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A black and white photograph of a man riding a motorcycle on a dirt road. The man is wearing a jacket and pants, and is looking towards the right. The motorcycle has a large headlight and a rear rack. The background shows a desolate landscape with sparse vegetation and a utility pole. The overall mood is somber and reflective.

The village of
Velikyning in
Ukraine, abandoned
after the explosion

Twenty years on, the shock waves from the nuclear disaster haven't faded—they're just beginning

CHERNOBYL THE LEGACY

BY JOHN DYSON

PHOTOGRAPHED BY ANTONIN KRATOCHVIL

The telephone woke Sergiy Parashyn, a senior manager of the nuclear-power plant, at 1.30am on April 26, 1986. "Come quick," a frightened woman told him. "Something is broken."

Over the next few days a horrified world would learn that the number four reactor in the nuclear-power complex at Chernobyl, in northern Ukraine (then part of the Soviet Union), had surged to 100 times full power and blown up. Gases and

“hot” particles pouring out of the collapsed roof for ten days released 400 times more radioactivity, according to the International Atomic Energy Agency, than the Hiroshima bomb. The lethal cloud rained pollution on vast areas of farm and forest, then drifted over Poland, Scandinavia, Western Europe and North America.

Some 350,000 people were forcibly evacuated from their homes. Total deaths were surprisingly low—just 56 to date—but some health consequences are only now appearing among the seven million people in Ukraine and Belarus affected by radiation, some researchers say.

Notorious as the scariest industrial accident in history, Chernobyl's name remains a byword for man-made horror. Twenty years after the explosion it is time to take stock of its legacy.

Demise of the USSR: A lot more than a nuclear power station was “broken”, as it turned out. Engineers on duty were blamed and the survivors jailed, but Parashyn, today in charge of Chernobyl and its 18-mile-radius exclusion zone, has no doubts about the real cause. “Politics,” he says. To meet artificial targets set by the Soviet government, the plant was rushed into commission before it was ready and built to suit military rather than safety priorities.

The design of the plant was unsafe in principle. It had no protective containment and was inherently dangerous at low power. Vital safety tests were not done. There was no disaster plan. Fire drills were never conducted. Firemen

and police rushing 53 miles from Kiev to fight the fire had no protection gear. No doctor on site was trained in radiation. Military conscripts shovelled highly radioactive debris by hand.

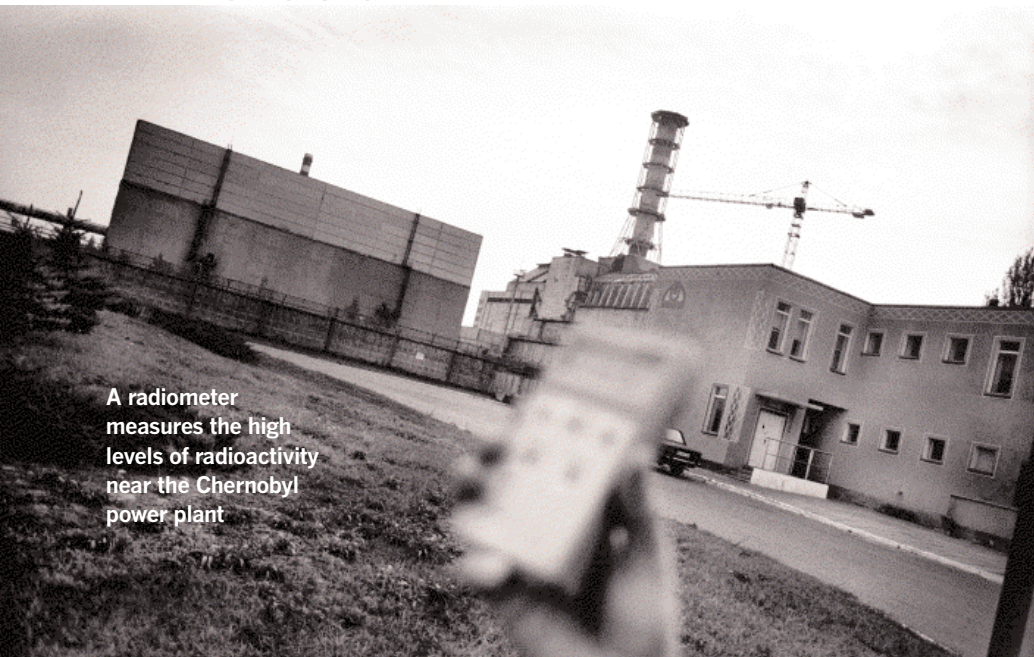
Other countries advised their people what precautions to take. The Soviet authorities did nothing and some seven million people in Ukraine and neighbouring Belarus received some (mostly harmless) radiation.

The combination of incompetence and cover-up not only cost the Soviet government its last vestiges of trust but made a mockery of the *glasnost* (openness) policy put in place by President Mikhail Gorbachev only a few weeks earlier. Says Dr Richard Pipes, emeritus professor of history at Harvard University, “People in the Soviet Union put up with all sorts of things, like the lack of freedom and restrictions on travel, because they were persuaded that their government was strong and confident.

“They were terribly shocked by the accident and its repercussions. It lowered the prestige of the government in their eyes, which had profound effects and ultimately contributed to the collapse of the regime.”

The Soviet Union disintegrated and the legacy of Chernobyl was inherited by Ukraine and Belarus.

The lurking dangers: Far from burning up in the fire, virtually all the nuclear fuel—196 tonnes—is still inside the ruined nuclear plant and has no effective containment. The fire melted sand, concrete, steel and fuel together,



A radiometer measures the high levels of radioactivity near the Chernobyl power plant

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forming complex and dangerous new materials that flowed like molten lava, then solidified into a kind of glass. Now these are breaking down.

In seven months after the explosion, 90,000 workers built a gigantic sarcophagus over the plant. The 12-storey slabs visibly lean outwards and the roof is caving in, creating wide cracks and letting in water.

In some parts of the sarcophagus, men can work for only a few minutes before receiving dangerous radiation

doses, even when wearing protective suits. The “hottest” radiation is nearly four sieverts an hour (three are lethal).

Materials scientist Alexander Zhydkov, 51, of the Ukraine National Academy of Sciences, braved the most intense radiation to hacksaw a small piece of fuel rod that he took to his laboratory and shielded in a special container. Over many months, he and his team found a “self-sputtering” phenomenon: Chernobyl’s lava-like fuel-containing materials, sputtering like a damp firework, are emitting particles of dust only one-tenth of a micron in grade—small and light enough to float in the air like cigarette smoke.

This sub-micron dust is highly radioactive, but is it a hazard? Russia’s Kurchatov Institute says it’s “probably

OK" for 100 years; Ukrainian scientists say 25 to 50.

The first steps towards totally isolating the ruined reactor from the outside world are just starting. An arched roof, gigantic enough to cover the entire plant, is being built alongside the reactor. When complete and fully fitted in about four years, the 20,000-tonne shelter will be slid along concrete tracks to cover the plant. Its estimated £630 million cost is being footed by 28 countries and the EU.

Fitted to the girders inside will be a complex system of cranes, adapted from those used to assemble the new Airbus jumbo in Toulouse, as well as robots and monitors. The hope is that large amounts of fuel-containing materials can be scooped up, locked in special containers and safely stored.

Says Sergiy Parashyn, who has lived with the disaster every minute since that phone call just after the explosion: "It will be 30 more years and £28 billion before we can put a 'safe' sign on the door."

Radiation: Reports of animals born with two heads or five legs—and "only three per cent" of children of irradiated parents born without abnormalities—circulated round the world. "All this is nonsense," says Marina Naboka, a health specialist who established a research station at Chernobyl within weeks of the accident.

A more realistic picture emerged last September when the Chernobyl Forum—seven UN agencies plus the World Bank and the governments

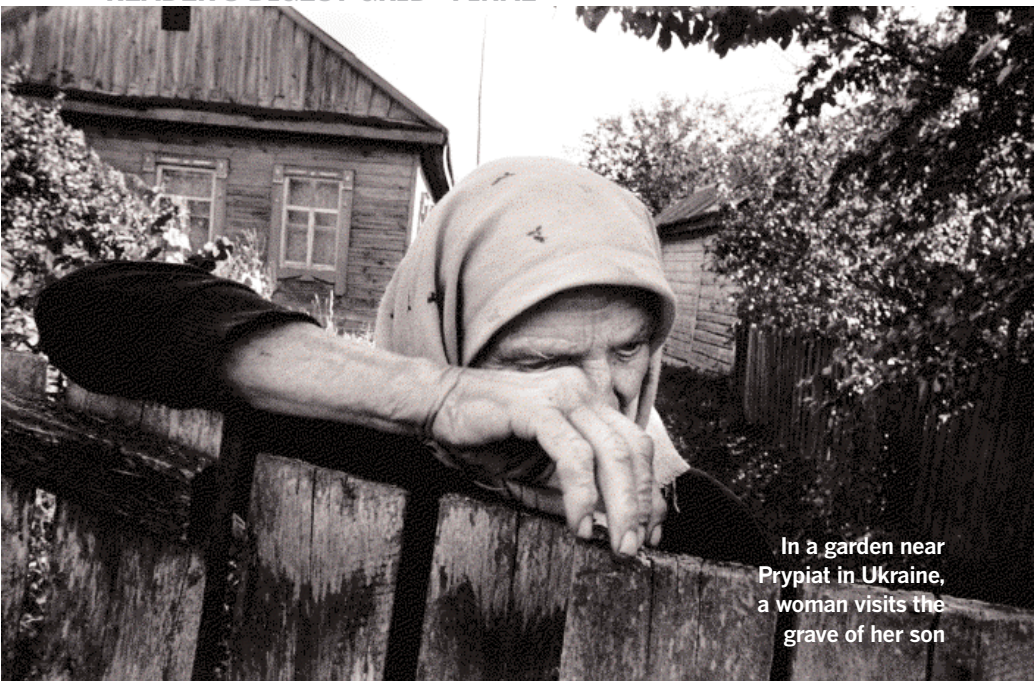
of Russia, Belarus and Ukraine—produced a fat report intended to draw a line under the disaster.

It found that two men died immediately, 26 from radiation in the next few weeks and 19 since. A further 134 people have severe radiation sickness and may die prematurely. Four thousand children have radiation-induced thyroid cancer and nine have died, but this condition is rarely fatal and could have been prevented by prompt action.

The report also predicts 8,950 radiation-induced deaths to come, but this number is theoretical and based on the hotly disputed premise that any dose of radiation is harmful, no matter how small. More than 92 per cent of the 74 million people involved received doses much lower than natural levels in many countries, so few deaths are likely. Forum experts say that any upsurge in overall deaths due to radiation will be too small to detect.

Significantly, the report found no profound impact on health—no decreased fertility, no increased congenital abnormalities or bad pregnancy outcomes and, apart from the rise in thyroid cancers, no effect on children's health. "The sum total is reassuring," says Michael Repacholi, of the World Health Organisation.

The Forum's message is that the legacy of Chernobyl is not as dark as feared. But leading medical researchers in Ukraine and Belarus disagree. They say tumours and other radiation effects can take more than 20 years to appear (as lung cancer often does in smokers) and that illnesses in children are rapidly



In a garden near Prypiat in Ukraine, a woman visits the grave of her son

The genetic damage done to new generations seems worryingly real

increasing. “There are still lots of gaps in scientific knowledge,” says Dimitry Bazyka of the Research Centre for Radiation Medicine in Ukraine.

To some, Chernobyl’s effects on new generations seem worryingly real. In a centre for radiological medicine in Kiev, Professor Eugenia Stepanova is assessing hundreds of children of irradiated parents. One is Yuri (not his real name), a pale, stick-limbed boy of ten, anaemic, malnourished and prone to every bug. “We know he’s not suffering directly

from radiation,” Stepanova explains in her office piled high with stuffed toys brought by sponsors visiting from all over the world. “But he is sick because his father was a fireman irradiated at Chernobyl. Our task is to find out why these children are always the sick ones.”

Clues to the repercussions of Chernobyl may lie in the irradiated forests surrounding the nuclear plant for 18 miles in every direction. Surprisingly lush, this area is full of moose, boar, deer, horses, black cranes, otters and wolves. The air seems pure and nature appears to be thriving. However, significant genetic damage through many generations has been found in 24 of at least 32 species of plants and animals studied by international scientists.

In barn swallows, even after 19

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generations, mutations are up to ten times higher than average. One Chernobyl swallow in five has white feathers speckling its face, signs of albinism, against one in 100 in clean areas. Chernobyl swallows breed less often and have smaller broods. About 15 per cent live as long as a year, compared with 40 per cent in clean areas.

Rats and mice in the forest are anaemic, with immune-system problems, limited reproduction and more aberrations, even after 12 generations. "The effects are similar to those of inbreeding," explains Tim Mousseau, a biologist at the University of South Carolina, who works on Chernobyl region swallows. "It is very possible that similar effects will be seen in future generations of humans."

Anti-nuclear hysteria: Beyond the USSR, the hysteria did more damage than the radiation. In Western Europe radiation was negligible, yet more

than 100,000 pregnant women elected to abort rather than risk a deformed child. And the impact on nuclear power policy continues to be massive. Outside the flourishing nuclear industry in France, only one new nuclear power station has been approved (in Finland) since 1986.

Yet the nuclear power industry's safety and pollution record beats that of all other energy sources by a long way. Nuclear power has reliably and safely provided much of the electricity in most Western countries for many years without a fatal accident. But nuclear opponents still argue that Chernobyl proves it is inherently dangerous and can't be trusted.

With fossil fuels increasingly seen as expensive and polluting, nuclear power is once again starting to be seen as an attractive option. That may ultimately count for more than the long shadow that Chernobyl still casts, 20 years after the explosion in reactor number four.

WAIST NOT, WANT NOT

Recently, I strapped on a step counter and went for a walk with my mother.

"What's that?" she asked.

"An exercise tool that keeps track of your steps," I said. "I'm hoping it'll help me lose weight."

Unconvinced, she asked, "Wouldn't it work better if it counted your bites?"



ANGELA GIACCI

After my doctor told me my cholesterol was too high, I tried to make an appointment with the flatmate of a friend, who is a dietitian.

Unfortunately, she couldn't see me, my friend said, because "her plate is too full."

DIAN SMITH in The New York Times