

FEBRUARY 1997

THE UNESCO COURIER

INTERVIEW

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DE LIBERA**

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ENCOUNTERS

We invite readers to send us photographs to be considered for publication in this feature. Your photo should show a painting, a sculpture, piece of architecture or any other subject which seems to be an example of cross-fertilization between cultures. Alternatively, you could send us pictures of two works from different cultural backgrounds in which you see some striking connection or resemblance. Please add a short caption to all photographs.

UNTITLED I
1996, acrylic, pencil,
colour photocopy
applied on paper
(63.4 x 49 cm)
by Enam Huque.



Enam Huque is a Bangladeshi artist whose work explores cross-cultural themes and attempts to foster cross-cultural communication. In this painting he has superimposed a motif of white palms decorated with henna on a background of designs inspired by the folk art of eastern India. Henna is widely used as a decorative substance in India, the Middle East and Africa.

© Enam Huque, Toronto, Canada

RADIO

A FUTURE FOR SOUND



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INTERVIEW

Alain de Libera,
a specialist in medieval philosophy,
looks at the history of Western thought
from a new angle (p.4).

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Monticello, a masterpiece of American
neoclassical architecture built on a hilltop in
Virginia by Thomas Jefferson, 3rd President of
the United States (p. 43).

Cover: © Paul Young/SIS, Paris

The Arab forebears of the European Renaissance

French historian and philosopher Alain de Libera, an authority on medieval thought, talks to Rachid Sabbaghi about some unjustly neglected chapters in the history of Western philosophy.

■ How did you first become interested in Arab-Islamic philosophy?

Alain de Libera: It was when I embarked on my work as a historian of medieval philosophy. I read a book by the French philosopher and historian Etienne Gilson called *L'Être et l'Essence* ("Being and Essence"), which contained two extraordinary, thought-provoking chapters on Avicenna and Averroës. Ever since, my interest in Arab-Islamic philosophy has been indissociable from my interest in medieval philosophy.

The received wisdom at the Sorbonne when I was a student there was that the Middle Ages were a kind of long parenthesis in the history of humankind. The nineteenth-century French scholar Ernest Renan called it an appalling period, a "1,000-year disaster". The traditional view insisted that nothing happened between Aristotle and Descartes. As a philosophy student, then, I saw the Middle Ages as a neglected period of history.

When I read Gilson's book, I realized that at the core of this neglect was neglect of the Arab-Islamic dimension *within* medieval philosophy. I then became convinced of two things: first, that medieval thought as a whole had a contribution to make to philosophy that was as important as that of Greek or classical philosophy; and secondly, that a key reason why it was overshadowed was the overshadowing of Arab-Islamic philosophy, which I then approached from the most difficult philosophical angle, the metaphysical angle.

■ Was the contribution of Arab culture to the making of modern Europe not overlooked as well?

A. de L.: Yes, without doubt. But it must be said

The medieval European university, which came into being in the 13th century, was based on the map of knowledge drawn by Al-Farabi.

that there was something diabolical in this neglect, since it went hand in glove with the recognition of a certain debt. This debt is often referred to as though it should be taken for granted, as when people say: "The existence of an Arab-Islamic legacy is so obvious that there's not much point in discussing it." The debt is so patent that it distracts attention from the neglect. People say: "Of course the Arabs passed on the bulk of Greek science to the Christian West." But we must be careful here: when it is

admitted, objectively and dispassionately, that the Arabs were "transmitters", they are denied any other role or any other contribution to the overall history of Western thought. Recognition of this kind, through a process of total assimilation, turns the Arabs into the continuation, in another form, of the Greeks, into people whose only role was to pass on what they had received, just as relay runners hand over a baton or torch. They passed on a science that was not theirs, a science they simply reproduced and perpetuated. They passed it on, then stepped aside; their job was done. They withdrew from the European stage, where they had no business to be and where they had never had anything to do but serve as intermediaries.

Now this image is fallacious. The Arabs made a much more important contribution to the history of European thought than that.

■ How would you define this contribution?

A. de L.: I should find it very hard to answer the question: "What contribution did Greek philosophy make to the forming of a European identity?" The question you have asked has equally wide implications. The influence of such thinkers as Avicenna and Averroës on European culture is as vast a subject as that of Plato's or Aristotle's influence. One is tempted to treat the subject comprehensively, and looking at it in detail it is hard to know where to begin. But I will try to suggest some basic guidelines.

Perhaps the simplest thing would be to start with the notions of science and scientificity. In the twelfth century the Christian world realized that there existed a considerable corpus of scientific work in Antiquity (which had up to then been lost or known only in a very fragmented and indirect form)—a systematic organization of knowledge, a division of the sciences, a classification of scientific disciplines, an articulation, a system, a hierarchy of disciplines. The West made this discovery when the catalogue of sciences drawn up by Al-Farabi was translated into Latin.

With Al-Farabi the Christian world obtained its first signposts to the corpus of knowledge bequeathed by late Antiquity organized so as to provide a kind of map of the knowable. The West then went on to make a detailed examination of each of these sciences, which ranged from ▶





Alain de Libera

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► astronomy and metaphysics to psychology, biology, botany and meteorology. In each case it discovered an Arabic text which, if it was not always a founding text, had the effect of accompanying, boosting or accelerating knowledge.

Between the end of the twelfth century and the middle of the thirteenth century, the Latin West became scientifically literate as a result of two great batches of translations of Arab scientific works, which became the very foundation of the university system. The medieval European university, which came into being at the beginning of the thirteenth century, was in a sense the institutional manifestation of the map of knowledge drawn by Al-Farabi. The Arab learning that was translated and passed on to the West formed the basis and the scientific foundation of the university in its living reality—the reality of its syllabus, the content of its teaching.

The historical paradox is that this Arab learning, which never spawned a university in the Islamic world itself, provided the Latin West with the substance of an institution that enabled it to develop rapidly and acquire a growing ascendancy over the rest of the world. The influence of that learning was therefore quite inestimable. It was not just a case of progress in this or that field or discipline, or a specific contribution to this or that aspect of an existing or nascent science. It was the very idea of the university and its reality as an institution that grew out of the Arabs' systematization of knowledge. If you want to talk about the profound influence of Arab-Islamic philosophy on the Latin West, you have to approach the phenomenon from this angle, from the notion that science, ideology and, to some extent, history, the history of thought, took shape in a unique institution, the university.

■ What about the disciplines themselves?

A. de L.: I think a distinction needs to be made between two aspects of this question. As far as the Middle Ages are concerned, one aspect of the medieval output of knowledge is linked to an activity which today seems very outmoded: the commentary. There was a phenomenon that might be called medieval "commentarism"; medieval culture was based on texts. It is reasonable to assume that about half the texts read and commented upon in medieval universities

were of Arab origin. There was the corpus of Aristotelian physics and its Arab sequel, the corpus of Aristotle's *De Anima* (*On the Soul*) and its Arab sequel, and the corpus of his *Metaphysics* and its Arab sequel.

But the manner in which knowledge was transmitted is only one aspect of the question. It is more important to see how new disciplines emerged, how new knowledge was acquired, how sciences came into being. At this point we leave behind the aspect of "commentarism" and the transmission of texts, however interesting it may be, as a phenomenon of another kind begins to emerge.

■ What kind of phenomenon?

A. de L.: I deliberately referred to Aristotle's *De Anima*. It would be stretching a point to describe this as the founding text of psychology as a science. It presents an extraordinarily complex doctrine of the soul, which was adapted, annotated and partly rewritten over the centuries. In this context, a work such as Averroës's great commentary on the *De Anima* is not just another piece of annotation, but one that raises fresh problems that bring out inconsistencies and gaps in Aristotle's discourse. And the realization by Averroës that Aristotle's work led nowhere, that there were residual difficulties in his system—or what was assumed to be a system—and that the very formulation of his founding principle was faulty means that Averroës had something more to contribute than annotation or commentary. He caused the very foundations of philosophy to be questioned.

This being the case, the issue cannot be approached from a purely quantitative point of view. One cannot simply say that Averroës added 200 pages to Aristotle's 100. What Averroës added was the astute perception that Aristotelianism is something that had to be built, that it was not "ready-made", and consequently, that the science of the soul had to be built. Its fundamental tools and its broadest concepts needed to be defined. As soon as Averroës became known, there was a debate about what the science of the soul might be. Before Averroës, what Aristotle had said was simply repeated and reproduced.

I insist on this point because Averroës is usually made out to be no more than a commentator on Aristotle. In fact he was more than this. He

In ancient Greece, the wise man tried to grasp eternal verities, by detaching himself to some extent from the material world. For Averroës, the wise man should know things as they are, going into the detail of a changing world. . . .

certainly repeated what his predecessor said in some areas, but always with the aim of developing a body of knowledge that obeyed the model of science as Averroës defined it—a model that was essentially demonstrative and strongly argued from a logical point of view, a model that sought to be consistent and systematic. It may consequently be said that it was Averroës who, in a sense, invented the science of psychology,

The European individual as a type came into being at the heart of the medieval world, prompted by the notion—which is not Greek but Arabic—that work liberates.

whereas all Aristotle did was pass on the corpus and the terms on which the science would be built.

■ What did Averroës contribute to psychology apart from the idea that it could become a science?

A. de L.: He contributed the basis on which he tried to create that science, namely the critique of materialism. It was important in his eyes to recognize psychological reality as such, as something thoroughly independent, autonomous and separate from the biological sphere (what today we would tend to call the materialist sphere). He made a distinction between the theory of thought and the theory of cerebral functions. He believed there was an absolute moral irreducibility between the physical world and the “noetic” world—i.e. the psychological and cognitive processes, scientific thought itself. He strove to put across a view that preserved Aristotelian empiricism as far as possible, but diverged from it when that empiricism tended to reduce thought to its material elements alone.

Averroës posed the question of the psychological subject, the thinking subject. And he posed it by criticizing any interpretation that might reduce the soul and thought to products of the body, to forms secreted by the body. He regarded the psychological subject as independent of its corporal substratum.

■ What theory did he propose?

A. de L.: He set up a model that the history of psychology has shown to be immensely fruitful—what might be called a topological model. He tried to see the act of knowing in terms of elements that are neither corporal nor non-corporal, but purely psychological—what he called the intellect. In the intellect, he distinguished between a passive dimension which receives concepts, and

an active dimension which produces those concepts. There is therefore an interaction between three agencies—imagination, receptiveness and activity.

So Averroës proposed a theory which, although it broke away from materialism, was not a theory of the individual subject, of the thinking ego, of what Descartes would later describe as “the thinking being”. Averroës did his best to steer clear of the twin pitfalls of materialism and psychologism.

When students say to me: “What on earth is all this talk of active intellect and passive intellect? What does it mean?”, I reply: “What is the ego, what is the super-ego?” They are not entities that can be located in the brain, nor are they egos within the ego. They are agencies that form part of a dynamic vision of the psyche. I believe that if people could think in this way about Averroës, they would appreciate his radical novelty: the introduction of a model that was unknown before him. His approach involved finding a space which is neither that of materiality (the corporeal), nor that of an ego entirely in control of itself and of its conscious acts. It may be a little difficult to grasp, but it does seem to me that this topological model of the soul, which was unknown before Averroës, has not yet yielded all its riches.

■ In your book *Penser au Moyen-Age*, you even put forward the theory of an Arab contribution to the appearance of the European mentality. You suggest that Arab culture could have made possible the emergence of that curious creature which subsequently conquered the world: the modern individual.

A. de L.: Let's start with the notion of the intellectual. An intellectual is someone who lives in a specific institution, the university, and has a specific task, which is to understand, to find out, to know and to act within the general framework of a practice which is that of the scientist. In the ancient Greek world, the wise man adopted a contemplative attitude. He wanted to find out the intelligible structure of reality by detaching himself to some extent from the material world, the world of sensations and appearances. This is the thoroughgoing Platonism of ancient philosophy, which is found even in Aristotelianism, since the ideal of the wise man, as expressed by Aristotle in his *Nicomachean Ethics*, is summed up in a single Greek word: *theoria*, i.e. “contemplation”. A man of this kind lives a life of leisure: he is wealthy and has a small circle of friends. He does not work and he is free.

What fresh contribution does the Arab-Islamic vision of the wise man make to this ▶



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Alain de Libera

► model? I would say that in a sense it rehabilitates the work of the intellectual. Intellectuals no longer contemplate eternal intelligible structures, but know things as they are, going into the detail, reality and substance of a changing world that has its own reality and consistency and is subject to a number of laws. Not a separate and eternal world, but this world, in all its cohesion, beauty, organization and structure. So where is the dividing line between work and contemplation? It does not exist, because it is impossible to be involved in the science of optics or medicine, or to investigate certain meteorological phenomena, without observing, seeking, investigating, looking, working and organizing. This is particularly true of optics, which was the great triumph of Arab science and its finest export to the Latin world.

■ Was this change of perspective also a change in the way people related to work?

A. de L.: Yes. Finding out about things is work. But it is not a constricting experience. Far from it, it has a liberating effect. It does not belong to what were known as the mechanical arts, those “adulterous” arts which ended up enslaving humans to matter instead of liberating them. The whole relationship between scientific work

bers of a society of human beings who have gathered to share a moral code, a task and an ideal.

Obviously this ideal does not at first concern the whole of society. But it is already a model. The modern notion of the individual does not really come into its own until there is an overall social dimension, until there is a general society of individuals, a civil society which parts company with the medieval world of hierarchies, obligations and highly codified social roles.

Universities helped to bring about the transition from one world to the other. They were laboratories in which the notion of the European individual was invented. The latter is always defined as someone who strikes a balance between culture, freedom and enterprise, someone who has the capacity to show initiative and innovate. As it happens, and contrary to a widely held view, this new type of person came into being at the heart of the medieval university world, prompted by the notion—which is not Greek but Arabic—that work liberates.

■ Can you be more specific about this non-Greek notion?

A. de L.: It is the idea, developed notably by Al-Farabi and Avicenna, which holds that the act of knowing, the work of the scientist, generates wisdom. After Avicenna, the Latins eventually adopted this theory, according to which the philosopher and the prophet come together in a single temperament. It is the idea of natural prophecy. For the Latins it becomes synonymous with knowing in order to gain foresight. It is not prophetic revelation; it is the ability to say what must happen on the basis of one’s knowledge of the reality of things. In other words, it is natural, not supernatural, prophecy.

This is an extraordinary novelty: the reconciliation in one and the same person of the scientist and the natural prophet. It takes us to the origins of the new conception of European science, science which is neither purely contemplative nor purely technical, but presupposes a reconciliation of the two.

■ Could you briefly outline for us the successive stages of your philosophy as expounded in your three major works, *Penser au Moyen-Âge, la Philosophie Médiévale* and *Averroës et l’averroïsme*?

A. de L.: In *Averroës et l’averroïsme*, I wanted to write a little book that would show more sympathy for its subject than Renan did when he wrote about Averroës in the last century. My idea was to give an account of the multiplicity of Averroës’s legacies and filiations. I devoted a lot of space to Jewish Averroïsme, because I wanted to show that while Averroës’s influence on posterity was wide-

Avicenna contributed an idea of extraordinary novelty—the reconciliation in one and the same person of the scientist and the prophet. Knowing in order to gain foresight. Natural, not supernatural, prophecy.

and the contemplative attitude is thus radically altered. And it was in the universities that this new type of intellectual most thrived.

I would say that the emergence of the individual began when the relationship between wisdom and knowledge, and between contemplation and work, was completely redefined. Universities were able to expand because they were societies of individuals effectively linked by a whole series of reciprocal services and social obligations. The scientific ideal, the ideal of shared knowledge, of a community of lives based on the communication of knowledge and on the joint discovery of the reality of things—all these went far to shape the individual. In this context, individuals are neither aristocrats living off their resources and savouring from time to time the joys of intellectual contemplation, nor wretches enslaved by the demands of their jobs, but mem-

The idea that philosophy originated in Greece and made its way directly to the minds of 19th-century German thinkers does not hold water. I have tried to rehabilitate the Arab and Jewish contribution to that history—the forgotten legacy.

ranging, it was particularly strong on Jewish thinking. It could be said that a good deal of medieval Jewish philosophy, and certainly its most original side, came in Averroës's wake. *Penser au Moyen Age* was written in a different, freer and more personal way. Sometimes it is more aggressive, and sometimes more ironical.

■ What is the book's thesis?

A. de L.: After making a diagnosis of the deplorable state of political debate in France as regards Islam and the Arab world, based on observation of the devastating effect on people's minds of Jean-Marie Le Pen's ideology in particular and of xenophobic ideology in general, and on a realization that the Arab world was being mixed up with the Muslim world, and both of them associated with a hotchpotch of fanaticism, intolerance and ignorance, I said to myself that the prime task of the historian was perhaps to recall what the "forgotten legacy" had been.

That is the subject of one chapter of the book, and although there are other chapters I think it represents the core of the book. My aim was to draw attention to European culture's profound and usually overlooked debt to the Arab-Islamic legacy, or Andalusian model, as it has also been called. As a result my book, which aimed to give the Middle Ages a new place in the history of European culture and in the making of the European identity, focused on a crucial moment in history—the Arab-Islamic moment.

La Philosophie Médiévale is an academic account of what *Penser au Moyen Age* sets forth in a polemical form. It is based entirely on the notion that philosophy did not die out with the Greeks. The history of philosophy between late Antiquity and the end of the Middle Ages needs to be seen in terms of a shift in the centres of study, a kind of migration. Philosophy was a migratory bird which left the East—Baghdad—in the ninth century A.D. and, after making its way along the Mediterranean, moved up through Andalusia into northern Europe, where it finally reached the land of its choice. But it never died out in any of the places it traversed during its centuries-long journey.

Basically I wanted to show that the history of philosophy based on the Graeco-German myth, which holds that philosophy originated in Greece and made its way directly to the minds of nine-

teenth-century German thinkers—simply does not hold water. Embarking on a perfectly normal process of academic research, I set out to rehabilitate the Arab and Jewish contribution to that history, in other words the forgotten legacy.

■ How does your most recent book, *Saint-Thomas d'Aquin contre Averroës*, fit into this scheme of things?

A. de L.: It throws light on a particular moment in the process whereby Averroës was accepted by the Latin West, the moment when two models of psychology openly confronted each other—Averroës's model, which I attempted to describe above (and which is based on a rejection of both materialism and the Cartesian cogito), and Thomas Aquinas's theory, which was closer to Aristotle. Aquinas defended Aristotle against Averroës, whom he accused of having been a corrupter as well as a commentator, and turned back to Aristotle as someone who exalted the person and personal thought, the ego and the I, against what Aquinas regarded as Averroës's scandalous claim that there is such a thing as transpersonality of thought.

What I wanted to do was to give an account of probably the best and most powerful critique of Averroës produced during the Middle Ages. And, because I so much enjoy working on Averroës, I also wanted to describe what form anti-Averroism could take.

■ What are your plans for the future?

A. de L.: I have several projects. The main one that concerns us here is a translation of Averroës's commentary on Aristotle's *De Anima*. As you know, the commentary has survived only in Latin. The original Arabic version has been lost, and the Hebrew translation is based on the Latin. The Latins pass on to us something that was passed on to them and which no longer exists anywhere else: there could be no better illustration of the silences of history. When translating the text, I shall do my best to make sure that it does not come across as a kind of antiquated curiosity, but as a high point in the history of psychology. I shall try to make a modern interpretation of it, using the instruments appropriate to the kind of debate and discussion that currently focuses on the relationship between body and soul. ■

1. *Penser au Moyen Age*, Seuil, Paris, 1991.

2. *La philosophie médiévale*, new edition, PUF, Paris, 1995; *Averroës et l'averroïsme*, (co-author), PUF, Paris, 1991.

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Radio's bright future

by Bahgat Elnadi and Adel Rifaat

Radio, which recently celebrated its centenary, is widely undervalued. People tend to forget how far it helped to shape ways of thinking in the twentieth century and to minimize the role it is earmarked to play in the twenty-first.

The radio age ushered in a perception of the world in global terms, something that now seems self-evident but which drastically changed parish-pump mentalities and linked the destinies of villages and city districts alike to the unfolding events of our turbulent century. It was over the airwaves that news of revolutions, coups d'état and wars came to the illiterate populations of the Nile and Ganges deltas, and that Indian, African and Caribbean music was widely heard in Paris and London for the first time. Ubiquitous, quick to purvey news based on a diversity of sources, radio brought a new area of experience to all countries and every social class. It would be hard to over-emphasize the important part the new medium played in the spread of democratic pluralism.

All well and good, one might say. Let's bury radio under a mass of valedictory flowers and leave it at that. Radio blazed the trail for television and tomorrow's information superhighways. It has a glorious past but no future.

This is not true. Just as the globalization of financial and technological flows will not dissolve national identities and local cultures, so television will not replace books or kill radio. It is a fact that old habits are going by the board, and familiar landmarks are disappearing. Various kinds of retrogression are in the air. But the further our antennae extend and the further afield we look, the greater our need for roots.

In this issue, Hervé Bourges notes that radio will continue to be indispensable "to cover news in each world region, in each country, in real time" and to enable young people to keep their finger on the "musical pulse" of their choice. In short, it will go on providing people with the freedom to make their own considered personal choices from an increasingly wide range of possibilities.

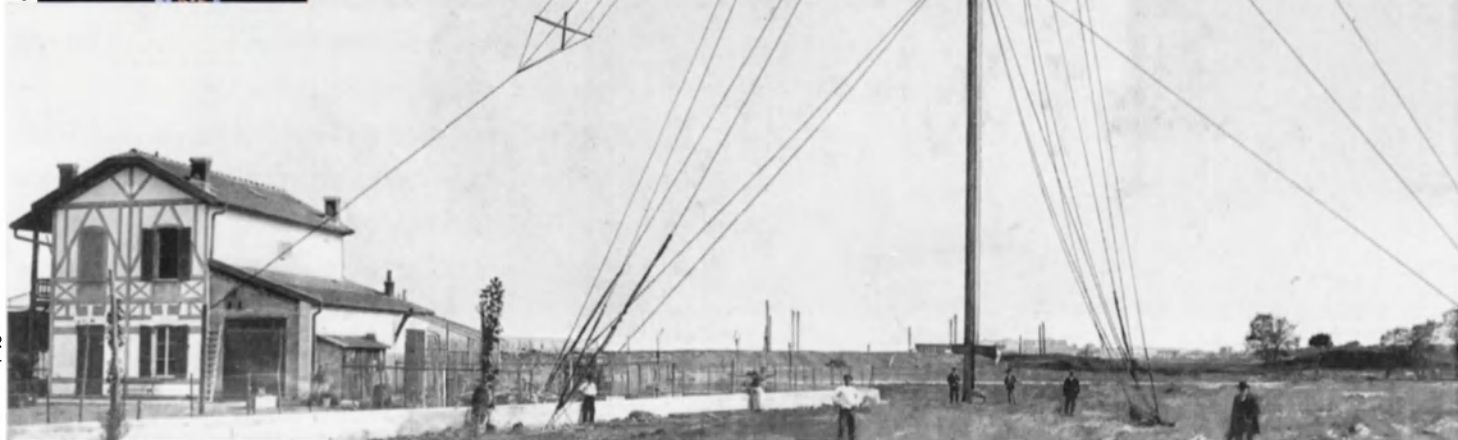
Paradoxically, one advantage of radio is that it is not accompanied by the image. The chief quality of the TV image—that it seems so realistic—is actually its main flaw because it inhibits our imagination and our capacity to stand back and think. We shall always need sound without image as part of our right to interpret for ourselves, as we tune in to the morning news, the meaning of world events. ■

ON THE CREST OF THE WAVES

BY HERVÉ BOURGES



© G. Bassignac/Gamma, Paris



© L. Illustration/Sygma, Paris

An antenna fixed to a mast, near Antibes in southern France (1901).

With hindsight, the coming of wireless seems to have been inevitable, like that of most great modern inventions. It was announced almost simultaneously in two places—in Russia by Aleksandr Popov, and in Italy by Guglielmo Marconi.

Initially, as its name indicates, wireless was a system of long-distance communication without wires. Transmitted in real time, the radio signal defies distance, geographical barriers and geopolitical frontiers. Ubiquitous and instantaneous, radio was the first technological manifestation of a virtual reality whose mysteries are still being explored today. It took a generation before its cultural significance was fully perceived. At first transmitting the language of telegraphy, it was soon being used in the merchant navy, in aviation and above all in the armed forces, where it had many applications.

Broadcasting only became an important

medium of mass communication in the industrialized countries in the late 1920s; the trend was reinforced in the following decade. The expansion of radio was steamrollered by two very powerful forces that are still at work. One was industrial development; the other was political and commercial propaganda.

From crystal set to satellite

The development of radio as a medium of mass communication was shaped to a large extent by the arrival on the market of successive generations of receivers.

The valve receiver, which replaced the pioneering crystal set, was a heavy piece of walnut or rosewood drawing-room furniture. What did it matter if amplitude modulation (AM) coverage (on medium wave, long wave and short wave) was still somewhat hit and miss? Radio was entering the home at the speed of sound.

In the United States, big companies like RCA broadcast musicals featuring the stars of Broadway. While the cinema was still silent radio hummed to the rhythms of jazz and ragtime. In Europe, where post and telecommunications ministries monopolized the airwaves, programmes tended to be more formal—concerts from the Royal Albert Hall, classics from the Comédie-Française, and decorous tea dances.

But on both sides of the Atlantic a new social ritual came in as people gathered to listen to the wireless. In the 1950s the TV set would become the focal point of a similar kind of convivial relationship.

Reaching a world audience

The transistor radio came on the scene in the early 1960s, when the TV set was gradually taking the place of the radio in the home. Along with the record player, it soon became a cult object of the consumer society. Cheap enough to be a mass-produced instrument of personal entertainment, it was a symbol of teenage emancipation in the rich countries. From the North Sea pirate stations to the studio that appears in the film *American Graffiti*, a whole generation celebrated its values, its counter-culture and its music (rock) on the air.

The cheapness of transistor sets also made radio the mass medium best suited to the poor countries, above all in regions where distances and infrastructural weakness meant that communication had to take place over the airwaves.

At the same time, radio became mobile. This was the age of the car radio. Soon, frequency modulation (FM) was encouraging programme proliferation, neighbourhood radio stations and audience segmentation. The extent of the latter, especially in the United States, seems to have gone so far that it is hard to know what people really do listen to.

Will the time come when radio no longer federates distant audiences and different socio-cultural backgrounds? Will digital broadcasting turn it into an elite medium, for example? Some European manufacturers seem to be opting for systems such as digital audio broadcasting (DAB), which offer high definition sound and multimedia services, but require far more expensive receivers. Perhaps consumers will make different choices.

Broadcasting policies have followed the main trends of twentieth-century history so



© Guy Mansfield/Panos Pictures, London

Satellite broadcasting transmits news all over the world. In left foreground, two dish antennae in Bahrain.

closely that they are almost mirrors of our time. The turning point came during the period of reconstruction after the Second World War, when governments realized that audiovisual communication was a key instrument in public life, a sensitive area that ought to be controlled in the public interest.

From monopolies to pluralism

After first national, then international, allocation of frequencies came the development of state radio systems. Once the age of totalitarian illusions was over propaganda radio stations became champions of sovereignty and in some cases supporters of national liberation movements.

Public audiovisual networks put out programmes containing a mix of light entertainment, news and educational broadcasting—the main strands in the fabric of contemporary ▶



© P. Solloway/Format, London

Women disc jockeys at a pirate FM radio station in Leeds (United Kingdom, 1993).

► culture. They were organized in different ways in different countries: kept under relatively close supervision by the executive in countries such as France, Spain and Portugal; shared between political parties (Italy); air time divided between voluntary service and religious groups (The Netherlands); separate services for different language communities (Switzerland and Belgium).

This kind of regulatory set-up came to

A French family listens in (1926).



© Keystone, Paris

prevail on almost all the continents, except North America. Over two centuries ago the United States wrote into its constitution an amendment which prevents congress from legislating to establish a religion or abridge freedom of speech or the press. To appreciate the astonishingly progressive nature of such a provision, it is hardly necessary to recall that royal or imperial censorship existed in most European states at that time and that censors violated the secrecy of private correspondence as well as keeping tabs on printed matter.

The fourth estate

Audiovisual regulatory frameworks in Europe are not totally consonant with an American-style liberal approach. Their foundations were laid pragmatically. The Board of Governors of the BBC, the body responsible for guaranteeing the independence of public broadcasting in the United Kingdom, may have served as a model, but it was the development of FM radio, and later of commercial television in Italy that really set things moving. Political authorities soon came to realize that monopolies were rapidly becoming obsolete and that anarchy threatened. Most coun-



© Rhodi Jones/Panos Pictures, London

A Bolivian youth listens to a radio bought in town with his earnings.

tries set up systems designed to separate the audiovisual media from the state.

The criteria varied from country to country. The United Kingdom put licences up for auction; the French went in for pluralism; the countries of Africa and Asia created institutions designed to guarantee the implementation of a multi-party system and protect national cultural identities. Democratic change was thus transposed into the field of the audiovisual industry.

Digital radio

People often talk of the golden age of radio, as if this hundred-year-old medium were out of date. The fact is, however, that in the South as well as in the North radio, like the written word, has remained an incomparably vital medium, which others can complement without ever being able to replace.

It is true that satellites are bringing to television some of the qualities of radio such as instantaneous transmission and planetary coverage. But no TV news channel, however powerful it may be, will be able to cover news in each

world region, in each country, in real time, as radio does. Satellite music channels can never keep their finger on the pulse of rapidly changing tastes. Young people find the music they want on the FM band of radio. It will be a long time before television becomes interactive and hands over the microphone to the public except in specially staged circumstances.

But radio is also adapting to the age of satellites and digital communication. On the Internet, some information services are already offering a combination of written and audio material. Radio France Internationale, for example, can now be picked up all over the world on a multimedia personal computer. Soon, individual receivers with low-cost dish antennae will make it possible to receive in digital form, anywhere in the world, the main international radio networks relayed by geostationary satellites; the same signal will be able to transmit complementary data to screens with liquid crystals.

And so, in the age of multimedia and online communication, there is still plenty of room for radio. ■

THE FIRST HALF CENTURY

Milestones in radio

(1895-1945)

BY BERNARD BLIN

1895

► Aleksandr S. Popov (Russia) invents the lightning-recording antenna. On 7 May he presents the first receiver of electromagnetic waves to the St. Petersburg Physical and Chemical Society.

► Near Bologna (Italy) Guglielmo Marconi carries out the first experimental transmission of wireless signals over a distance of 400, then 2,000 metres.

1896

► 2 June: In England, Marconi files a patent for a system of wireless communication, and later transmits and receives Morse code signals over a 3 km distance.

1897

► Eugène Ducretet (France) experiments with wireless telegraphy.

► Marconi founds the Wireless Telegraph and Signal Company, Ltd., in London.

► Karl Ferdinand Braun (Germany) invents a device which completes "the tuned circuit", matching the wavelength of transmitter and receiver, a procedure discovered by Sir Oliver Lodge (U.K.).

1898

► 5 November: Ducretet describes to the French Academy of Sciences transmissions between the Eiffel Tower and the Pantheon in Paris (4 km).

1899

► A 42-km link is established in France between two cruisers equipped with Ducretet-Popov devices.

► 28 March: Marconi makes a wireless transmission across the English Channel from Dover to Wimereux.

► Popov makes transmissions covering 50 km. from the shore to Russian ships.

1900

► Marconi obtains a patent for a process enabling an operator to select a wavelength. (The first receivers picked up all frequencies at the same time.) February: The first commercial wireless station is set up, on the island of Borkum (Germany).

1901

► 12 December: Marconi makes the first transatlantic wireless transmission, using Morse code, between Poldhu in Cornwall (U.K.) and St. John's, Newfoundland.

1903

► In Germany Siemens and Allgemeine Elektrizitäts-Gesellschaft create a joint affiliate, Telefunken.

► Valdemar Poulsen (Denmark) invents a means of producing continuous waves by "arc transmission", later used to construct high-frequency alternators for sending continuous radio waves.

► Gustave Ferrié sets up a long-distance telegraph station on the Eiffel Tower.

► The London *Times* and the *New York Times* receive information about the Russo-Japanese war via radio.

1904

► First experiments with telegraphic radio links in Spain.

► In France a commercial maritime radio network is set up under the control of the Ministry of Posts and Telegraphs.

► 16 November: John Fleming (U.K.) invents the thermionic two-electrode valve, or diode, making possible sound transmission.

► A radiotelegraphy station is



◀ The Russian engineer Aleksandr Stepanovich Popov (1859-1906).

In December 1901 Guglielmo Marconi received the first trans-Atlantic radio signal. Below, Marconi at St. John's, Newfoundland, with the receiving apparatus he used.

Marconi's assistants attach the receiving antenna to a kite (bottom photo). Marconi is at far left. ▼



© Novesti, Paris



© Dier/Usis, Paris

© L'illustration/Sigma, Paris

built on the Adriatic coast in the principality of Montenegro.

1905

- ▶ In Canada, the Wireless Telegraph Act stipulates that a licence must be obtained for wireless telegraphy.
- ▶ First wireless communication in Spain, between El Ferrol del Caudillo and La Coruña.
- ▶ Discovery of the properties of galena (lead sulphide) as a detector of radio-electric signals.

1906

- ▶ Reginald Fessenden (U.S.A.) constructs a high-frequency alternator and succeeds in transmitting the human voice via radio.
- ▶ 25 October: Lee de Forest (U.S.A.) applies for a patent on the triode, a 3-electrode valve that makes possible the detection, transmission and amplification of radio signals.

1908

- ▶ 2 April: De Forest experiments with his triode in France by broadcasting from the Eiffel Tower.

1910

- ▶ 13 January: A broadcast from the Metropolitan Opera House in New York featuring Enrico Caruso is arranged by Lee de Forest and is heard 20 km away on a ship at sea.

1912

- ▶ 15 April: Radio amateurs pick up the SOS sent out by the *Titanic*.

1913

- ▶ Amateurs with galena-crystal radios listen in to the first regular weekly musical programmes broadcast from a wing of the Château de Laeken (Belgium).
- ▶ A federation of radio clubs, the Wireless Society of London (later the Radio Society of Great Britain) is founded in London.

1914

- ▶ March to August: a weekly concert is broadcast from the Château de Laeken (Belgium).

1915

- ▶ First international broadcasts, from Germany, of daily news reports.
- ▶ 25 October: The American Navy station in Arlington, Virginia

(U.S.A.) establishes a link with the Eiffel Tower in Paris.

1917

- ▶ The Bolsheviks use radio to influence the Germans during negotiations for the Treaty of Brest-Litovsk.
- ▶ 8 November: A decree on the press establishes censorship that will last for 72 years in Russia.

1919

- ▶ 17 October: The Radio Corporation of America (RCA) is founded, absorbing the American subsidiary of the Marconi Company and amalgamating General Electric, Western Electric, AT&T (American Telephone and Telegraph) and Westinghouse.
- ▶ 16 November: In Germany Hans Bredow organizes political and economic news broadcasts for the press and industry.
- ▶ Many American radio amateurs receive on their crystal sets regular broadcasts from Pittsburgh (U.S.A.) by Frank Conrad. On Wednesday and Saturday evenings the station plays records chosen by the listeners. This marks the appearance of broadcasting as opposed to wireless telephony, where a connection is made from one point to another, between two correspondents.

1920

- ▶ Broadcasting on a regular daily basis was born in the United States.
- ▶ The first demonstrations of radio broadcasting in Australia.
- ▶ The appearance in France of battery-powered receivers with valves and headphones.
- ▶ The Amsterdam stock market (Netherlands) broadcasts stock prices and financial news.
- ▶ 23 February: The Marconi Company organizes a radio-telephone concert (featuring Dame Nellie Melba) that is broadcast from Chelmsford (U.K.) and heard in France, Norway, Italy, Persia and by ships at sea. The British Postmaster General protests against the "frivolous" use of a public service and suspends broadcasts in November.
- ▶ Autumn: Soviet international broadcasts begin.
- ▶ 2 November: The Westinghouse station KDKA in Pittsburgh announces the victory of Warren G. Harding over James Cox in the American presidential election.



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▲ A recital by the Italian tenor Enrico Caruso was broadcast from New York in 1910.



© Jean-Loup Charnet, Paris

◀ In 1903 radiotelegraphy equipment was installed on the Eiffel Tower in Paris. For many years the Tower's transmitter was one of the most powerful in the world.

▼ American farmers with a radio receiver on their way to a dance (1924).



© Boyer-Vollet, Paris

► The first radiotelegraph (Maracay) service begins in Venezuela.

1921

- 2 January: KDKA broadcasts the first religious programme, "Church of the Air".
- In France Gustave Ferrié makes the first radio broadcasts from the official "Paris PTT" transmitter on the Eiffel Tower.
- 9 May: A play is broadcast for the first time on the air, direct from the Davis Theatre in the U.S.A.
- 2 July: An RCA station broadcasts the world heavyweight championship fight between Georges Carpentier and Jack Dempsey from Hoboken, New Jersey (U.S.A.).
- August: Radiokomintern is launched in the U.S.S.R.

1922

- Regular public broadcasting (news and music) begins to spread in many countries, including Argentina, Denmark, Canada, the U.S.S.R. and the United Kingdom.
- The Canadian government imposes a one-dollar tax on radio receivers.
- Publication of Spain's first magazine devoted to radio, *Radio-Sport*, coincides with the inauguration of the country's first transmitters.
- In France a wireless industry employers' federation and an International Wireless Committee are formed to examine legal, economic and administrative issues connected with wireless.
- Rules for the control of wireless telegraphy in time of war are adopted at The Hague (Netherlands).
- 16 August: AT&T launches station WEAJ in New York (U.S.A.), the first station funded by advertising.
- 17 September: The first programmes are broadcast from Moscow to all Soviet radio stations.
- October: The BBC (British Broadcasting Company) is formed. 6 big companies own 60% of the capital, the rest being divided among 200 private companies.
- Marconi demonstrates the range of short waves.
- There are 700 licenced radio stations in the U.S.A.
- The first Chinese radio station starts up in Shanghai.

► Radio broadcasting starts in Cuba.

1923

- The first regular broadcasts in Germany, Belgium, Finland, Norway, Switzerland, Czechoslovakia and Australia.
- 8 February: In Italy radio is nationalized by royal decree and placed under the authority of the Ministries of Posts, of the Army, and the Navy.
- Colombia sets up a Ministry of Posts and Telegraph and an international radiocommunication station.
- 30 June: A French law extends the principle of state monopoly on telegraphic transmissions to the broadcasting and receiving of radioelectric signals.
- A private Radio Club is founded in Madras (India).
- Japan's minister of communications regulates radio broadcasting by decree and bans radio advertising.
- The first experiments are carried out by the Ceylon (now Sri Lanka) Telegraph Service. First broadcasts in Prague (Czechoslovakia).
- First broadcasts by the Finnish Radio Society from Helsinki.
- The federal Mexican government authorizes the first commercial radio station.

1924

- 27 April: The Unione Radiofonica Italiana (URI, a jointly-owned company with a majority participation by the state) is set up in Italy.
- October: Radio broadcasting begins in Austria with the founding of the RAVAG, a semi-public body that takes over from the Viennese Radio-Hekophon experimental station, inaugurated in 1923.
- Regular broadcasting begins in Sweden. It is funded by licence fees, carries no advertising and has an educational mission. Radioj anst (Sverige Radio) is granted exclusive rights.
- In France Paris-PTT broadcasts debates at the League of Nations.
- 14 December: URI obtains exclusive rights to broadcast in Italy.
- A long-wave station is founded in Mexico and a state-run educational station is opened.
- The Philips Company launches the Hilversum (Netherlands) station. Programmes are managed by a listeners' association.

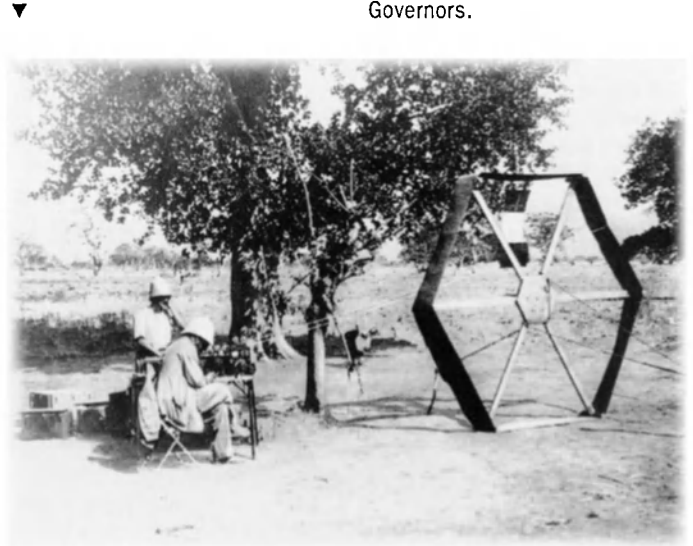
► Experimental broadcasts in Ceylon.

- In the U.K. the BBC broadcasts its first programmes for schools and young people.
- Radio Moscow transmits on a regular basis. Its programmes are produced by *Radiopredacha*, a joint body associating the unions and the People's Commissariat for National Education.
- KDKA broadcasts on short wave to South Africa.

1925

- Radio broadcasting starts in Hungary, Latvia, Poland, Romania and Mexico.
- The Union internationale des radio-amateurs (International Union of Radio Amateurs) is formed in Paris.
- 25 March: Independent companies funded by private capital open the first Japanese radio stations in Tokyo, Osaka and Nagoya.
- 3 April: The International Broadcasting Union (UIR) is formed in Geneva under the auspices of the League of Nations.
- Association Radio-Luxembourg is established with a 50-watt transmitter in the Grand Duchy.
- 20 June: The first Peruvian radio station (OAX) is founded.
- August: Polskie Radio is created in Warsaw (Poland) as a limited liability company (40% of the shares are state-owned).
- The first regular radio service in a British colony opens in Ceylon.
- The United Kingdom's most powerful transmitter is opened at Daventry. It covers 85% of the population and transmits on long

Wireless being used in central Africa (1924).



wave the BBC's first regular broadcasts to North America.

- Venezuela's first radio broadcasting service, AYRE, starts up.

1926

- Radio broadcasting starts in Estonia, Iceland, Lithuania and Yugoslavia.
- A radio station is established in Beijing (China). The Indian Broadcasting Company (an affiliate of British Marconi) is authorized to open radio stations in India.
- A radio broadcasting monopoly is set up in Japan with the establishment of NHK (Nippon Hoso Kyokai), a public utility incorporating the existing Tokyo, Osaka and Nagoya stations.
- Following a resolution from the UIR and seeking to avoid or settle differences between radio broadcasting bodies, the League of Nations examines the dangers of international radio for world peace.
- 3 to 12 May: In Britain the general strike hits the press, and the BBC becomes the only source of news and public information.
- In the U.S.A. RCA sets up the NBC (National Broadcasting Company) network, based on two existing networks.
- Radio Zagreb is opened in Yugoslavia.

1927

- 1 January: The British Broadcasting Company becomes the British Broadcasting Corporation, established by Royal Charter, and is granted the broadcasting monopoly by licence for an initial 10-year period. It becomes a public service funded by a licence fee and managed by an independent Board of Governors.



◀ Reporters use a walkie-talkie radio during floods in Louisville (U.S.A.) in 1927.



▲ British archaeologist Walter Emery broadcasts to America from the burial chamber of the great pyramid of Cheops (Egypt, 1930).

► 23 February: In the U.S.A. the Radio Act grants radio protection under the First Amendment to the Constitution (on free speech) and sets up the Federal Radio Commission (FRC). From now on a licence is required in order to broadcast.

► The Austrian, Czech, German and Polish radio networks use telephone circuits to exchange symphony concerts.

► The Japanese colonial authorities set up a radio station in Seoul (Korea).

► The Indian Broadcasting Company Ltd. opens in Bombay and Calcutta.

► Eindhoven (Netherlands) transmits the first radio broadcasts to the East and West Indies.

► The BBC starts educational broadcasting.

► 11 November: The BBC starts broadcasting on short wave from Chelmsford.

► The Columbia Broadcasting System (CBS) is established in the U.S.A.

1928

► The Kuomintang sets up the central Chinese broadcasting station at Nankin.

1929

► The Zeesen station relays German national programmes to Germans overseas.

► The first short-wave broadcasts in Kenya and in Tanganyika (now the United Republic of Tanzania).

► 11 February: The Lateran Agreement between the Holy See and Mussolini's Italy provides for the establishment of a radio station in Vatican City. Radio Vatican is organized by Marconi and inaugurated in 1931.

► April: Representatives of 27 countries attend an international conference in Prague (Czechoslovakia) and reach a long-term agreement on the allocation of radio-electric frequencies in Europe.

► October: Radio Moscow International starts short-wave broadcasts in German, French and English, in compliance with its missions under the first 5-Year Plan.

1930

► Colombia's first radio station, "Voz de Bogotá", starts to broadcast.

► Danish national programmes are relayed on short wave.

► 7 October: The first Spanish radio news programme, "La Palabra" goes on the air.

► In France, the radio station at Agen warns of the sudden flooding of the Garonne before being swept away by the floodwaters.

► Station 1 BC in Caracas (Venezuela) starts regular broadcasting.

1931

► In Sydney and Melbourne (Australia), Amalgamated Wireless launches "The Voice of Australia", the first regular world

Radio Moscow headquarters (around 1930). ▶



▲ A studio at the Tokyo radio station (Japan), around 1930.



broadcasting service in the southern hemisphere.

► A schools broadcasting service is launched in Ceylon.

► From Ecuador, station HCJB (Heralding Christ Jesus' Blessings) broadcasts religious programmes in 11 languages under the auspices of the World Radio Missionary Fellowship.

► Japanese radio comes under state control and censorship becomes more stringent.

► 29 April: A Madagascar station broadcasts music and information in French and Malagasy for two hours a day.

► A short-wave transmitter makes occasional broadcasts in Thailand.

1932

► The International Telecommunication Union (ITU) succeeds the International Telegraph Union, founded in 1865.

► Radio plays a leading role in the U.S. presidential election campaign (Hoover vs Roosevelt).

1933

► 13 March: A Ministry of Popular Education and Propaganda is established in Germany to control the press, cinema, theatre and radio broadcasting. The RRG (Reichsrundfunk Gesellschaft), set up in May 1925, becomes a state body.

► The Ente Radio Rurale broadcasts “educational” programmes to Italian rural areas in support of a campaign to increase farm output.

► May-June: The broadcasting countries (members of the UIR) attend a conference in Lucerne (Switzerland) to negotiate an agreement on the distribution of wavelengths.

1934

► 1 January: A law regulating radio broadcasting in India comes into force.

► The South American Radio Broadcasting Union (SARBU) is formed.

► 12 February: Austrian Radio (RAVAG) broadcasts official information and practical advice during riots in Vienna.

► In Austria, the Dollfuss government organizes the jamming of Nazi propaganda broadcasts from Germany.

► The first Mongolian radio station is set up at Ulan Bator, serving 1,700 receivers.

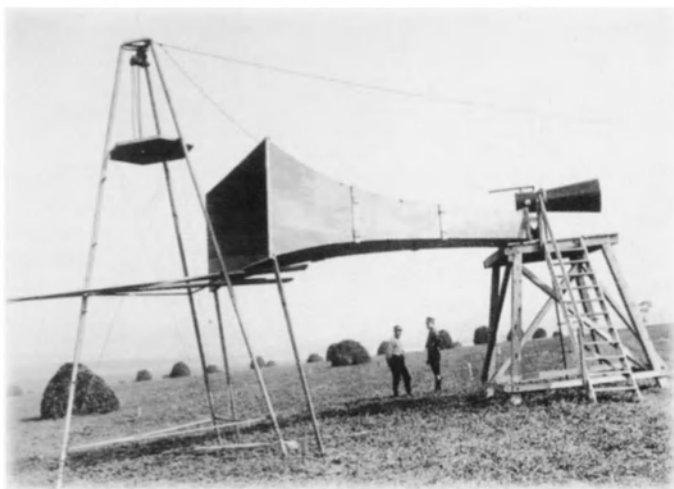
► The Radio Club of Lisbon (Portugal) broadcasts to Brazil, North America and the Portuguese colonies.

► 19 June: In the United States, the Federal Communications Act sets up a Federal Communications Commission (FCC) to regulate transmission and reception of all communications, internal and external, to grant licences and allocate frequencies. There is no censorship, but indecency, vulgarity, false or deceptive signals, etc. are forbidden.

► Radio Vatican starts broadcasting religious services and liturgical and spiritual commentaries.

1935

► Meeting in Brussels (Belgium), jurists of the International Wireless Committee propose a “code of good conduct”



◀ An outdoor loudspeaker built to broadcast Hitler's speeches (1933).

for international radio broadcasting.

► China starts broadcasting to other countries.

Radio broadcasting begins in the Gold Coast (now Ghana).

Italian radio starts to broadcast in Arabic (anti-British propaganda) and jams broadcasts from Ethiopian radio.

► 1 June: Japan starts broadcasting programmes to the west coast of the Americas, Hawaii and the Pacific, in order to defend its foreign policy after leaving the League of Nations.

► 10 August: A radio-communications agreement between Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay sets up technical co-operation and bans broadcasts detrimental to good international relations.

1936

► Number of radio receivers per 1,000 population:

Algeria: 7
Australia: 131
United States: 189
France: 62
Hungary: 40
Italy: 15
Kenya: 77
New Zealand: 146
Poland: 20
Romania: 8
Czechoslovakia: 63
U.S.S.R. 22

► A new radio centre broadcasting on short wave is set up at Zeesen (Germany) on the occasion of the Berlin Olympic Games.

► April: A Radio-Club station is set up in Congo Brazzaville.

► 11 July: In Spain a Falangist group seizes the Union-Radio station in Valencia and announces that revolution is imminent. There is widespread

fighting for control of Spain's radio stations.

► 23 September: The International Convention on the use of Broadcasting in the Cause of Peace is signed at Geneva (Switzerland).

► Hong Kong starts short-wave broadcasting to China and Europe.

► The BBC's first big scoop: a report on the fire at the Crystal Palace (London), with on-the-spot commentary and background noise.

1937

► Number of receivers per thousand population
Germany: 122
France: 76
Netherlands: 118
Canada: 122

► 5 January: A radio transmitter is inaugurated at the Albert I college, Kinshasa (Zaire) on the initiative of the Jesuits. It later becomes “Radio-Leo”.

► Radio supports—within Japan and externally—Japan's military campaign against China. A ban is imposed on listening to foreign radio programmes.

► The United Kingdom has 10 radio transmitters and over 8 million receivers.

► The United States adopts a



A mobile transmitter in France (c. 1935).

“Radio Code”: information is a social duty and should be in the public interest. Radio should provide entertainment, education and information that is not subject to censorship and serves objective truth.

► October: Roosevelt gives a radio talk against the rise of fascism, terror and international lawlessness.

► U.S. commercial radio advertising receipts total \$70 million.

1938

► A law sets up military censorship in Spain.

► There are 650 transmitters and 26 million receivers in the U.S.A.

► 30 October: Orson Welles's programme based on H.G. Wells's *War of the Worlds* is broadcast on CBS and sows panic among thousands of listeners.

1939

► Germany transmits external broadcasts in 26 languages.

► September: The German government makes listening to foreign radio broadcasts a capital offence.

► The French Ministry of Posts, Telegraphs and Telephones establishes Radio Dakar in Senegal.



◀ Arms upraised, Orson Welles directs a rehearsal of a radio programme in 1938. His broadcast on 30 October of an adaptation of H.G. Wells's *War of the Worlds* sowed panic among listeners who thought the country was being invaded by Martians.



◀ Algerians listen to the radio in a café (1939).



▲ A BBC mobile recording unit during the Second World War.



◀ Radio operators of the French Resistance (around 1943).

1940

- ▶ German radio broadcasts a single national programme.
- ▶ 24 April: The first Iranian radio station, supervised by the Ministry of Posts, Telegraphs and Telephones, is inaugurated.
- ▶ 15 May: Belgian radio destroys its facilities in Brussels and moves to France, where it broadcasts from Lille and later from Montpellier.
- ▶ 18 June: Broadcasting from London on the BBC, General de Gaulle calls on the French people to resist.
- ▶ 27 July: In occupied Belgium, a decree makes listening to British radio broadcasts an offence punishable by forced labour.
- ▶ 1 August: General de Gaulle launches an appeal to French Canadians from London.
- ▶ 28 September: Radio-Belgique is established in London.
- ▶ 24 October: Regular news broadcasts begin in Ewe, Fanti, Hausa, Ga, Tiv and French in the Gold Coast (now Ghana).
- ▶ Radio Omdurman is created in Sudan to serve the Allied cause.

1941

- ▶ Radio Douala (Cameroon), broadcasts programmes in support of the Free French.
- ▶ Negus Haïle Selassie I sets up a radio station broadcasting 4 hours a day in Amharic, Arabic and English, independent of colonial control.
- ▶ Radio Nairobi (Kenya) broadcasts in Hindustani, Urdu and Gujarati.
- ▶ The Geneva Studio (Switzerland) begins broadcasts in support of humanitarian action by the International Red Cross.
- ▶ August: A commission led by Colonel W. Donovan is set up in the United States to combat Axis radio propaganda worldwide.
- ▶ The Yugoslav radio network is destroyed. A transmitter is built at Skopje. A clandestine transmitter of the Central Committee of the Communist Party of Croatia is established at Zagreb.
- ▶ Radio starts up in Northern Rhodesia (now Zambia).

1942

- ▶ 24 February: The Voice of America (VOA) starts short-wave broadcasts in English, French, Italian and German.

- ▶ 14 July: Following an appeal launched on the BBC, tens of thousands of French people gather around war memorials and then parade through the main streets of French towns.
- ▶ The Office of War Information (OWI) is set up in the United States.

1943

- ▶ 18 June: "Radio-Brazzaville-Voix de la France Combattante" is inaugurated in the Congo.
- ▶ Radio Kudu is set up at Hargeisa (Somalia) for the British army.
- ▶ The BBC starts broadcasting English-language lessons and halts its Russian-language broadcasts at the request of the Soviet government.
- ▶ 4 July: The American Forces Network (AFN) is set up.

1944

- ▶ Chinese communist stations in the Shaanxi-Yanan region start broadcasting.
- ▶ 1-5 June: Coded messages broadcast on the BBC announce the imminence of the Allied landings (which take place in Normandy, France, on 6 June) and alert resistance fighters for action.

1945

- ▶ 23 March: In France, all private radio stations are nationalized by decree and the state broadcasting monopoly is strengthened.
- ▶ 11 April: The Sarajevo (Yugoslavia) radio station starts broadcasting.
- ▶ 19 May: The Berlin Rundfunk starts broadcasting.
- ▶ 9 June: Radio broadcasting in the Soviet-occupied zone of Germany comes under the control of the Soviet military administration.
- ▶ 15 August: The Emperor of Japan makes his first radio broadcast, announcing his country's capitulation.
- ▶ 10 September: A memorandum on "Freedom of expression and freedom of the press" in Japan abolishes all restrictive laws promulgated under the previous regime.
- ▶ 11 December: A memorandum reorganizes NHK. Government control is abolished and private radio is banned. A committee of representatives of the Japanese people is formed. ■

THE SECOND HALF CENTURY

A continuing struggle for access to the airwaves



© Keystone, Paris

During the Hungarian uprising in 1956, crowds gathered to air their demands outside the Radio Budapest building, its façade pitted with gunfire (above).



Radio has an image problem. It lacks the maturity of the newspaper industry and the modernity of television. Unlike the newspaper, radio has to be understood immediately and unlike TV it lacks an appeal to young people attracted more to visual images in an increasingly multimedia world. And yet it continues to hold the largest audiences of all media and it has been party to the most dramatic political developments during the past half century.

National radio stations have had an enormous impact on the political lives of their citizens. Was it not Moscow Radio which broadcast Khrushchev's message to Kennedy in which he announced the dismantling of Russian rocket bases in Cuba? Egyptian radio broadcast President Nasser's announcement of the nationalization of the Suez Canal, Hungarian radio reported the crushing of the Hungarian revo-

lution, Czech radio reported the demise of the "Prague Spring".

Nothing, however, allows radio to give greater value than times of crisis or war. The Gulf War was dubbed the first war to be conducted in the media. It has always been assumed that the media in this context meant TV. According to research, however, the first source of knowledge that war had broken out in the Arab States was "word of mouth" for the majority of people in Egypt, the United Arab Emirates and Saudi Arabia. Radio surpassed TV in all three of these countries as a source of further information.

But when a normally credible station such as the BBC is based in a country which gets involved in a crisis such as the Gulf War it too can be mistrusted. "If an uneducated person hears the news on the BBC, he'll believe it even if it's wrong... they can start rumours..." And

(1945-1995)

BY GARETH PRICE



© Keystone, Paris

President Nasser of Egypt used the radio to proclaim the nationalization of the Suez Canal in 1956. After the broadcast he was acclaimed by the crowds.



© Keystone, Paris

Czech radio gave up-to-the-minute reports of events during the "Prague Spring" of 1968. Above, a lorry carrying young patriots passes a detachment of Soviet tanks parked on the pavement.

A big crowd turned out for the opening of Malopolska Fun, Poland's first free foreign radio station, in Cracow (1990).



© J.-M. Turpin/Sygma, Paris

so we are back with accusations of propaganda, with the eternal philosophical debate concerning the existence of objectivity. Perhaps it is easier for the pragmatic journalist to aim for the slightly different goal of credibility.

Jamming the airwaves

It is the fear of an audience believing a radio station which leads to jamming of the airwaves, a phenomenon that came to its height during the cold war of a communist era that only eased off in 1985 with the accession to power of President Gorbachev. Jamming by the Soviet Union in the early 1980s was calculated to cost \$800 million per year because the jammer has to transmit a blocking noise as strong as the incoming signal—and even then some signal does get through. It was always difficult to cut off the listener determined to receive the broadcasts.

The world of transfrontier radio since the fall ▶



© J. Langewiesche/Sigma, Paris

The antenna of a radio station in support of Kanak independence in New Caledonia (1985).

► of communism is more complex. After the accident at the Chernobyl nuclear power station in the Soviet Union in August 1986, Radio Liberty carried out an audience research investigation in order to establish how listeners had discovered the facts about the crisis. More respondents quoted Western radio stations as their prime source than those watching Russian TV. A majority of the sample who had first heard of it on TV switched to Western radio for added knowledge. In some post-communist countries, the broadcasters now have less resources with which to compete with the Western media

in reporting a major crisis. Even during the Bosnian conflict, the Bulgarian media were heavily reliant on reports from the West because they could not afford to send correspondents to the war arena next door to them.

The transistor revolution

Transfrontier broadcasting is a costly business but it has many participants. In Francophone Africa, for example, Radio France Internationale (RFI) and the commercial Afrique Number One broadcasting from Gabon may dominate

the airwaves but they face stiff competition from the Soviet Union, China, South Africa, Germany, the U.S.A. and the U.K. In recent years, rebroadcasting of international radio services on national networks as well as on cable systems has increased considerably.

In this age of satellites it is now difficult to imagine the problems of radio transmission in earlier days, particularly the problem of worldwide reception. Short-wave transmissions faced obstacles galore—limited range, the sun, ionospheric storms, the seasons. Today's obstacle is congestion of the airwaves.

From the listener's point of view, however, the invention of the transistor in the 1950s was particularly important in revolutionizing radio. Until then the majority of sets were in Europe and North America. The transistor opened up listening in sub-Saharan Africa, in China and in India from an estimated 2.5 million sets to 90 million sets in the space of twenty years after 1956.

In the last twenty years alone radio set ownership has doubled again around the world and even today the potential for growth is incredible. There are over twice as many radio sets in existence as there are TV monitors.

The rise of local broadcasting

The interesting fact about even transfrontier broadcasting is that in any one country listening to broadcasts from international operators always peaks when the national or vernacular languages are used. And this is why local broadcasting has now come into its own.

One has only to consider the number of languages used in some countries to realize that TV cannot compete with radio in servicing multi-ethnic and multi-linguistic audiences. In some emerging democracies, strenuous efforts are made to embrace the linguistic maze. In Namibia, for example, the constitutional problem of language was solved by adopting only one language—English. But NBC, the national broadcaster, caters for the real linguistic needs of Namibian listeners with seven services in all including the major indigenous languages and Afrikaans. In neighbouring South Africa, eleven languages are given equal status in the constitution. Radio copes with all eleven, while TV struggles to embrace but a few.

It is difficult for TV to reflect national cul-

tural mosaics. Radio is better able to embrace the national cultures, in music as well as in the spoken word. The demand for music, whether classical, folk or pop, gives an option to people's lives which can only be satisfied on radio.

A sense of place

All the same, there are limitations to the number of languages which radio can cope with. It is unrealistic to even consider the possibility of all of Papua New Guinea's tens of dozens of languages getting airtime in the short run. There are also worries that tribal differences in Africa or ethnic divisions in the former Yugoslavia have led to the development of radio of the worst possible kind. It is for governments to promote the media in a regulated way within the context of a democratic society.

There are legitimate needs within each state ▶

A Zambian villager listens to a radio hooked up to added battery power.



© Corinne Treppe/Format, London

► which do not necessarily conform to the state boundaries. This is where national radio's role in several countries has been challenged by the strengthening of local commercial radio providing services in local languages and a greater depth of national and local identity. This is an important concept best dubbed "a sense of place" and it is the very antithesis of trans-frontier broadcasting. In 1996, the retiring chairman of the European Broadcasting Union's Programme committee, Geraint Stanley Jones, delivered an important lecture which embraced the essence of the argument:

"Broadcasters have a special role in maintaining a culture and cherishing identity," he said, "for it is not just, indeed it may not even be principally about information. It is as much about culture—music, art, education, language and so forth. At its best it reflects back to a community the richness which that community contains. There is no other medium which can do it; and at the end of the twentieth century if public service broadcasters don't do it other broadcasters will swamp the airwaves with other messages. I would now argue that credibility in broadcasting, requiring as it does identity between the broadcaster and his or her audience, also now requires much more attention to be paid to cultural differences than to national mass. In a Europe with fewer national boundaries people will be freer to develop and

deploy their local identities as part of the broader whole. And broadcasting needs to reflect and celebrate and foster that. It can only be public service broadcasters who will do it."

But public broadcasting has to be carefully defined because it is not always to be found in the state or national broadcaster, certainly as far as independent journalism is concerned. One of the basic problems facing journalistic independence in most countries of the world during the past half century is the repressive attitude of the governments of new states, often termed emerging democracies, towards their own national or local media.

Threats to independent reporting

When the "winds of change" released dozens of countries in Africa and Asia, the South Pacific and the Caribbean from the bonds of colonialism in the 1950s and 1960s, few emerged successfully either as true democracies or with anything other than large state radio stations tied to a government information policy. The majority of countries even today have retained these large state broadcasters who have a valuable role to play in the "nation-building" process albeit at the expense of independent journalism. They have contributed to the struggle for better health and hygiene in development and educational programming. In



A woman mechanic is interviewed for *Buenos Tiempos Mujer* (El Salvador), a community radio programme produced by and for women and designed to help the country's needy women. The programme was launched by Unesco with support from the Salvadorian government and funding from Germany.

that sense they have had an important role as a public broadcaster but one deprived of independence in reporting on government itself.

The irony of that situation is that it has been left to the emerging private radio stations to test the waters of actual reporting in its truest sense. Similarly, the major feature of the 1990s in the post-communist world has been the difficulty of persuading governments which claim to be democratic that independent media are the prerequisite for good government and underpin a truly democratic nation. Such a sea-change requires media which stop being messengers for politicians and start servicing the audiences who elect those politicians. In other words, journalists should report on government performance between elections.

It is a difficult enough task to get this message across in all the countries of Central and Eastern Europe and the Commonwealth of Independent States (CIS) in their difficult transformation from communism to free market economies. It is even more difficult in countries such as Bosnia and Serbia where hate is ingrained on all sides. In the emerging democracies the hope for independent journalism lies not with the state "public" broadcasters but with the small private and commercial operators who dare to take a different approach. It is they who build credibility and therefore audiences.

Unfortunately there are all too few countries even today which allow for freedom of speech. While journalists in the more sophisticated democracies tend to indulge in varying degrees of self-censorship, those in emerging democracies have little pretence to subtlety when interviewing their favourites. But there are those even worse off, such as the journalist in one country I shall not name who, when asked by a Western journalist in 1992 whether he submitted questions in advance for a ministerial interview, answered "No, the Minister gives me the questions. And if I change the script I could be shot". In fairness to journalists paid by governments, they cannot be expected to report on their paymasters.

The clash between ideology and idealism will continue for years to come, complicated by the increased pressures on public broadcasting on the one hand and commercial survival or profit on the other. The good news is that the choice of radio channels available to audiences throughout the world is rising every day. ■

A PUBLIC SERVICE

BY KNUD EBBESEN

Public service broadcasting means providing a service to the public in all its diversity, not only to important or interesting parts of the public.

Its implications were well defined by the President of the European Broadcasting Union, Professor Albert Scharf, when he said: "Public service programming calls for such duties as accuracy, reliability, objectivity, truthfulness in disseminating facts, honesty and fairness of comment, impartiality in all matters of public controversy. Majorities have to be reflected as such; silent minorities must also be respected as such, i.e. the right balance must be found. This does not, however, exclude commitment to new ideas and unthought thoughts; it does not prohibit provocation. On the contrary, the trust that broadcasters must serve includes a commitment to promote innovations and new trends, to advance the creativity that is hidden within society."

For the British broadcaster David Attenborough, "Public service broadcasting is not just a schedule with a peppering of good programmes, nor is it a broadcaster with claims to a social conscience. It is a system which strives to provide the widest possible range of programmes and is enabled to do so by being beholden neither to commerce on the one hand nor government on the other. . . . Public service broadcasting, uniquely, can thus be free from pap on the one hand and propaganda on the other".

The editorial and political freedom of a public service broadcasting organization has to be defined in its charter and secured by legislation. Its funding also has to be considered carefully and no method or combination of methods is ideal. Even limited dependence on advertising revenue creates a conflict of interest, diverting broadcasters from public service standards. Licence fee funding has fewer drawbacks than other methods but can only be introduced in countries where the general public has sufficient paying power.

Even where appropriate legislation has been passed and an adequate funding mechanism exists, governments sometimes find it difficult to abandon control of the media. They fear public criticism and find ways to encourage self-censorship among broadcasters and management.

The public service concept of radio broadcasting has proved to be a valuable tool in supporting the continuing struggle for democracy and people's participation in social development at both local and national level. ■

FROM SHORT WAVE TO SATELLITE



© L'illustration/Sygma, Paris

Do satellite and digital radio spell the end of short-wave radio?

For almost seventy years, short-wave transmission has been the most efficient method of delivering programmes across long distances. Today, however, the development of new technologies such as satellite transmission, digital audio broadcasting and interactive two-way cable is forcing many international broadcasters to reconsider the choice of short wave as their principal medium for the future.

The phenomenon known as “short-wave radio” is actually the result of a combination

of transmission technology and the electromagnetic properties of the earth’s atmosphere. Just as the waves of the ocean are caused by the vibration of water molecules, radio waves result from the vibration of electromagnetic particles. The rate at which they vibrate is much faster than that of ocean waves—several thousand times per second, or even several hundred thousand times per second.

The number of vibrations (or cycles) per second is the frequency of the wave. The cycle per second is named the hertz (abbreviated Hz) after the German physicist Heinrich Hertz. The higher the frequency of a radio wave, the shorter its wavelength—the distance between two consecutive cycles. Radio waves of different lengths are used for different purposes, because they have distinct physical

properties. Radio stations are allocated frequencies according to a system ratified by a series of international conventions. They are often identified by their number on the dial, which corresponds to a frequency in kilohertz (kHz) or megahertz (MHz).

Hopping round the earth

Short-wave transmissions are in the frequency range of 3 to 30 MHz. They are used for international broadcasting because their physical and electromagnetic characteristics (wavelength, energy level, etc.) allow them to be reflected by the ionosphere, a layer of electrically charged particles in the upper atmosphere. Unlike domestic broadcast transmissions, which are beamed at the horizon and cover a broad but local area, international short-wave broadcasts are pointed at the sky. When a radio wave emitted from a transmitting antenna hits the ionosphere, it “bounces” back towards the earth. This is called a “hop”, and carries

the signal a distance between 2,000 and 4,000 kilometres.

The wave is then reflected back towards the ionosphere by the earth’s surface, making another “hop” as it again returns to earth. After several “hops” the signal can reach the other side of the globe. The more powerful the transmitter, the farther the signal can travel.

But the ionosphere also causes problems for long-distance broadcasts. The generation of radio waves in the ionosphere is strongly affected by the time of day, the season and sunspot activity. Small but rapid changes in the ionosphere’s altitude and makeup alter its reflecting abilities, affecting the quality of reception.

Static also interferes with short-wave reception. It can be caused by electrical charges such as those produced by ignition systems in automobile and aircraft engines. But lightning is the most common culprit. Radio frequency interference produced by these atmospheric discharges can travel thousands of kilometres. Since there is almost always a thunderstorm somewhere within a few thousand kilometres of any radio, static is a constant disturbance. This is why short-wave broadcasters often send the same programme simultaneously on several frequencies, and periodically change these frequencies. But as a consequence, the ▶

Left, a Mongolian nomad camp in the Gobi Desert around 1930.

Below, Somalis listening to the BBC World Service learn that Mogadishu has fallen (1991).



© Hamish Wilson/Panos Pictures, London

- ▶ spectrum of frequencies is often overloaded, increasing the likelihood of interference and restricting the introduction of new services.

Technological innovations and improved co-operation among countries are now making it possible for international broadcasters to provide alternative solutions to ensure reception and improve sound quality. For example, they now often transmit programmes by satellite to local FM stations, which retransmit them as part of their domestic schedule. Rebroadcasting is fast replacing short wave in some parts of the world, especially in Russia and Eastern Europe.

In areas where co-operation agreements are not yet possible, the same technology is used to relay signals to short-wave transmitters in the target region. The closer the transmitter, the fewer “hops” necessary to reach an audience, resulting in greater listening comfort.

Satellite direct broadcasting

Short wave has been called the “first generation of international radio”. The second generation, according to Simson Najovits, deputy editor-in-chief of Radio France Internationale’s foreign language services, is the system of programme placement and leasing of domestic FM transmitters. “What is strange,” he says, “is that the second generation is not likely to last for many years. What’s likely to overtake it is the third generation called mobile radio.” Mobile radio, also known as Satellite Digital Audio Broadcasting (Satellite DAB), means digitally encoded signals, similar to the digital sound on a compact disc, sent directly from satellites to radio receivers in homes, cars, or on the street. This, in the opinion of Najovits, will relaunch the idea of international radio.

“It will suddenly make international radio from several countries available everywhere in the world with a simple mobile receiver,” he says, “which if mass-produced would be sold for perhaps \$100. A whole new horizon will be opened, both in information and entertainment. It will mean almost a new medium.” The technology exists already, and prototype receivers have been built.

The proliferation of Satellite DAB is dependent on a typical chicken-egg scenario: receivers will only be manufactured if there are broadcasts to receive, and broadcasters will only use the technology if the potential audience has receivers. Market studies indicate that most radio listeners are unlikely to spend \$100 on a new radio just to receive international broadcasts. The market will be driven by the conversion to DAB by domestic broadcasters, initially in developed countries where the



© Mark Edwards/Still Pictures, London

means to invest in expensive new equipment are more available. The dilemma for the large international broadcasters is that the majority of their audience is in the developing world.

The North-South gulf

“We’re finding that there’s an increasing split,” says Jonathan Marks, Director of Programmes at Radio Netherlands and organizer of a recent conference on the future of international broadcasting. “In some parts of the world technology is leaping along very quickly, but if you look at the statistics, there’s an enormous gulf between North and South.” There is a large existing base of short-wave receivers—particularly in Africa and in the former Soviet republics, where short wave has also been used for domestic broadcasts across large stretches of territory.

“A lot of people in Third World countries depend on short wave,” explains Victor Goonetillike, a teacher and writer who monitors international broadcasts from his home in Sri Lanka. “They listen to it for information, not for stereo music quality.” He emphasizes that \$100 can represent an entire month’s income for a family in a poor country: “The technology will be able to reach the audience,



A satellite dish brings telecommunications to Bhutan.

but whether the audience can reach out for it is another matter.”

“People are still listening to short wave,” confirms Andres Sennitt, editor of the *World Radio and Television Handbook*. “The broadcasters on the other hand have limited budgets. They want to invest in new technologies because that’s obviously what’s going to be important in the future. And in order to do that they’re having to cut back on some of their short-wave broadcasts. So they’re having to make difficult choices—whether to invest for the future and risk losing some listeners in the short term that they might regain later on, or whether to stay longer with short wave, and risk being squeezed out of the digital medium. There are only going to be so many satellites and if the big broadcasters have already taken up the space, there won’t be anything left for the ones that come along later. “The real irony,” as Dr. Kim Andrew Elliott, producer and presenter of “Communications World” on the Voice of America, and the VOA’s former director of research, points out, “is that we already have DAB TV as a reality, but DAB radio is a distant dream.”

One possible compromise which would permit the continued use of short-wave transmission for the short to medium term, and at

the same time improve the quality of reception, is to relocate short-wave transmitters which currently deliver their energy (via the “hops” described above) to distant places, but not to neighbouring countries. For small to medium external services such as Radio Prague International, the most effective way to operate is regionally, targeting neighbours with similar interests and cultures to their own.

Relocating transmitters

The current short-wave system was set up at a time when international co-operation was difficult or impossible to achieve in this area, and stations had to use powerful transmitters in their home countries, not necessarily the best locations for reaching their target audiences abroad.

Now that there is a greater spirit of co-operation among international broadcasters, says Oldrich Cip, co-ordinator of frequencies and adviser to the management of Radio Prague International, “We should start co-operative projects which would relieve the enormous pressure on the space of the short-wave spectrum. We could introduce integrated projects such as streams of multinational broadcasts on special channels. They would be broadcast from strategically located positions on the outskirts of Europe, let’s say from Russia towards western Europe or from the Iberian peninsula towards eastern Europe. This would deliver 100 per cent reliable signals into these target areas. The homeland-based transmitters could be switched off and the spectrum would be cleared and improved.”

In western Europe, Cip says, “you would hear a stream of programmes, perhaps including Radio Prague and other stations from Central Europe at very good strength, whereas if you listened to those programmes from the transmitters within central Europe you would probably hear very little or nothing, especially during the winter evenings because of physical conditions.”

If the lure of new technologies is irresistible for international broadcasters, short wave still has a powerful hold on listeners, even in rich countries. Oldrich Cip believes that short waves are here to stay for at least two more decades, and probably for much longer. “Short wave as a natural resource will always remain within the spectrum of radio frequencies. Even if we change to digital, we still have some space which has to be utilized somehow. I am convinced that the condition of short waves can be reversed so that they can be very effective and relatively reliable. Of course, some of the vagaries of the ionosphere never change. But this is also one of the fascinations of short-wave reception.” ■

BY THE PEOPLE, FOR THE PEOPLE

BY CARLOS A. ARNALDO

Self-reliant low-cost community radio stations at the heart of rural development



© Carlos Arnaldo/Unesco, Paris

A young member of a street theatre group in Sri Lanka invites villagers to come to a show that will be broadcast on radio.

The concept we developed was very simple: a radio built by and for the community that would be small and effective, and capable of being maintained, repaired, programmed, produced and aired by the people themselves.

There would be no large freight cases, no need for heavy trucks to meet the shipments at the pier or the airport, no tall shiny metallic cabinets to hold electronic gear. The whole station would fit in a suitcase. So successfully were these specifications met that our consultancy visits to prospective community radio stations often began with, "Yes, welcome, but uh, where is it?"

The beginnings

Historically this kind of community radio arose from a combination of two factors: limiting transmitter power so as to keep costs down, and using radio constructively to get members of a community to work with each other for social and economic improvement.

Technically the concept became feasible in the late 1970s, when silicon chips were taking over the tasks (amplifying, fine tuning signals, selecting frequencies, controlling low-power electric currents) of vacuum tubes in transmitter design. This meant that the basic transmitter (the exciter) could be the size of a small book instead of a bookcase; it could be assembled in a few hours instead of a few days or weeks; it would not heat excessively and therefore did not need large and noisy cooling fans; it would cost less to ship, to maintain, to replace and to handle.

An FM (frequency modulation) transmitter of this size, designed for UNESCO by Martin Allard, produced only 10 to 15 watts. But with a 10-metre mast and a simple antenna, and with no interference from other FM stations in the immediate area (which is the case in many developing countries), this transmitter could cover an area up to 15 kilometres in radius. Given the dispersion of rural populations in many countries, this would

mean from about 20,000 to a maximum of 100,000 people.

The prototype: Homa Bay

Homa Bay Community Radio, which was installed on the shores of Lake Victoria in Kenya in 1982, was UNESCO's first attempt to set up a station based on this newly designed low-cost, low-powered equipment. Engineers assembled a small transmitter and a six-channel mixer designed by the former Director of Technical Operations of the Ghana Broadcasting Corporation. Microphones, tape recorders and other components in the semi-professional range could be purchased at reasonable prices. Later, engineers also designed an FM receiver and an amplitude modulation/short-wave (AM/SW) receiver adapter, both presented in kits for local assembly.

Homa Bay Radio primed the enthusiasm of the local folk for their "own radio", and sparked their interest in local affairs. But the station was short-lived. After two years, it was dismantled. Independent FM community radio in 1984 was a little ahead of its time in Kenya, but the experience was valuable to many other countries. It showed that radio could be made by the community and that it did not have to cost millions. It cost only \$25,000 to finance Homa Bay.

Village volunteers

In Sri Lanka, the opportunity for another experiment arose when Guirandurokotte, a newly established township in the heart of the Mahaweli Development Area, was chosen to be the site of a new development centre and a community radio station. In 1979 when the project was launched, Guirandurokotte was a grassy field crossed by a feeder road lined with a handful of shanties where saronged old men sold tea and cakes to weary travellers. It was located in an upstream area of Sri Lanka where there were fertile valleys and vegetable gardens, small temples set amidst majestic coconut trees and rich green rice terraces. Downstream, where the river dried up before it could reach the plains, the land was hard-caked and dry. The cattle were thin and mortality rates for infants and farm animals were high. Dirt roads octopusped into the interior, where there were more dried mud and shrivelled crops.

The basic plan of the Mahaweli Development Authority was to build a network of



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reservoirs upstream, store water, and then release it regularly through newly constructed canals to ensure all-year-round irrigation to the downstream regions. When the valleys were flooded, some one million settlers would have to move downstream to the drylands which would eventually be watered by the new canals. One could imagine the anguish of farming families at having to uproot their homes, farm implements and religious shrines and settle in some unknown dry region downstream. Whole villages with their sacred temples would soon be underwater.

Alongside the Mahaweli Plan, a joint UNESCO-Danish International Development Agency (DANIDA) project aimed to create and train a team of mobile radio producers who would visit the villages both before moving and after resettlement and would produce programmes to smooth the transition to their new homes.

The Guirandurokotte Community Radio, Sri Lanka's first permanent FM Station, was a key feature of this project. From this station, built by its own technicians, the production team related to the immediate community. The technicians also designed and built their own mobile audio mixing console for fieldwork, and when the transmitter developed faults, they altered the design themselves and kept the station on the air. With the exception of a few weeks during the critical stages of the civil disturbances in Sri Lanka in 1988 and 1989, ▶



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© Carlos Arnaldo/Unesco, Paris

Above, a news producer of the Bhutan Broadcasting Service (BBS) prepares her programme.

Top, recording a quiz for Bhutanese farmers. The BBS received aid under a UNESCO-Danida multilateral project between 1989 and 1993.

A recording studio at the Guirandurokotte community radio station (Sri Lanka).

VILLAGES

The 20-watt transmitter was hit by lightning and broke down in May," begins the Project Manager's report for 1994. "It has been replaced. The local technicians were advised to install a lightning arrester to forestall repetition of the accident."

The people of Banga, a small town in the province of Aklan, in the Philippines, are quite capable of taking preventive measures of this kind. After all, it was they who set up their small community radio station on the campus of the Agricultural College and mounted its antenna on top of a concrete structure on a small hill nearby. The station, one of five similar set-ups in the less developed areas of the Philippines, was established several years ago as part of Tambuli, a community radio project in which UNESCO, the Danish International Development Agency (DANIDA) and the Philippines are collaborating. (Tambuli is the traditional way of calling villagers to an important meeting.)

In this kind of project, the initiative comes from the communities. The local folk build the radio station, and after group discussions, they set the guidelines for the broadcasters. They organize the radio team, drawing on all sectors of the village. There is no lack of volunteers. At Banga, Lyn Villasis, a beautician turned broadcaster, reads fairy tales to children over Radio Manduyong, modulating her voice to evoke the characters in each story. A health programme is hosted by a midwife. On Radio Tambuli in Laurel, a little town in Batangas province, Nerrie Bihis gives talks on development topics, town cleanliness and good manners, while a local police officer hosts a weekly awareness programme on law and order.

Village problems get an airing

Two Christmases ago the Banga community went carolling to raise funds for the purchase of a karaoke sing-along system for their radio station. In Baranggay Bugtong Bato, where Radio Ibajay did the organizing, Vicente Pagayonan played indigenous songs on a flute



© Georges Dupont/UNESCO, Paris



© Georges Dupont/UNESCO, Paris

© Georges Dupont/UNESCO, Paris

- ▶ the station has been on the air continuously since 1986 and is still operating today.

The team recruited a number of volunteer producers and assistant technicians from among the villagers. One volunteer, a farmer's daughter, opens the station every day with the sign-on announcements; others assist in announcing duties and production tasks. The station has also sponsored a clinic where village folk were taught the basics of health and hygiene and spread this learning both by radio and person-to-person campaigns. The station regularly promotes income-earning activities, such as breeding goldfish for sale in the town market and recording music cassettes of local songs and poems. Guirandurokotte has been eminently a people's station.

New targets

Now after more than ten years of experience, new targets have been set, using community stations in Welikande, Batticoloa, Trincomalee and further north, possibly as far as Jaffna, to support the peace accords which are seen as a major springboard to rural development nationwide.

The basic philosophy behind this work has been to encourage communities to undertake their own communication tasks and run their local media facilities to further development, catalyse their evolving culture and bring about a lasting peace. In many ways, radio brings power to the people of these communities. ■

Kenya's first community radio station, operational from 1982 to 1984, was set up by UNESCO at Homa Bay.

FIND THEIR VOICE

BY WIJAYANANDA JAYAWEERA
AND LOUIE TABING



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© Louie Tabinig, Tambuli Community Radio

made from a PVC plumbing pipe! Whatever the music, people sing to cultivate a sense of belonging and identify with their community in the context of a larger national culture.

In Banga, karaoke is more than just a sing-along machine. Karaoke time is time for their *barangayan sa himpapawid* (village on the air). Live interviews, and discussions with local officials are broadcast between spontaneous musical performances, problems are raised and solutions are sought in what amount to village meetings aired over the local radio station.

Olutunga is a small island near the southern tip of the Philippine archipelago, which comprises some 7,000 islands. Toto Val Samonte, manager of Olutunga Island Radio (DXOI), wants it to become “the best island in the world”, an ambition that reflects the confidence of his fellow townsfolk in the power of radio to make Olutunga a better place in which to live.

Community radio stations regularly hold forums—often linked to karaoke sessions—on gambling, irrigation, relief during floods and typhoons, fishing rights and education. One programme which revealed that cement used in road construction had not complied with contract specifications alarmed the contractor and persuaded the local authorities to investigate.

Local initiative

In Banga, local radio mobilized community efforts to build a footbridge. Another station successfully campaigned to clean up a big poultry farm to reduce air pollution. Some families

“If you city folks have car stereo, we have car-abao (water buffalo) stereo!” say Filipino villagers reached by community radio, above.

Above left, a “village on the air” programme being recorded at Ibajay, in the heart of the Philippine archipelago.

and neighbourhood groups have started small pig farms, fish traps and prawn production. In Laurel, Batangas teenagers used the radio to collect donations for the construction of their basketball court. Often people tune in to community radio to find out whether the local bus has arrived! On islands like Batanes, which only has three flights a week to the mainland, it is very important to know the arrival and departure times of local flights.

Community radio stations have made a lot of difference to these “sleepy towns”, usually found at the bottom of the development list. They have encouraged people to analyse their problems and come up with their own solutions, with contributions from the local political and administrative authorities. Live discussions on the air ensure a continuing dialogue on issues of concern to the community and perform a watchdog function by making sure solutions stick. More civic organizations are being formed, and new income-generating activities are being started by families and neighbourhood groups. There is a more constructive dialogue with local officials.

“Were it not for Radio Tambuli, the Bangans would still be sleeping,” said one municipal officer. “Tambuli has made the big people listen to the voice of the small people.” Added Porfirio Bullo, Banga’s station manager: “Before we used to just listen to radio; now we are the ones who are listened to.” ■

ALL POWER TO THE MICROPHONE!

BY ARMEN OGANESSIAN

For almost 70 years, radio was a formidable weapon wielded by Soviet leaders



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Lenin during a recording session in the Kremlin (1919).

Throughout its history Russia has felt a need to link up its vast spaces, and in the early years of the twentieth century radio took over from the railways as the instrument of this grand design.

At the third Pan-Russian Electrotechnical Conference, in February 1904, engineer Aleksandr Popov gave the first demonstration of radio transmission of the human voice. He had already invented a lightning detector, and in 1896 developed a radiotelegraph system which transmitted Morse code. It was first used by the Russian navy, which later owned Russia's first large radio stations.

But Russian industry lagged behind Popov's genius. Russia's first radio factory in St. Petersburg was established by the Marconi

company, and the country's first radio company was founded some time later, in 1910, under the auspices of the naval authorities.

A propaganda tool

Lenin and his followers immediately grasped the possibilities of this new medium of communication, and in their hands radio became a powerful weapon in the exercise of political power.

On the eve of the October 1917 coup d'état the Bolsheviks issued orders to armed patrols via radio. They asked the railwaymen to stop troop trains bringing battalions loyal to the provisional government from reaching St. Petersburg (renamed Petrograd). The rebel sailors seized the naval radio station and the

next day Lenin wrote his "Address to the citizens of Russia" on the delegation of power to the Armed Revolutionary Committee.

After the transfer of the Soviet government to Moscow, the radio station at Khodinsk became "the megaphone of the Russian revolution". It broadcast government decrees, messages for foreign states and peoples, and news from the Russian telegraph agency. At a time when millions of Russians, for the most part illiterate, had to be reached and persuaded, radio had the edge on the written word. It was, in Lenin's words, "a daily that knew neither paper nor distance".

Significantly, Lenin ordered the best Russian engineers to be released from the jails of the Cheka, the Bolshevik secret police, and sent to work in the radio technology laboratory at Nizhni-Novgorod. In 1920, the laboratory produced a radiotelephone with a loudspeaker, and some time later, a short-wave transmitter whose signals could be received in Britain, France and Iraq. By the end of the decade Moscow was broadcasting to other countries, first in German then in the other main European languages.

At the same time, the content of Russian programmes became more diversified and music was given air time between speeches and propaganda programmes. In 1924 private citizens were authorized by decree to buy a receiver for per-



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Radio reaches distant parts of the Soviet Union (1929).

During the Second World War, people in a Russian city street listen to Yuri Levitan, Radio Moscow's chief announcer.



© RIA-Novosti, Paris

sonal use, and daily newspapers began publishing programme schedules. Scientific and sporting news, poems and stories went out over the airwaves. Then came the first live broadcasts from stadiums; the first radio correspondents and children's programmes appeared.

A popular hit

According to Russian historian M. Miriukov, radio was regarded by the people as a "real miracle". The Communist Party press was especially interested in the audience's reactions and its opinion of programmes.

In 1928 A. Chorin, an engineer who had also been freed on Lenin's orders, patented a recording and sound-reproduction machine developed under his responsibility. His device provided Russian radio journalism with a prototype of the tape-recorder. Later advances in recording techniques in the 1930s were decisive for radio broadcasting during wartime.

In the mid-1930s two Moscow radio stations broadcast images as well as sound twice a week, thus paving the way for the coming of television. In 1935, hermetically sealed as the "iron curtain" then was, Moscow stations broadcast a concert given in the United States, while in response ninety American stations broadcast a concert performed in Moscow.

On the eve of the Second World War there were more than a million radio receivers and nearly 5 million relays in the Soviet Union. The broadcasting network covered nearly the whole country.

At noon on 22 June 1941 Moscow radio announced that the Soviet Union was at war ▶



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The Moscow radio tower built in 1922.

► with Hitler's Germany. Although German troops advanced deep into the country, radio stations continued to transmit, and the voice of Moscow could be heard throughout occupied Europe, including Germany.

The triumph of radio

The leaders of the Third Reich, especially Josef Goebbels, the Minister for Propaganda and Information, wanted to silence the transmitter. The Soviet Radio Committee was among the strategic targets of the Luftwaffe bombers, and Radio Moscow's chief announcer, I. Levitan, was on the hit-list of people to be executed if Moscow fell. Later Levitan talked about his work during this grim period: "Preparation was hard going. Your words had to show no sign of panic or despair, and you couldn't allow your voice to shake. The voice of the radio was heard all over the country, at

the front and abroad. Resistance fighters and partisans listened in. Radio brought hope, helped people forget wounds and fatigue, and called for victory over the enemy."

With the army, radio was the war's great victor. With the coming of peace, its triumph as the most successful medium of mass communication seemed incontestable. In the immediate post-war years, Soviet radio began broadcasting on three networks for several hours a day. Some time later the appearance of a receiver capable of receiving three programmes set the seal on this success. Radio was listened to everywhere. At the time it was so popular and people were so convinced of its indispensability that they could not imagine that it would one day be supplanted by television, then in its infancy.

This complacency, especially among people working in radio, was probably partly to blame for radio's decline in popularity once television began to catch on. But radio did not give up the ground it had won in the 1920s without a fight. When one of the networks interrupted a concert to transmit the radio signals from the first earth satellite, Sputnik, as it drew closer to Moscow, tens of millions of listeners were glued to their radio sets.

The thaw

Shows devoted to pure entertainment, apart from opera and concerts, were unknown on pre-war and wartime Soviet radio. It was during the years of political thaw under Nikita S. Khrushchev that entertainment programmes first appeared mornings and evenings. The people in charge of these programmes were famous nationwide.

The defining radio event of the 1960s was the creation of a round-the-clock station, Mayak ("The Lighthouse"), which broadcast only music and news. It currently reaches 221 million listeners throughout the Commonwealth of Independent States. Under Leonid Brezhnev a number of directives were issued to strengthen artistic, political and social news programmes. New stations were created, and the network grew and diversified.

Mikhail Gorbachev's rise to power brought changes to radio although the main contours of the broadcasting scene remained essentially the same. During his period of office the first steps to dismantle the state broadcasting monopoly were taken. ■

UNESCO Radio is different, unique even, according to some listeners.

UNESCO began to produce radio programmes in the late 1940s. The aim has always been to contribute to the understanding of the ideals that the Organization stands for, through discussion of issues in the fields of education, science, culture and communication.

Around fifteen 30-minute feature programmes are produced each year in English, French, Spanish or Russian. Their subjects, chosen on the basis of their interest both for UNESCO and the general public, cover a vast field rang-

ing from Aids to astronomy, from biodiversity to bioethics, from street children to indigenous peoples, from the violence of war to the culture of peace.

The programme catalogue contains hundreds of recordings which are offered on tape or cassette to over 400 national, public and community radios in all parts of the world (257 stations broadcasting in English, 60 in French, 60 in Spanish and 42 in Russian) as well as to international short-wave broadcasters.

For the last two years, UNESCO Radio has been taking part in the Nexus-International Broadcasting

Association Internet experiment of RealAudio on demand. All UNESCO programmes will shortly be available via the Nexus RealAudio server (for details, consult <http://www.nexus.org/IRN>) and will eventually be put on UNESCO's Internet site.

Catalogues, recordings and transcriptions may be obtained from:

Erin Faherty-Mella,
Radio Producer
 UNESCO
 7 Place de Fontenoy Paris 07 SP
 France
 Tel: (33) (0) 1 45 68 16 92
 Fax: (33) (0) 1 45 68 56 55

Number of radio receivers

	Number of receivers in millions				Number of receivers per 1,000 inhabitants			
	1970	1980	1990	1994	1970	1980	1990	1994
World total	771	1 307	1 877	2 008	209	294	355	357
Africa	19	49	108	122	51	104	171	173
America	350	566	711	756	687	926	991	991
Asia	78	254	568	621	37	96	178	183
Europe	314	418	464	481	481	604	643	662
Oceania	10	20	26	28	526	871	996	1 007
Developing countries	123	323	724	790	46	97	177	179
Sub-Saharan	10	36	77	88	35	92	151	152
Arab	14	28	55	62	110	166	247	251
Latin America and Caribbean	45	93	153	168	160	261	348	354
Eastern Asia and Oceania	29	117	328	349	25	82	196	197
Southern Asia	18	42	102	114	24	45	85	88
Least developed countries	7	20	48	55	23	51	95	98
Developed countries	648	984	1 153	1 218	629	881	969	1 009

Source: Unesco, June 1996

How radio works

Radio transmits sounds over long distances using waves, invisible electric impulses that travel through the atmosphere and space. These waves, known as Hertzian waves (from the name of the German physicist Heinrich Hertz, who demonstrated their use in 1888) or radio waves (from the Latin word radius = ray) travel at the speed of light (300,000 km per second).

To make a radio connection, a transmitter and a receiver are needed, each connected to an antenna. The waves travel between the two antennae in some cases

by bouncing back from certain layers of the atmosphere. Satellite transmission systems exist today.

Sound vibrations are changed into electrical waves, which are then changed into radio waves by the transmitter. The radio waves are picked up by the receiving antenna and changed back into an electrical signal which is amplified and further processed before being changed back into sound by the loudspeaker.

There are different kinds of waves. Long waves cover almost 2,000 km.

Medium waves travel a few hundred km. Short waves can travel all round the world.

Amplitude modulation (AM) is a broadcasting method in which the sound changes the power of the wave. Frequency modulation (FM), which guarantees better quality reception, is a method in which the sound changes the frequency of the wave.

In simple terms, it may be said that the transmitter codes the signals, the waves carry them and the receiver decodes them. ■

Federico Mayor

Energy for all



UNESCO/Gil Jacques, Montreal

“The more experience I gather, the more I realize that Man himself is the cause of his happiness as well as his misery,” said Mahatma Gandhi. We should take inspiration from the words of this great Indian sage and politician if we wish to establish a globally sustainable energy system.

Such a system is an important facet of the changes we must make in order to reduce current asymmetries in the sharing of resources. These asymmetries, which are morally unacceptable, generate frustration and violence and threaten world peace and security at the dawn of a new millennium.

It is estimated that 2.4 billion people today have no regular access to electricity. The lack of a reliable means of heating and lighting the homes, clinics and schools of some 40 per cent of the world’s population—living mainly in rural or remote areas of the developing world—acts as a significant brake on the development process. In such areas, people—more often than not women and children—are obliged to make long journeys to find drinking water and fuelwood.

Renewable energy electrification would help meet the basic needs of isolated populations in terms of heat, light, the pumping and purification of freshwater, educational opportunities, basic communications, medical care, income-generating rural activities and improved agricultural methods and techniques—in short, all those facilities we think of as necessary for a healthy, developing community.

Leaders of the world's nations who met at the United Nations Conference on Environment and Development in Rio de Janeiro in June 1992 recognized the risk of rapid climate change caused by gas emissions (some of them with clear greenhouse impact) and prepared a Convention designed to stabilize the earth's climate. The Conference laid stress on the development of environmentally sound energy systems, particularly new and renewable sources of energy, to the benefit of industrialized and developing countries alike.

Industrialized countries can profit from the incorporation of renewable energies into their national energy programmes. Denmark, for example, today produces 3.5 per cent of its electricity from wind, at a cost that is competitive with traditional fossil fuels.

Renewable energy sources

The widespread use of renewable energy sources as part of a global energy system requires increased knowledge of the various technologies and their adaptation to different contexts and fields of application. The importance of further research, education and training of engineers and technicians cannot be over-emphasized. The availability of unrestricted information and its communication to decision-makers and the public at large will serve to influence opinion and the all-important energy consumption patterns of the population.

Only if we enhance the quality of life in rural areas shall we achieve our target of reaching those who are excluded from the benefits of progress. Only then will population growth rates and the consequent emigration flows decrease. The three main—interdependent—dimensions of this initiative are therefore social, educational and environmental. Here the media have a major role to play.

Public awareness and participation are the keys to success, as in so many other fields. The regional consultations that preceded the World Solar Summit held in Harare (Zimbabwe) in September 1996 identified

education, training and public understanding in the field of renewable energy as a strategic priority.

The Solar Summit

The World Solar Summit marked the start of a ten-year plan of almost unprecedented international and national action and co-operation. The World Solar Programme 1996-2005, which comprises some 300 renewable energy projects, is a major international initiative with which UNESCO is pleased to be associated. Its execution requires the commitment of national authorities, the relevant organizations of the United Nations system, multilateral and regional development banks, intergovernmental and non-governmental organizations, academic and research institutions, and the private sector.

We now know that integration—at the sub-regional or regional levels—will never happen if it is only based on economic interest. It is clear that money divides if it is the only ingredient of alliances. Integration is achieved with common values, with the democratic ideals of justice, freedom, equality and solidarity enshrined in UNESCO's Constitution. There can be no sustainable peace without development; there can be no sustainable development without a social context governed by democratic principles; there can be no sustainable development without a human face.

We have too often forgotten the human face. We have forgotten that science and technology are there to mitigate human suffering. A system based on equality collapsed in 1989 because it had forgotten freedom. A system based on freedom can also fail if it forgets equality. And neither system takes into account fraternity. We must tirelessly build peace in the minds of men through our everyday conduct, which is the supreme expression of our culture. Let us exercise our responsibilities and make the indispensable and urgent transformations that human dignity demands. In a word, let us create a culture of peace. ■

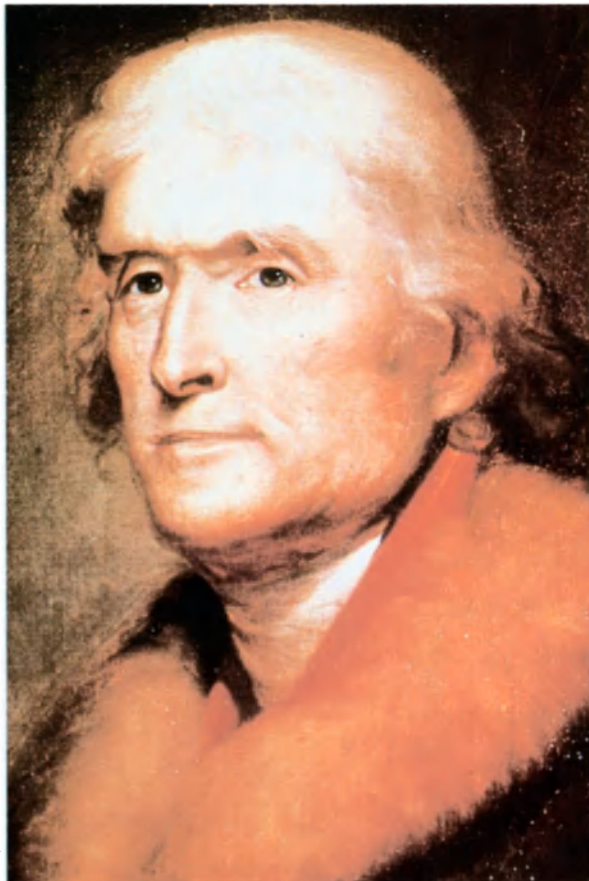
Mr. Jefferson's dream house

by Francis Leary



Monticello, the mansion built in Virginia by Thomas Jefferson, third President of the United States and principal author of the Declaration of Independence, is a jewel of American neo-classical architecture. In 1987 it was placed on UNESCO's World Heritage List.

Thomas Jefferson
(1805) by the
American painter
Rembrandt Peale.



On the first day of 1772, twenty-eight-year-old Tom Jefferson brought his bride, Martha Wayles Skelton, a widow of twenty-three, to Monticello, "Little Mountain" in Italian, their new home. As a carriage could not traverse the route in a snowstorm at night, they had ridden on horseback over the mountain.

Though only the one-room South Pavilion was completed, Tom was eager to welcome Martha to the house he was building for them. While outside the storm raged, Tom built a fire in the hearth and produced a bottle of wine; a black servant prepared a meal for the honeymoon couple. The romantic aura of this firelit snowbound first dinner at Monticello reflects Thomas Jefferson throughout his life.

A correspondent, to whom he had written about his bride, remarked that his description of Martha was "the most Romantic and Poetical that I ever did read." A comment that might also apply to

Jefferson's feelings about Monticello. This tall lanky youth with red hair, freckles and grey eyes was a complete man in the Romantic tradition. He towered over other men in height as he would tower over them in intellect and inspiration.

Most planters built their homes on their plantations, on the low-lying Tidewater land where tobacco was the chief cash crop. Jefferson chose a mountain-top in the Blue Ridge, two leagues or six miles (10 km.) from the town of Charlottesville. His classical studies at the College of William and Mary had revealed to him a new architecture for the house he was already planning before his marriage.

In a 4-volume edition of the Renaissance architect, Andrea Palladio, Jefferson found what he wanted. The designs of the Italian master were inspired by the temples and villas of Ancient Rome. Palladio projected one-story structures with double-columned porticoes on each front and a hall that extended the length of the



© L. R. Pastor/Ineato, Madrid

Monticello is an outstanding example of a neo-classical villa inspired by the architecture of Antiquity and Palladio.

building, while living and dining rooms opened off the central hall.

Local materials were employed in the construction of Monticello. Jefferson burnt bricks in a kiln in the deer park on the southeast side of the mountain, where the deep-red clay was ideal for making bricks. He sawed the planks for the flooring and had limestone quarried for porticoes. He relied on cabinet-makers in Williamsburg for interior furnishings and embellished the estate with orchards and vegetable gardens.

Plantation slaves performed the hard labour of construction as well as working in the tobacco fields. Jefferson had inherited 5,000 acres (2,900 hectares) from his father, Peter Jefferson, and had 150 field hands to cultivate this acreage. The extensive Hemings family acted as maids and house-hoys. They were never called slaves, though in fact they were.

The first black slaves were brought to Virginia in 1619. Tobacco soon proved to be the small colony's leading export, and slave labour and tobacco farming became intertwined. By 1790, Virginia's population of 750,000 would be almost equally divided

between whites and blacks.

For Jefferson, the slave system was "a firebell in the night". Newly elected to the Virginia legislature at Williamsburg, he proposed a bill to phase out slavery in the colony, but he failed. The planters felt that they could not manage without slaves. Indeed, for Jefferson to try to build his dream house without slave labour would have been almost impossible.

'A FIREBELL IN THE NIGHT'

During the War of Independence, two English deserters, skilled craftsmen, boarded at Monticello. Billy and Davy made furnishings for the house and built an elegant phaeton to Jefferson's design. Soon after independence was achieved, Jefferson received a visit from the Marquis de Chastellux, who had served with the French army during the war. Most impressed by his host, Chastellux commented: "Mr. Jefferson is the first American who has consulted the Fine Arts to know how to shelter himself from the weather."

The marquis also visited the deer park on the southeast side of the mountain. There he saw a

score of white-tailed deer, very different from the European *chevreuil* and so tame that Jefferson fed them Indian corn out of his hand.

Jefferson's happy life at Monticello was abruptly ended by Martha's death. Torn apart by the tragedy, he needed to get away and accepted an appointment as Minister to France in 1784. With his elder daughter Martha and his body-servant, James Hemings, Jefferson came at last to the country whose history and culture had long fascinated him. On his return to America, Jefferson's French furnishings filled eighty-six crates for shipment. Nothing like it had ever been seen in the new nation.

Inspired by the classical architecture of Paris, Jefferson decided to remodel Monticello. He was captivated by the Hôtel de Salm, newly-built on Palladian lines, on the rue de Lille, across the Seine from the Tuileries. This princely residence gave the effect of a soaring single storey under a shallow dome, an impression produced by rooms of oval and octagonal shape, great skylights and tall windows extending from the top and opening at the ground level. It was a ▶

► design ideally suited to Virginia's scorching summers.

Jefferson preferred the natural beauty and wonder of English gardens to the geometrical perfection of the French. At Painshill Park in Warwick, he found the roundabout walks, mazes and serpentine walls that he wanted for Monticello. He was enchanted by the temple of Bacchus at Painshill, built by Charles Hamilton, a genius of eighteenth-century landscape gardening, who had created the park.

THE TRANSFORMATION OF MONTICELLO

The entire east front and central staircase of Monticello were torn down to make way for a *grande entrée*, a lofty portico of single columns topped by Doric capitals, which led into a great hall that was connected by double doors with the salon beyond. These automatic glass doors were worked by a chain in the floor wound around two cylinders, so that when you opened one door, the other also opened, a contrivance of Jefferson, who delighted in such tricks.

North and south wings were lowered to conform to the height of the lofty salon on which the dome rested. On the east and west fronts, the windows of the second floor were elongations of the first-floor windows, which opened at ground level. Thus did Jefferson preserve the illusion of a one-storey mansion under an elegant dome, as in the Hôtel de Salm.

In reality, the new Monticello comprised four storeys. The basement was connected by a series of tunnels to outlying "dependencies", a large kitchen with charcoal-burning ovens of 8 burners, a wine cellar, ice house, dairy and smoke house. These additions Jefferson had buried under terraces on the hillside to preserve his panoramic vistas.



Jefferson's bed at Monticello. Located in an open alcove between his bedroom and his study, it could be raised using a pulley system Jefferson invented. It was on this bed that Jefferson died on 4 July 1826.

To make Monticello completely self-sufficient, Mulberry Row, an avenue 300 metres long near the house, was lined with seventeen small structures of logs or stone. Here were more slave quarters and workshops for both white and black artisans, joiners, weavers, blacksmiths.

From Mulberry Row, a gate through a ten-foot fence led into a 400-tree orchard and vegetable garden on the south slope, where Jefferson experimented with seventy different kinds of vegetables. In the large Fruiterie, which included the North Orchard of cider apples and peaches for distilling brandy, grew not only all the American varieties but such exotic delights as figs, Spanish almonds and the prized Breast of Venus peach.

A romantic grove of shade trees and glades crowned the mountain top. Twenty oval flower beds blossomed around the house, while on the West Lawn a Roundabout Walk evoked an English garden, as at Painshill Park.

All this beauty and practical

functions took seventeen years to achieve. As Monticello was slowly taking form, the master himself was creating a new nation. As President of the United States (1801-1809), he grasped the opportunity to purchase the vast Louisiana territory from the Emperor Napoleon in 1803. The size of the infant Republic was increased by 140 per cent and now stretched from the Atlantic to the Pacific.

A 7,000-BOOK LIBRARY IN 'HONEYMOON COTTAGE'

When he was at home, Jefferson often retreated to a sanctum sanctorum in the south wing, the original "honeymoon cottage", where he had his library of 7,000 books, his study and bedroom, with alcove bed. In the study, he kept his telescope, polygraph machine, revolving table, reading stand and a swivel chair with holes in the arms for brass candlesticks—all conveniences invented by Jefferson.

In the north wing was the dining room, with an octagonal tea room leading off it. The rooms opposite were guest bedrooms, each with its alcove bed. Additional bedrooms on the second floor were reached by steep narrow staircases enclosed within the north and south passages.

Another flight of ladder-like stairs gave access to the dome room, "a noble and beautiful apartment with eight circular windows and skylight". It was usually occupied by one of Martha's twelve children. The yellow walls contrasted vividly with the floor, painted "grass-green", as was the parquet of the *entrée*, on the advice of Gilbert Stuart, famed portrait painter of Revolutionary heroes.

Jefferson died on 4 July 1826, the same day as his friend and political rival, John Adams. It was exactly fifty years after the adoption of the Declaration that had resounded around the world. Death had come as he had desired, at Monticello. ■

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The Academical Village



© Georg Gerster/Rapho, Paris

Jefferson devised a plan for what he called an "Academical Village", a University that would serve as a model for the education of American youth. He believed in a liberal non-sectarian formation and he devised a curriculum comprising all the intellectual currents of his time.

According to Jefferson's plan, the university was to have eight schools, including both classical and modern languages, mathematics, natural history, anatomy and medicine, moral philosophy and law. A flexible elective system, the first of its kind, prevailed; a student who had completed six schools would graduate from the university.

The "Academical Village", as it was built in Charlottesville, was grouped around a complex of ten pavilions, five on a side, before a grassy quadrangle, the Lawn. Pavilions on either side were connected by colonnaded walkways.

At the Lawn's north end, a majestic Rotunda dominated the scene, its dome crowning three storeys, with marble steps ascending to a columned portico. To the south, the Lawn offered students the lofty vistas of the Blue Ridge Mountains.

His classical inspiration prevailing, Jefferson designed the pavilions with no two alike, "to serve as specimens for the architectural lectures." Each façade would exhibit details

derived from Antiquity. One Pavilion would display Ionic columns with Doric capitals, another the Corinthian order of Diocletian's Baths, the august Rotunda would be a smaller scale copy of the Roman Pantheon.

When the University opened in 1825, 109 rooms were available for the 40 students admitted. Soon, however, a double occupancy became the rule. Today, the original "Jefferson rooms" are eagerly sought.

As the University outgrew the first design, new buildings sprang up to house the Faculties of Law and Medicine. The classrooms, student and faculty quarters of the Pavilions were converted to other uses: public meetings and social events. While the façades were unchanged, rear extensions supplied amenities such as bathrooms, toilets, modern kitchens.

The "Hotels" or dining halls now harbour faculty and student rooms and the editorial offices of the *Virginia Quarterly Review*. The Rotunda, once a library, burned down in 1895. It was restored to its pristine splendour in 1976 and is now an administrative centre. The Dome Room is used for large public gatherings and formal dinners. The original concept of the Academical Village is preserved. With a library of 4 million volumes, a faculty of 1,700 fine scholars, this great University annually gives diplomas to over 5,000 students.

■ F. L.



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Top, the University of Virginia (1814-1825) or "academical village" in Charlottesville, designed by Thomas Jefferson, embodies the Enlightenment ideal in architecture applied to a large educational institution. In background is the Rotunda with its neo-classical portico. Students' and teachers' quarters stand on each side of the grassy quadrangle.

Above, view of the Rotunda. A half-sized replica of the Pantheon in Rome, the Rotunda dominates the academical village.

Right, extensive colonnades link the university buildings.



© L. R. Pastor, Inefoto, Madrid

Earthwatching Satellites

by France Bequette

Landsat, Spot, Topex-Poseidon, ERS, Polder, Argos, NOAA, Cosmos, Sarsat, Meteosat, Himawari, GOES, Tiros, Nimbus—mysterious words that often appear in news reports—are the names of artificial satellites.

The satellite era began on 4 October 1957, when the Soviet Union successfully launched Sputnik ("fellow traveller" in Russian) into orbit around the earth. An observation tool weighing almost 84 kg, Sputnik circled the earth for three months at altitudes ranging from 228 to 947 km.

Bolstered by progress in information technology, satellite technology has come a long way since then. Today we rely heavily on

these eyes in the sky to tell us about the environment and help us to manage the earth's resources.

Eyes in the sky

Artificial satellites today observe the atmosphere, the oceans, and the earth's land surface from space. They provide information using two different techniques, data collection and remote sensing. With the first technique, they receive data from various points on the earth's surface and then beam it back to earth. With the second, they use their instruments to analyse information contained in electromagnetic radiation emitted by the earth.

The choice of orbit is extremely

important. A satellite in geostationary orbit some 36,000 kilometres above the earth appears immobile since it moves at the same speed as the revolving globe. Geostationary satellites continuously observe a wide area but are hampered by their distance from the earth. A satellite in polar orbit, on the other hand, covers the entire planet without remaining permanently above a single region.

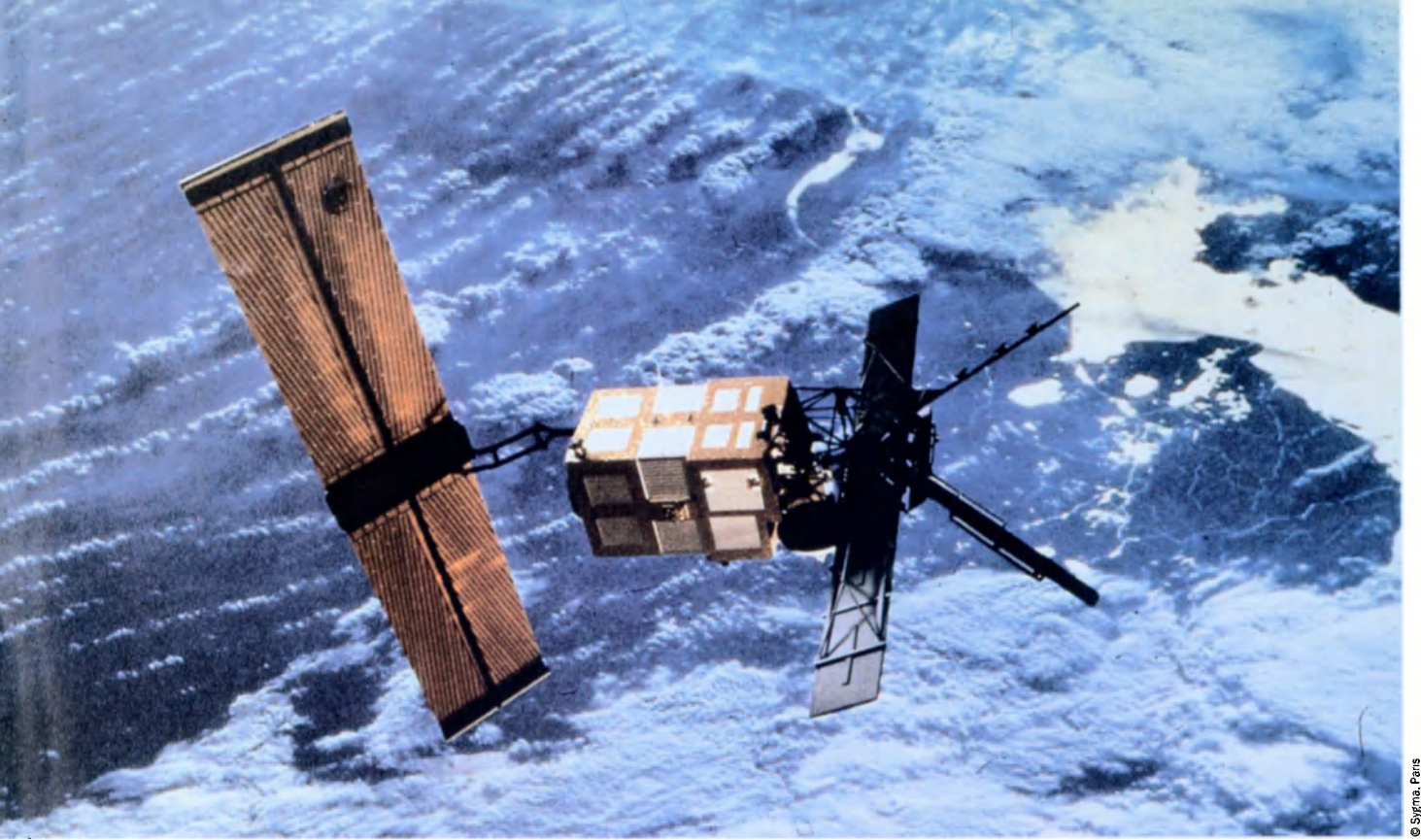
Geostationary satellites and satellites in polar orbit do not have the same uses, and their capacities complement each other. Both kinds are used in meteorology, for example, a field where satellites have proven to be of vital importance. Five geostationary satellites



The SPOT-1 satellite under construction in Toulouse (France) in 1984. This family of earth-observation satellites provides black and white photos of the earth within an accuracy of about 10 metres and reconstitutes relief.



The ERS-1 satellite on its Ariane 4 launcher (total height 58.4 metres) at the Kourou space centre (French Guyana) shortly before lift-off on 16 July 1991.



© Sigma, Paris

enable weather watchers to keep a constant eye on the earth's weather system *in toto*, while polar orbital satellites provide more precise measurements at different points on the earth's surface.

Satellites, whose weight ranges from a few kg to several tons, are launched by extremely powerful rockets. The United States, Russia, France, Japan, China, India and Brazil are among the countries that possess such launchers, and in some cases launch satellites for other countries. Canada and the Arab states, for example, have had satellites launched by the United States and France respectively.

Once in orbit, satellites record images by means of still photography, TV cameras, scanners or radar. Film from manned satellites is returned to earth for processing. Unmanned satellites either process the images themselves or transmit them to terrestrial receiving stations in different parts of the world. Each image is ordered in advance from the satellite by computer and identified in detail.

This battery of observational technology has great potential for environmental monitoring. In July 1991, the European Space Agency launched ERS-1 (an acronym for European Remote-Sensing Satellite), Europe's first environmental satellite, whose work was later carried on by its sister craft ERS-2.

The European Remote Sensing Satellite (ERS-1), Europe's first earth-observation satellite.

Radar sensors enable the satellites to "see" at night and through cloud cover. One system generates 100-km x 100-km scenes of regions over which the satellite flies and measures wind speed and direction and wave energy. Another measures wave height to within 2 cm. A third system is an infra-red detector that measures sea surface temperature to an accuracy of 0.3°C.

High resolution images

"Our only way to obtain an overall vision of the state of ocean biology at any moment is satellite observation of the ocean's colours," explains John Withrow, a member of the Intergovernmental Oceanographic Commission (IOC). "Data on the colour of the ocean will enable us to monitor such important fields as biogeochemical cycles, the direct effects of biology on the physics of oceans, coastal resources and sustainable fishing." It is only by observing colour that we can also study carbon dioxide absorption by the oceans, a phenomenon which has repercussions on the abundance of marine algae.

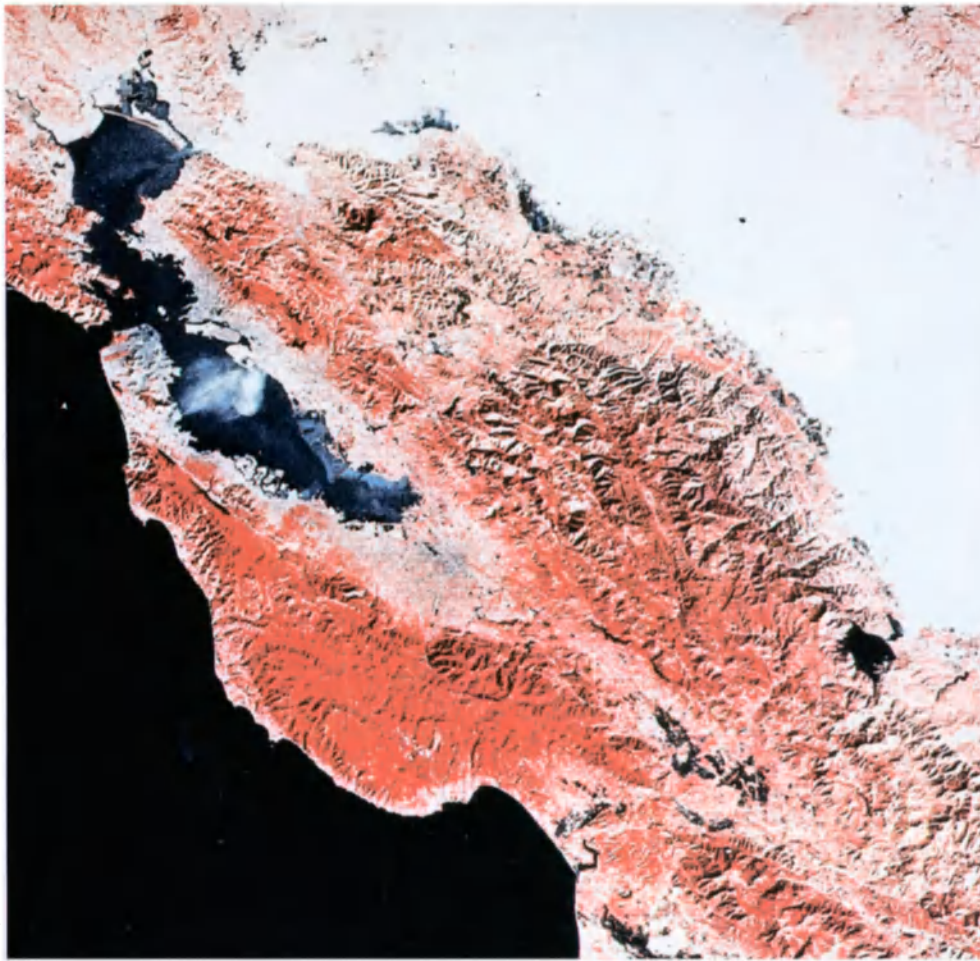
Remote sensing is an efficient tool for monitoring ice, especially in the Baltic Sea. In the northern reaches of the Baltic, the ice season lasts on average more than six months of the year and obstructs shipping. Since 1989, ice-break-

ers of the Finnish Shipping Office have been equipped with a workstation for processing images sent by the NOAA and ERS satellites. If the image arrives quickly and has a resolution of at least 100 metres, the captain of the ice-breaker can choose his optimum route and transmit to other ships information that will help them through the ice without any need for his ship to intervene.

In July 1994, fire raged through some 140,000 hectares on Spain's east coast. Using their high-resolution imaging systems and transmitting four times a day, the Tiros and Landsat polar orbiting satellites monitored the advance of the fire, identified at-risk zones and assessed the damage. Even at night they were able to warn of new outbreaks of fire and smoke, enabling the fire services to use their resources to maximum effect.

A map-making tool

Satellites can also help us to take stock of the natural environment. They have, for example, been used to map old growth forests in Oregon and Washington State in the United States which have suffered from over-logging. They identified three levels—the oldest trees (400 years old), 160-year-old trees, and a lower level, and used three parameters: rate of coverage, diameter, and structure and nature of species. ▶



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► The American yew (*Taxus brevifolia*) lives in the lowest level of these forests. When taxol, an anti-cancer drug, was extracted from its bark, large numbers of the trees were felled. Later, a synthetic molecule for the drug was created, and logging was halted. If it had continued, however, satellite mapping would have helped mobilize the authorities and improve forest management. Another unexpected beneficiary of satellite mapping is the northern spotted owl (*Strix occidentalis*), which lives only in these old growth forests and would disappear if too many of their trees were felled. Its survival has become a priority target of nature conservation in the United States.

Brazil and Thailand have high-powered data-receiving stations and use ERS, Landsat and Spot satellites to monitor their plant resources. In Amazonia, deforestation is assessed every three years by satellite and its consequences are measured—regional warming and declining rainfall.

Agriculture is one of Egypt's main resources, and satellite data are extremely valuable tools for agricultural resource management

Above, a photo of northern California taken by the Landsat 2 satellite from an altitude of 914 kilometres. It shows the San Francisco Bay area, the great valley of central California and the coast south of San Francisco. The white patch over the Bay is industrial smoke. Crops, trees and other plantlife appear in bright red, and the built-up and industrial areas in green and dark grey. The broad white diagonal band at right of the image is a thick blanket of fog covering the valley.

The northern spotted owl (*Strix occidentalis*).

and forecasting. The Agricultural Land Information System (ALIS) is designed to measure and follow the evolution over time of areas where the main crops are grown, to control urban sprawl in these areas and to develop new areas. This project, devised by Spot Image, which distributes imagery provided by Spot remote-sensing satellites, began in France, where twelve Egyptian specialists were trained. As a result of outside funding, the specialists are now continuing their



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work in Egypt with the most advanced equipment.

Using maps made by this process it has been possible to study 4 million hectares, to identify 6,240 plots of land and obtain accurate statistics on Egypt's ten main crops. This inventory of land use has also helped to map urban development with a view to preserving the agricultural potential which is vitally important to Egypt.

A non-stop observation system

Will it be possible to increase and improve the use of environmental satellites? Manned flights bring back plenty of experimental results, and virtually the whole planet reaps the benefits of progress made in weather and communication satellites and is ready to help fund them. But natural disasters continue to happen without being predicted, and it is no longer enough simply to note increasing desert encroachment, soil erosion and deforestation. Is the fate of the earth too general and too long-term a problem to motivate governments, groups of nations and private companies to act?

André Lebeau, a former official with French and European space programmes, believes that if we are to fully understand the global environment, we must devise and implement a permanent system for observing the earth in which satellite observations would be supplemented by other—notably aerial—observation at a much lower cost. “The need for a system of this kind,” he notes, “is not directly perceived either at the individual or institutional level, or even by nations. It only becomes really obvious when we consider the future of humanity as a whole—and since that is everybody's business, it tends to be nobody's business.” ■

TO FIND OUT MORE:

▼
L'observation par satellite
et l'environnement
Ministry of the Environment,
Paris, January 1996

WHEN DOLPHINS AND MULLET END UP IN THE SAME BOAT

The World Wide Fund for Nature (WWF) has asked the government of Mauritania to ban harmful fishing practices in the coastal waters off the Arguin Banks National Park, which has been listed under the Ramsar Convention on Wetlands of International Importance and included on UNESCO's World Heritage list. Non-Mauritanian boats fish illegally there, particularly for grey mullet spawn. The use of seine nets and other huge industrial nets recently caused the death of 130 dolphins. WWF's request is also an alarm signal because these practices are a threat to the fishing resources that account for 2/3 of Mauritania's annual income. ■



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THAILAND'S PESTICIDE PROBLEMS

Within less than 10 years, Thailand has doubled its imports of pesticides, reports *The Asian Wall Street Journal Weekly*. In 1994, 3,672 different products were used officially. Many farmers exceed prescribed quantities to obtain higher yields with the result that during the first seven months of 1996 1,760 people were hospitalized, and 16 died. ■

GRIM CORNUCOPIA

Rhinos don't have much luck, but in this case neither did a gang of rhino horn smugglers. In London in September 1996 the British police seized the largest haul of illegal rhino horn on record: 105 horns weighing in at 240 kg with a market value of almost £3 million. Only some 7,000 white and 3,000 black rhinos are still alive. Although they are a protected species,

they are increasingly threatened because of Western interest in Oriental medicines and consumption of "medicines" containing powdered rhino horn and even bear bile! ■

OFFSHORE GENERATORS

The World Bank's Energy and Industry Department has come up with a smart idea to bring electricity to developing countries with a shoreline: barge-mounted diesel generators. If properly maintained, the generators work well, and standard engines can produce from 5 to 50 megawatts, depending on need. Up to 100 megawatts can be obtained by placing several generators on a single barge. Among the countries using the generators are Guatemala, Jamaica, the Dominican Republic and the Philippines. In spite of drawbacks such as oil spills, waste disposal problems, noise and atmospheric emissions, the generators have a number of attractive features including mobility, space-saving (particularly useful when providing energy for small islands), respect for sites on land and, above all, the production of low-cost electricity. ■

Unfortunately, much of it comes from protected species. In 1995, a non-governmental organization, "Vétérinaires sans Frontières", came up with the idea of raising cane rats (*Thryonomis swinderianus*) for their meat to reduce pressure on these threatened creatures. These animals live on a diet of insects, weeds and crop waste, and their meat is rich in protein. Farmers seem interested in raising this 4-to 5-kilo rodent because initial outlay is minimal and the additional income is more than welcome. ■

A DIVERSITY OF CREATURES

A new book about biological diversity in France published by the French Ministry of the Environment is packed with information about every aspect of the country's plant and animal wildlife.* It contains case studies of the causes of species depletion and summaries of programmes designed to protect a variety of species and habitats. The book describes, among many other topics, what to do if you want to help to clean up a river; the role of different government environmental protection agencies; and the extent to which such species as the little owl (*Athene noctua*), the European sturgeon (*Acipenser sturio*) and the wild tulip (*Tulipa Liliaceae*) are threatened. ■

* *La Diversité Biologique en France. Programme d'Action pour la Faune et la Flore Sauvages*, 318 pp.

GUINEA AND SENEGAL IN PARK MANAGEMENT PARTNERSHIP

Guinea's Badiar National Park and Senegal's Niokolo-Koba National Park are joining up to form a single, cross-border park and biosphere reserve. Eight years after a draft agreement for joint management of the two parks was signed, 125 km of trails have now been created and an environmental protection training and research centre has been set up in Dalaba (Senegal) helped by funding from the European Union. The Pan-African News Agency (PANA) reports that the centre is training 30 Senegalese soldiers in environmental issues and policing to combat poaching, and will later host courses for people from the 2 neighbouring countries. The aim is to prevent conflict arising from management of their joint resources. ■



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UNPROTECTED PROTEIN

In Gabon, "bush meat" (game) is one of the main local sources of animal protein, and each month 4 million tons of it are sold on the markets of Libreville.

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SAFEGUARDING THE CULTURAL HERITAGE: A GLOBAL CHALLENGE

An international symposium, "World Cultural Heritage, a Global Challenge", is being held in Hildesheim (Germany) from 23 February to 1 March 1997 under the patronage of UNESCO and sponsored by the Deutsche Bundesstiftung Umwelt and the EXPO 2000 Hannover GmbH.

International specialists and amateurs with an interest in the preservation of cultural property have been invited by the city of Hildesheim, the Roemer Pelizaeus Museum, Hildesheim University and the Fachhochschule Hildesheim/Holzminen to report on their experiences, exchange ideas and suggest strategies for the protection of the cultural heritage in the 21st century.

The symposium will seek to prepare the ground for the EXPO 2000 world fair that will be held in Hanover (Germany) in the year 2000 on the theme "Humankind—Nature—Technology".

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The 7th Exhibition of Magazines, Journals and Reviews

THE UNESCO COURIER

will have a stand at the 7th Exhibition of Magazines, Journals and Reviews, which will be held at the Parc des Expositions, Porte de Versailles, Paris, from 12 to 17 March 1997. More than 500 magazines will be represented at the Exhibition, which is part of a major combined event—the Paris Book Fair, the Multimedia and Electronic Publishing Fair, the Book Trade and Industries Fair, the High-School Student's Fair and the Video Fair.

Building on the success of the Book Fair, this complex of events offers a panoramic view of present-day culture.

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THEME OF THE NEXT ISSUE:
**MULTICULTURAL
CITIES**

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INTERVIEW WITH
PEDRAG MATVEJEVIĆ AND
VIDOSAV STEVANOVIC,
TWO WRITERS FROM THE FORMER
YUGOSLAVIA

▼
HERITAGE:
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