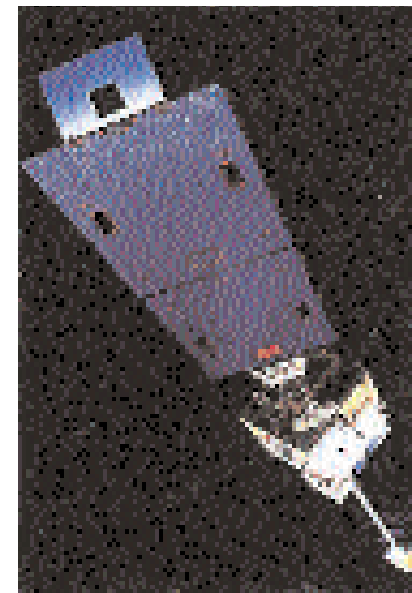
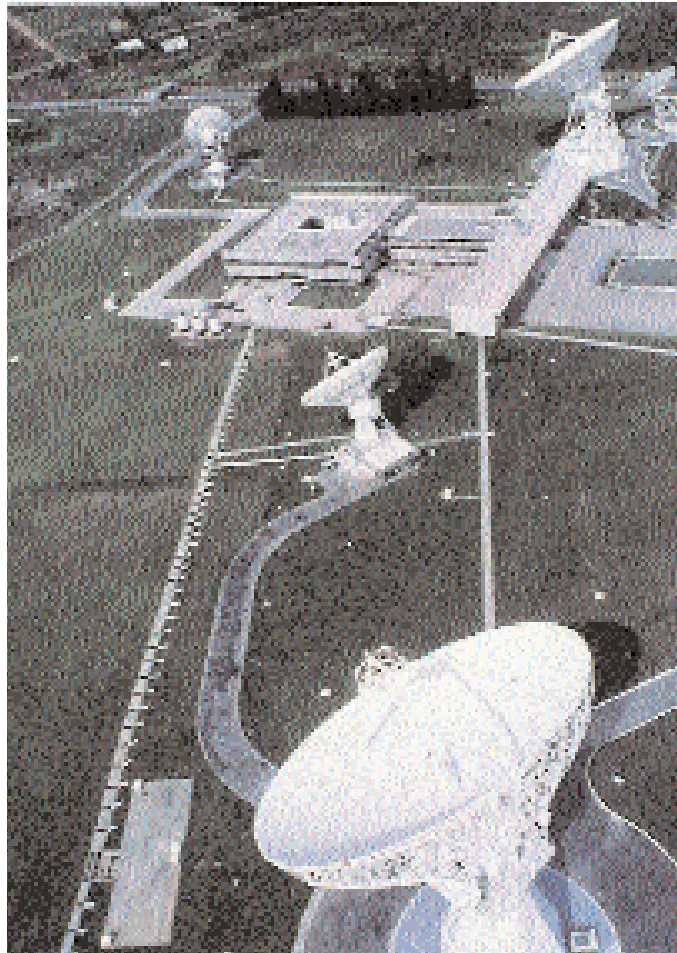
Message of Mr André Hediger, Mayor of the City of Geneva

A new Headquarters building for the office of the United Nations High Commissioner for Refugees was inaugurated in 1995, which made it possible to place the Centre William Rappard at the disposal of the World Trade Organization. In 1998, the Office of the High Commissioner for Human Rights was installed in the newly renovated Palais Wilson. This year, we have the pleasure of participating in handing over a new building to the World Meteorological Organization.

These investments demonstrate the constant will of the federal, cantonal and communal authorities to reinforce the position of Geneva on the international scene. They also fit into a tradition which has made our city a place for negotiation, codification and meetings, whose purpose is to set up concrete projects and to find solutions to global problems. Measurement of the climate's evolution and identification of means of fostering sustainable development, particularly through the struggle against pollution, are fundamental.

By associating itself with these activities, the City of Geneva wishes to help expand the welcome for international bodies in Geneva and give them a working environment which matches its reputation for quality of life through the various services provided by the Municipality in the cultural, sporting, educational and leisure fields. It thus hopes that the ties between international civil servants and Geneva's population will be strengthened.

"Architecture is not just a question of building, but of contributing to the future." The words of Rino Brodbeck, of the Geneva-based architects Brodbeck & Roulet, capture the essential concept behind the new Headquarters of the World Meteorological Organization. Using traditional techniques of ventilation and energy conservation, they have created a modern workplace which encapsulates the dynamics of WMO in its role of coordinating worldwide efforts of the national Meteorological and Hydrological Services (NMHSs), in the monitoring and prediction of weather and global climate change and the management of water resources to improve the well-being of our planet. The capital costs of this extraordinary and beautiful building will be recouped in reduced overheads through energy conservation and higher productivity through human-centred design. It is at once pragmatic and emblematic — a response to geography from the creativity of science and an example to builders everywhere that the foundations of the future are firmly based on our common past.



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1. *International Meteorological Conference 1879*
2. *High speed international communications underpin the World Weather Watch (INMARSAT)*
3. *Computers have long helped meteorology*
4. *Every observation counts* (Meteorological Administration, Republic of Korea)
- 5, 6. *Modern meteorology depends on satellites and supercomputers* (5: National Oceanic and Atmospheric Administration, USA; 6: Deutscher Wetterdienst)

History of WMO and main objectives

The World Meteorological Organization is an intergovernmental organization with a membership of 185 Member States and Territories. It originated from the International Meteorological Organization, which was founded in 1873. Formally established in 1950, WMO was recognized as the specialized agency of the United Nations for meteorology, operational hydrology and related sciences in 1951. It is the international community's authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the oceans, the climate, and the resulting distribution of water resources. The primary purposes of WMO are:

- To coordinate the activities of its Members in the generation and exchange of information on weather, water and climate according to internationally agreed standards; research at national, international and global levels; and the training of professionals to internationally recognized levels;
- To facilitate the development of services that improve the well being and safety of communities, nations and the whole of humankind.

Weather and climate know no national boundaries; and they are integral to the health and well being of living beings on this planet. Nearly three quarters of all natural disasters, including floods, tropical cyclones, droughts, forest fires and epidemics, are weather- and climate-related. International cooperation is therefore essential for the development of meteorology and operational hydrology — it always has been and, as water and other natural resources become more scarce, it always will be. WMO and its programmes provide the vital information for advance warnings that save lives and reduce damage to property and the environment. Every cent invested in the Meteorological and Hydrological Services produces an economic return of over ten times greater than the initial outlay.

Some major achievements of WMO

- The World Weather Watch (WWW) — a unique global operational system for the collection, exchange and analysis of weather and other environmental information. Every country in the world contributes to the WWW every day of the year. The system provides a standardized high-quality database on weather.
- WMO's pioneering role in the global coordination of geophysical and meteorological experiments and research contributes to remarkable advancements in weather forecasting and the geophysical sciences.
- WMO spearheaded the campaign to alert the world community of the potential effects of increased greenhouse gases and was instrumental in initiating the negotiations for the UN Framework Convention on Climate Change, which was then signed at the Earth Summit in 1992 and became international law in 1994.
- WMO has made essential contributions to the Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol and amendments. It continues to monitor the ozone layer through the Global Ozone Observing System of the Global Atmosphere Watch.
- When WMO and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988, assessment of the scientific understanding of climate change moved to an intergovernmental level. This was an important step to raise the issue of climate change to the political and decision-maker level.
- WMO is a leading participant in and host of the Global Climate Observing System (GCOS) which is crucial to the long-term security of the planet. It satisfies the needs for seasonal-to-interannual climate prediction and for detecting and attributing long-term climate trends. The GCOS includes the climate components of the Global Ocean Observing System and the Global Terrestrial Observing System, and is built on the existing observing networks of WMO's World Weather Watch, Global Atmosphere Watch and hydrological systems.
- The unique Tropical Ocean and Global Atmosphere project of the World Climate Research Programme brought a tremendous breakthrough in climate forecasting. Its research on El Niño and La Niña improved the forecasting of these events.
- WMO has forged the establishment of a global hydrological network for water quality monitoring and water resources assessment, which is a prerequisite for sustainable development.

The creation of the new building is a symbol of the growing importance of WMO and the NMHSs and of the optimism of the WMO Members that they can fulfil its ever-growing programme of work. It also stands for the ongoing process of reform, which has mobilized contemporary trends to transparency and interdepartmental coordination to raise operational efficiency. Good foresight and careful financial planning have given WMO flexibility while harnessing its resources effectively so as to undertake new programme initiatives in the context of its overall reform. This means that it can look forward to new programme initiatives in global environmental concerns such as climate change, ozone layer depletion, pollution, water resource issues and natural disaster reduction.





The surroundings

The building, an elegant vessel of aluminium, glass and steel, seems to float above the surrounding parkland like a ferry on the lake. It serves as a reminder of our duties towards the natural environment and of the close ties with our host city, Geneva, to the four elements of earth, water, air and, as the sun glints against the building's majestic facade, fire. Geneva, the international avant-garde of the Swiss Confederation, is one of the world's cleanest cosmopolitan cities. Stringent environmental laws and a deep-rooted appreciation of nature have kept Geneva's population free of the chronic illnesses which accompany pollution and which are an indication too of the damage being done to the world's climate control mechanisms and water resources.

Lake Lemman, the realms of fancy for nature lovers, provides a superb — and limpid — backdrop to the new WMO Headquarters. Situated between the industrial Sécheron zone and the Botanical Gardens, on a plot of land donated by the State of Geneva, the building creates a dynamic link through divergent architectural styles, between these two areas of the city. The work of the Organization in highlighting the integration of climate, water, health, security and human activity is thus given a setting which is itself a triumph of ergonomics and efficiency — the application of science to the service of the world.



The idea of the building

In 1985, with increasing environmental challenges and an already overcrowded building, WMO considered several options for enlarging its office space. Cost, convenience and building regulations persuaded the Organization to discard ideas of expanding its old offices by renting space or adding extra floors. In 1990, the Geneva authorities offered WMO the site at Sécheron and the Executive Council set up a working group to study the possibility of a new building.

Eleventh Congress (1991) approved in principle the construction of a new building and, following Executive Council approval, an international architects' competition was launched in the autumn of 1992. In 1993, the Executive Council confirmed the jury's recommendation of the 'Chic Planète' proposal. The Swiss Confederation granted a construction loan in March 1995, and on 30 May, the foundation stone was laid at the opening of Twelfth Congress.

Architects Rino Brodbeck and Jacques Roulet had two goals in mind when they submitted their 'Chic Planète' project to the WMO competition to design a new Headquarters in 1993 — to create an efficient, energy-saving work environment which catered to the needs of its staff as well as to the figures on the monthly accounts. Constrained by budgets and geography — the site for the building was a narrow strip between existing offices and a road — they studied the surrounding landscape, the mission statements of WMO and, perhaps most importantly, the old offices at Avenue Giuseppe Motta. These were modern in 1960 when WMO moved in, but outgrown by the 1990s when the need for greater efficiency in the era of technology and increased interdepartmental collaboration and productivity has determined the search for a better working environment. Modernization and



Innovative overall plan provides versatile interior spaces



“It is rare that an opportunity arises to combine principles such as those espoused by WMO with a building project.”

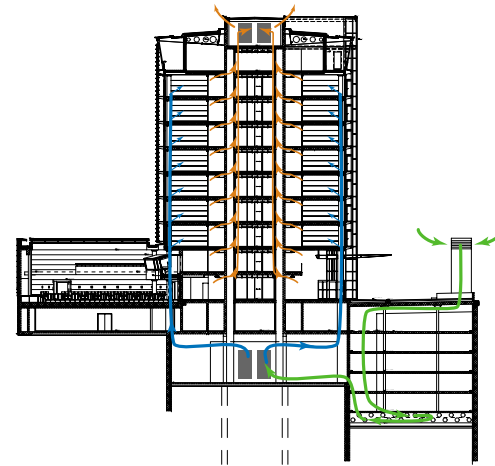
maintenance of the old building would have been an overly expensive exercise. At the same time, increased awareness of the critical role of the geosciences in some of the major issues involving human survival, health and socio-economic well-being and the ecosystems essential to life on Earth, has highlighted the vanguard role of WMO within the UN system. The Organization is increasingly called upon to lead multi-agency and interdisciplinary programmes on water resources, climate change, natural disasters and other environmental issues, and the new human and technical resources demanded for such expansion could not be easily contained within the old Headquarters.

Aluminium, glass, stone and concrete are the main materials used in a delicate compromise between maximum light penetration and optimal heat retention or cooling. Glass facades, while beautiful, create fickle office environments notorious for wasting energy. A normal office building, says Brodbeck, uses 800MJ/m² per annum; a new law promulgated by the Swiss Federal Government last year limits annual consumption in new buildings to 400MJ/m². The Headquarters of WMO will use significantly less. It will have its own gas-powered, internal generator to ensure that it can be disconnected from the national grid during daily (and expensive) peak periods.

Spaces for relaxation and reflection enhance the working environment

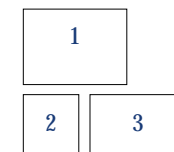


Cold fresh air (green) is stored under the building to be drawn on as needed for cooling (blue). Used air is drawn out from every space (red). In cold weather, heated air is filtered and circulated through the same trunks and vents.



Traditional techniques in a contemporary building

The Romans used a hypocaust, the Arabs a burj el hawa — harnessing the laws of physics to ensure heat transfer through a building takes many traditional forms. But the principle is the same across the continents and the centuries — warm air rises and is replaced by cooler air. Channelling this process through a system of vents and tunnels provides natural air conditioning — cooling and heating — at no cost to the environment or the budget. The competition stipulated that the new WMO Headquarters must reflect the Organization's commitment to environmental protection and efficient energy management, while at the same time ensuring a comfortable working environment and maintaining cost-effectiveness. To accommodate all these criteria, the architects looked to tradition and incorporated that into the modern need for computerized offices and unhindered communication across management structures. The WMO building uses Canadian wells, built into the foundations of the car park and linked through the supporting infrastructure of the main building, to all floors. Cold air is sucked into the system and as it heats up it rises. This natural process of heat transfer maintains the building at a constant optimal temperature, calculated at between 20 and 26 degrees Centigrade. The incorporation of the twin flow ventilation system into the supporting pillars of the building is aesthetically pleasing and cost-effective, as it does away with the need for false ceilings and does not detract from the integrity of the structure as a whole. Double floors on the ground floor also allow for enhanced acoustics, which is important where multilingual conferences are to be reported and transmitted via different media across the world.



*1, 3. Complex circulation machinery
2. Double-faced construction helps insulation and ventilation*



Heat, light and a modern working environment

Savings resulting from the lack of false ceilings and floors have allowed for the creation of an innovative double facade, a protective skin around the core of the building. This functions as a thermal flue and insulates the sensitive working environment from the vagaries of mountain weather. It constitutes an intricate compromise between heat and light. The design of the building is an organic synthesis between the interior and the exterior, between context and function. The tight constraints of the site itself have forced an east/west alignment to the building, leaving the facades exposed to the bitter mountain winds from the north and the full glare of the sun to the south. The northern windows of the outer skin are therefore permanently closed, providing insulation. The southern facade, however, is made up of panels which can be opened and closed. The entire facade is specially coated to reduce UV absorption and to the south the glass is further reinforced to provide 40 per cent shade. Altogether the design and composition of the southern facade mean that just 17 per cent of solar heat penetrates inside, and as all inner windows can be opened, each office can be adapted to individual comfort. The double skin also provides an effective ventilation system which complements the Canadian well. The system incorporates an automatic night ventilator which operates in the hot summer months. It kicks in during the coolest period between midnight and dawn, sucking cold air from the basement through the emergency stairwells in the centre of the building and out onto each floor by means of ventilators, which open automatically. The air is circulated and every working space is refreshed in time for work to begin in the morning.

Glass facades emphasize the building's harmony with its surroundings



One of the innovations of Modernist architecture was the inventive manipulation of natural light. The WMO building draws on this tradition, while adapting its Spartan principles to the human-centred needs of the contemporary office space. Light floods the interior and is reflected off the spacious light grey walls of the central core. The interior office walls are made of glass, cutting down on harsh (and expensive) artificial light, and inducing a sense of community and transparency to the workplace. The lighting system operates through a series of sensors which react to movement within a given space; the energy allocation is further adjusted to take account of available natural light, giving balanced and consistent illumination at lower cost. The sensors are automatic and the bulbs themselves are energy efficient — the higher price being quickly recouped in lower consumption costs. At the



rounded ends of each office floor larger seminar rooms are completely glass-walled and airy.

The objective of the new building is to create high-quality working areas which foster creativity, are conducive to personal exchange and which make it possible for all employees to realize their potential. As WMO enters the 21st Century the demands on each person are set to increase and individual use of computers and other technology will rise accordingly. It is therefore essential that the infrastructure created today will reduce the potential for physical and psychological stress caused by intense periods isolated in front of a computer screen. The offices, which can all be adjusted according to usage and need, open onto large communal spaces. Work areas make up 70 per cent of the total workspace, with additional facilities for conference and ad hoc personnel. WMO currently has a staff of about 300, and the excess capacity of the new building is to be rented out to other institutions, thus reducing the burden of repayment as well as allowing for optimal use of facilities.

The building is at once pragmatic and emblematic — a hi-tech response to geography from the creativity of science and a symbol that the foundations of our global future are firmly grounded in tradition. The new building, whose foundation stone was laid during the Twelfth Congress of WMO in May 1995, bears testimony to WMO's confidence and optimism for the future and to the commitment of its Members to work in partnership in the service of humanity.

The ground floor contains a spacious lobby, a conference hall for 260 people and a smaller seminar room for 60 people. On the same floor there are receptions lounges and offices. There is also a Press Conference room, video-conferencing facilities, a radio booth, audio-visual editing facilities and ISDN lines for the media and public information services as well as exhibition space projecting WMO's various operational activities. On the first floor are the library, print shop, seminar rooms and secretarial and interpreter facilities.

Spacious and luminous conference facilities and offices provide an ideal working environment

Above there are seven floors dedicated to office use, two of which will be rented out for the first four years and which can accommodate expansion of WMO. All are linked by glass elevators, as well as stairs, which are set into the facade facing the Botanical Gardens. On the ninth floor is a superb cafeteria with panoramic views across the lake and rooftop terraces.

Lunching atop the new building will be like lunching on board a luxury ocean liner, elevating the working routine to a cruise into the future.

Further facilities for staff and visitors include basement showers beside a multi-purpose room, which can be set up as a gym but can also be adapted to a conference or exhibition centre. On this floor too will be housed the archives and publication storage rooms.

The underground car park, which can take about 350 vehicles, is independent of the main building, although linked through the integrated ventilation system. It is built on five levels, and its deep foundation helps to secure the building against seismic disturbance. The entire building conforms to the stringent safety standards laid down by Swiss Federal Law, and there is a complex system of sprinklers and alarms running throughout all floors.

The next few years are critical to WMO both in operational and structural terms. Even as it expands its areas of activity, the Organization will further promote internal trading, strategic budgeting and financial transparency, and reinforce the culture of cost awareness amongst its staff. The open plan design of the new building will facilitate more effective functional links with and across units leading to increased efficiency and cooperation among staff members.

Priorities into the next millennium are to satisfy rapidly evolving demands for modern, cost-effective and high-capacity information exchange and to consolidate comparative advantages in core WMO programmes: World Weather Watch, World Climate Programme, Hydrology and Water Resources, Education and Training, and Regional Programme. The new Headquarters will contain state-of-the-art digital facilities essential for the swift translation of information from analogue systems and full multimedia access. This will allow more effective interactions with the WMO Regional Offices established in Burundi and Paraguay and Subregional Offices in Costa Rica, Kenya, Nigeria and Samoa.



Acknowledgements

The new WMO Headquarters building would not have been conceived and constructed without the consensus view of WMO Members on the need for the building, as well as the guidance and enthusiastic support of the Eleventh and Twelfth World Meteorological Congresses and the WMO Executive Council (EC), especially through the EC Committee on the WMO Headquarters building. Invaluable contributions to the deliberations of strategic and practical issues concerning the new building were made by the successive Presidents of WMO: Mr R. Kintanar (1980-1987), late Mr Zou Jingmeng (1987-1995) and Dr J.W. Zillman (1995-present), as well as by chairpersons of the EC Committee on the WMO Headquarters building, particularly by Professor A. Lebeau and Mr J.P. Beysson.

The Secretary-General of WMO, Professor G.O.P. Obasi, initiated the need for a new building and led the negotiations with the Swiss Federal authorities and the Geneva authorities on the interest-free loan and allocation of a plot of land, and with the World Intellectual Property Organization on the sale of the old WMO building. The Secretary-General paid constant attention to all aspects of the Secretariat's work on the new building, particularly through the specially established Building Management Team (BMT) chaired by the former Deputy Secretary-General, Dr D.N. Axford, in 1994, and since 1995 by the present Deputy Secretary-General, Mr M.J.P. Jarraud.

Acknowledgement should be made of the dedicated work of Mr T. Aidonidis, the Building Project Officer, and Mr J.M. Duret, the Project Manager/Consulting Architect, and their supporting staff, who have undertaken everyday coordinating contacts with building designers, engineers and other related enterprises.

Among those persons, companies and enterprises which brought the new WMO Headquarters building into existence, the following should be particularly acknowledged:

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ERTE S.A., Geneva/Energy Engineering

H+S Communications S.A./Telecommunications Engineering

H. Schumacher-R.Rumo SBHI-SA, Geneva/Sanitary Engineering

AAB J. Stryjenski and H. Monti SA, Geneva/Acoustics Engineering

H. Roger and P. Yves, Geneva/Surveyor

ZS Trafitec SA, Geneva/Environmental Impact Assessment.

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