

ENVIRONMENTAL POLLUTION



LAND & WATER POLLUTION

By Dr. Frank Elwell

The Environment



THROUGHOUT HUMAN HISTORY,
PEOPLE'S ACTIVITIES HAVE HAD AN
ENORMOUS IMPACT ON THE
PHYSICAL WORLD, AND NEW
ENVIRONMENTAL PROBLEMS HAVE
BEEN CREATED BY THE SOLUTIONS
TO OLD ONES.

The Environment

EVEN THOUGH SOME CULTURES WERE ABLE TO CREATE RELATIVELY STABLE BALANCES BETWEEN PEOPLE AND THE NATURAL WORLD, OTHERS SLOWLY TURNED THE EARTH'S FORESTS INTO GRASSLANDS, ITS GRASSLANDS INTO DESERTS, AND ITS RIVERS INTO SEWERS.

The Environment



IN ORDER TO UNDERSTAND THE ENVIRONMENTAL CRISIS, THE HUMAN RACE MUST BE VIEWED AS A SINGLE BIOLOGICAL SPECIES LIVING IN A SINGLE ENVIRONMENT.

Pollution



THERE ARE THREE BASIC TYPES OF
POLLUTION:

- ATMOSPHERE
- WATER
- LAND

THIS LECTURE WILL FOCUS ON
WATER AND LAND.

POLLUTION OF WATER



- POLLUTION OF LAKES, RIVERS, AQUIFERS AND OCEANS
- SCARCITY OF FRESH WATER SUPPLIES
- DESTRUCTION OF HABITAT AND SPECIES EXTINCTION

WHEN WE TALK
ABOUT WHAT IS
GOING WRONG
WITH OUR
WATER
SUPPLIES, IT HAS
THE SAME OLD-
FASHIONED
SOUND AS
TALKING ABOUT
THE POLLUTION
OF OUR AIR.

Water





Water

UNFORTUNATELY WATER PROBLEMS
ARE STILL WITH US.

IT IS A FACT THAT, APART FROM ITS
DRY SOUTHWESTERN STATES, THE
U.S. IS BLESSED BY NATURE WITH
PLENTIFUL SUPPLIES OF FRESH
WATER.

Water: Cities

ONE REASON FOR OUR WATER PROBLEMS IS THAT WE BUILD GREAT CITIES TO HOLD OUR PEOPLE IN PLACES WHERE THERE IS NOT ENOUGH NATURAL WATER TO SUPPLY THEM.



Water: Cities

LOS ANGELES HAS ENOUGH NATURAL
WATER SUPPLY FOR ABOUT 1 MILLION
PEOPLE--THEY NOW HAVE 14 MILLION.



Water: Cities

LOS VEGAS, PHOENIX, AND OTHER
CITIES HAVE SIMILAR PROBLEMS.
THEY SUCK UP ALL AVAILABLE
WATER IN THEIR REGION.



Ken Biggs, Photo Researchers, Inc.

Water: Agriculture

AGRICULTURE IS ACTUALLY WORSE.
ABOUT 85% OF CALIFORNIA WATER
ACTUALLY GOES TO THE STATE'S
FARMERS. MUCH OF THIS IS
WASTED ON IRRIGATING PASTURE
LAND, AND ILL ADVISED
IRRIGATION PROJECTS.

Water: Aquifers

WELL WATER, TOO, IS BECOMING
BOTH DIRTIER AND SCARCER ALL
OVER THE COUNTRY.



Water: Aquifers

UNDERGROUND WATER IS FOSSIL WATER. IT MAY HAVE TAKEN THOUSANDS OF YEARS FOR THE AQUIFER TO FILL. IF YOU NOW PUMP FASTER THAN IT CAN RECHARGE IT WILL SOONER OR LATER GO DRY.

Water: Aquifers

THE OGALLALA AQUIFER UNDERLIES
THE HIGH PLAIN STATES FROM
SOUTH DAKOTA TO TEXAS.

IT SUPPORTS 20% OF AMERICA'S
IRRIGATED FARMS. BUT THE
IMMENSE AQUIFER IS BEING
DRAINED.

Water: Aquifers

IN PARTS OF THE SOUTHWEST THE
WATER TABLE OF THE OGALLALA
HAS FALLEN BY DOZENS OF FEET--
BY 2020 THERE WILL BE NO WATER
LEFT SOUTH OF NEBRASKA.

Water: Aquifers

IN MANY PLACES WHERE THERE IS
PLENTY OF WATER NEARBY
SEEPAGE OF AGRICULTURAL AND
INDUSTRIAL POLLUTION HAS
RUINED UNDERGROUND WELLS
FOR HOUSEHOLDERS.

Water: Aquifers

IN FLORIDA EXCESSIVE PUMPING HAS LOWERED THE UNDERGROUND WATER LEVELS NEAR THE SEA SHORES SO MUCH THAT SALT WATER IS SEEPING INTO THE AQUIFERS.



Ned Haines, Photo Researchers.

Water: Aquifers

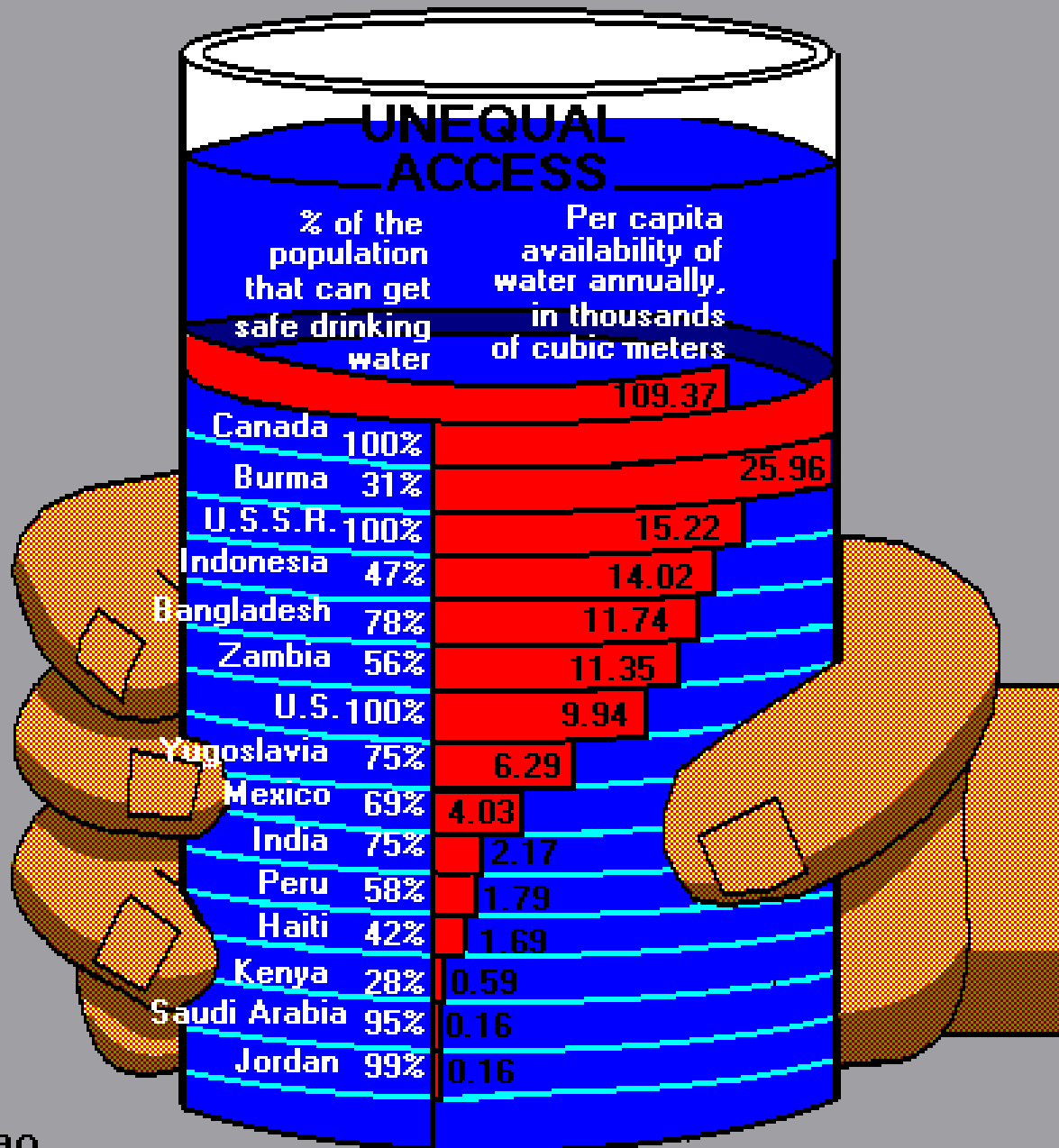
HEEDLESS EXPLOITATION OF DEPLETABLE
GROUND WATER SUPPLIES ENDANGERS
FOOD PRODUCTION AND OTHER ESSENTIAL
HUMAN SYSTEMS.



Water: Shortages

HEAVY DEMANDS ON THE WORLD'S WATER SUPPLIES HAVE RESULTED IN SERIOUS SHORTAGES IN SOME 80 COUNTRIES, CONTAINING 40% OF THE WORLD'S POPULATION.

UNEQUAL ACCESS



WATER: RIVERS



THE CAPACITY OF THE MISSISSIPPI RIVER HAS BEEN STRETCHED TO THE LIMIT IN ALL OF ITS USES, FOR DRINKING, FOR TRANSPORT AND FOR IRRIGATION.

WATER: RIVERS

THE REAL HEALTH PROBLEM IN USING MISSISSIPPI RIVER WATER IS THE LOAD OF CONTAMINATION BY INDUSTRIAL WASTE. THIS WASTE IS BEYOND THE CAPACITIES OF MOST MUNICIPAL WATER SYSTEMS, WHICH DO LITTLE TO COPE WITH INDUSTRIAL POLLUTION.

WATER: RIVERS



BY THE TIME THE MISSISSIPPI WATER GETS TO LOUISIANA IT IS ALREADY CARRYING A BURDEN OF SUCH POISONOUS WASTES AS PCBs AND HEAVY METALS.

WATER: RIVERS



THAT PART OF LOUISIANA HAS ONE OF THE HIGHEST RATES OF DEATHS FROM CANCER OF LUNG, STOMACH, RECTUM AND GALLBLADDER IN THE COUNTRY.

WATER: LAKES

VAST AS THEY ARE, THE GREAT LAKES ARE SERIOUSLY POLLUTED-- IN THE CASE OF LAKE MICHIGAN, TO SUCH AN EXTENT THAT PREGNANT WOMEN IN THAT AREA ARE ADVISED NOT TO EAT LAKE FISH MORE THAN ONCE A WEEK.

WATER: LAKES

IT WOULD COST AN ESTIMATED \$100
BILLION TO CLEAN UP THE GREAT
LAKES.



WATER: LAKES

IN COMPARISON: ALL THE CLEANUP EFFORTS OF THE PAST TWENTY YEARS COMBINED HAVE AMOUNTED TO ONLY A TENTH THAT MUCH.



Water: Oceans



DESTRUCTIVE PRESSURE ON THE OCEANS IS SEVERE, PARTICULARLY IN THE COASTAL REGIONS WHICH PRODUCE MOST OF THE WORLDS' FOOD FISH.

Water: Oceans

THE TOTAL MARINE CATCH IS NOW ABOVE THE ESTIMATED SUSTAINABLE LIMITS. SOME FISHERIES HAVE ALREADY SHOWN SIGNS OF COLLAPSE.



Vanessa Vick, Photo Researchers, Inc.

Water: Oceans



RIVERS CARRY HEAVY BURDENS OF
ERODED SOIL INTO THE SEAS ALSO
CARRY INDUSTRIAL, MUNICIPAL,
AND AGRICULTURAL WASTE--SOME
OF IT TOXIC.

Water: Oceans



Nova Scotia Dept. of Tourism

POLLUTION OF THE LAND



- LOSS OF AGRICULTURAL LAND
- CHEMICAL POLLUTION
- DESERTIFICATION
- DESTRUCTION OF FORESTS
- LANDFILL SHORTAGES
- DESTRUCTION OF HABITAT AND SPECIES EXTINCTION

LAND



SINCE 1945, 11% OF THE EARTH'S
VEGETATED SURFACE HAS BEEN
DEGRADED, AND PER CAPITA FOOD
PRODUCTION IN MANY PARTS OF
THE WORLD IS DECREASING.

LAND

SOME 65 COUNTRIES DEPENDING ON
SUBSISTENCE FARMING ARE
UNABLE TO FEED THEIR
POPULATIONS IN THE YEAR 2000.



LAND

THE ISSUE IS RAPIDLY BECOMING ONE OF HUMAN SURVIVAL. SUSTAINABILITY OF THE PRODUCTION OF FOOD IS IN DOUBT.



LAND

AS A RESULT OF ENVIRONMENTAL DEGRADATION, THE GAP BETWEEN THE "HAVE" NATIONS" AND MANY OF THE "HAVE NOT" NATIONS CONTINUES TO WIDEN.



LAND

IRREVERSIBLE LOSS OF PLANT AND ANIMAL SPECIES, WHICH BY 2100 MAY REACH 1/3 OF ALL SPECIES NOW LIVING, IS ESPECIALLY SERIOUS.



LAND



WE ARE LOSING THE POTENTIAL THEY
HOLD FOR PROVIDING MEDICINAL
AND OTHER BENEFITS AND THE
CONTRIBUTION THAT GENETIC
DIVERSITY OF LIFE FORMS GIVES TO
THE ROBUSTNESS OF THE WORLD'S
BIOLOGICAL SYSTEMS.

RESOURCES



DEPLETION IS MERELY THE OTHER
SIDE OF THE COIN. THE MORE
RESOURCES SOCIETIES USE, THE
MORE WE TEND TO POLLUTE.

RESOURCE PROBLEMS:

- UNEQUAL DISTRIBUTION
- WASTEFUL CONSUMPTION AND PRODUCTION PATTERNS
- RENEWABLE RESOURCE SHORTAGES (FOOD, WOOD, WATER)
- NONRENEWABLE RESOURCE LIMITS (RAW MATERIALS)
- HAZARDS OF NUCLEAR ENERGY

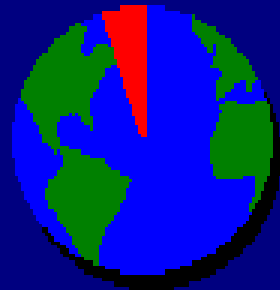
NATURAL RESOURCES



NATURAL RESOURCES

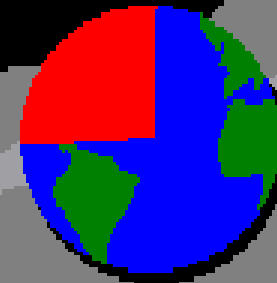
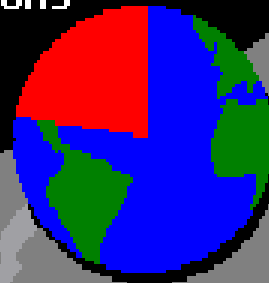


UNCLE SAM VS. THE WORLD



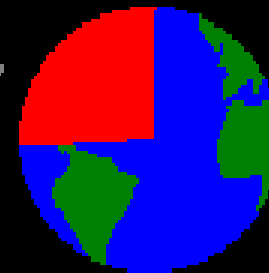
The U.S. has 5% of the earth's population, but...

...produces 22% of the world's carbon dioxide emissions



...releases 26% of the world's nitrogen oxides

...disposes of 290 million tons of toxic waste



...uses 26% of the world's oil

HUMAN HEALTH

- THREATENED BY POISONS, CARCINOGENS, AND DISEASE ORGANISMS
- THREATENED BY MUTAGENIC SUBSTANCES



UNCHECKED POLLUTION



EVEN A PARTIAL REDUCTION IN
POLLUTION IS DEFINITELY WORTH
HAVING, EVEN AT A HIGH COST.
ALL WE NEED TO DO IS TO LOOK AT
THE PARTS OF THE WORLD THAT
HAVE LET POLLUTION RUN
UNCHECKED, FOR EXAMPLE THE
COUNTRIES OF EASTERN EUROPE.

Europe



UNCHECKED POLLUTION



NIKEL A MINING TOWN IN THE FORMER SOVIET UNION, PRODUCES SOME 140,000 TONS OF METAL. THE SMELTERS PRODUCE HALF A MILLION TONS OF SULFUR DIOXIDE WHICH FALL ALL OVER THE AREA AS ACID RAIN.

UNCHECKED POLLUTION

THE ENTIRE NEXT-DOOR NATION OF
NORWAY COLLECTIVELY EMITS ONLY
HALF THAT MUCH SULFUR DIOXIDE.



UNCHECKED POLLUTION



AROUND NIKEL HUNDREDS OF SQUARE MILES OF FOREST ARE SIMPLY DEAD. THERE ARE NO LIVING FISH IN THE RIVERS. EVEN GRASS, WHEN SPARSE BLADES OF IT TRY TO COME UP IN THE SPRING, TURNS BROWN AND DIES.

UNCHECKED POLLUTION



NIKEL'S VOLUNTEER WORKERS FROM OTHER PARTS OF THE SOVIET UNION RARELY STAY MORE THAN TEN YEARS--NINE OUT OF TEN OF THEM LEAVE WITH PERMANENT LUNG DAMAGE.

UNCHECKED POLLUTION

THIS DISPIE THE FACT THAT DURING
THEIR WORKING HOURS THEY
BREATHE FILTERED AIR THROUGH A
MASK.



UNCHECKED POLLUTION



IN CRACOW, POLAND, TOURISTS ARE ADVISED NOT TO REMAIN IN THE CITY FOR MORE THAN THREE DAYS BECAUSE OF DANGEROUS AIR POLLUTION. THE RESIDENTS ARE FAR WORSE OFF.

UNCHECKED POLLUTION



- THE RATE OF DEATHS FROM CANCER IS SLIGHTLY LOWER THAN IN THE REST OF POLAND...
- CRACOW'S PEOPLE DON'T LIVE LONG ENOUGH TO SUFFER FROM SOME OF THE DISEASES OF AGING.

UNCHECKED POLLUTION

IN COPSA MICA, ROMANIA, THE IMMENSE CHEMICAL WORKS SPECIALIZES IN HEAVY METALS, AND EMITS 30,000 TONS OF METAL-LADEN SOOT EACH YEAR.



UNCHECKED POLLUTION



COPSA MICA'S WORKERS ARE HEALTHY WHEN HIRED, BUT A YEAR LATER THEY HAVE UP TO 800 TIMES THE PERMISSIBLE LEVEL OF LEAD IN THEIR BLOOD, AND ALMOST 3/4 OF THEM SUFFER FROM LEAD-INDUCED ANEMIA.

UNCHECKED POLLUTION



IN CZECHOSLOVAKIA, AS MANY AS 10% OF INFANTS BORN IN SOME AREAS, SUCH AS NORTHERN BOHEMIA, ARE AFFECTED BY BIRTH DEFECTS, AND THE SUNLIGHT THROUGHOUT THE AREA IS DESCRIBED AS "BLEAK AND GRAY."

UNCHECKED POLLUTION



IN THE TOWN OF TEPLICE CHILDREN
ARE KEPT INDOORS FOR AS MUCH
AS A MONTH AT A TIME;

IN THE SIX WORST WEEKS OF THE
YEAR THE SCHOOL AND ALL ITS
CHILDREN ARE MOVED TO
ANOTHER COMMUNITY WITH
CLEANER AIR

UNCHECKED POLLUTION



IN BUDAPEST, HUNGARY, HOSPITALS
HAVE INSTALLED
"INHALITORIUMS"--BOXES THE SIZE
OF TELEPHONE BOOTHS, WHERE
PATIENTS WAIT IN LINE FOR
FIFTEEN MINUTES OF BREATHING
CLEANED AIR.

UNCHECKED POLLUTION

ONE HUNGARIAN
DEATH IN EACH
SEVEN IS
ATTRIBUTED
TO POLLUTION.



UNCHECKED POLLUTION



IN PARTS OF CZECHOSLOVAKIA AND
POLAND AS MANY AS 3/4 OF THE
TREES ARE DAMAGED OR DEAD
FROM ACID RAID, AND THE REST OF
THE REGION IS NEARLY AS BAD.

FARM ANIMALS SICKEN, EVEN
VEGETATION IS DAMAGED OR
KILLED.

UNCHECKED POLLUTION



IN SOME AREAS OF THE EAST HUMAN
LIFE EXPECTANCY IS AS MUCH AS
SEVEN YEARS LESS THAN EVEN
COMPARATIVELY CLEANER PLACES
NEARBY.

UNCHECKED POLLUTION



FOR MORE THAN 70 YEARS THE
COUNTRIES OF EASTERN EUROPE
HAVE BURNED LOCAL BROWN COAL
DEPOSITS, HEAVILY
CONTAMINATED WITH SULFUR AND
OTHER CHEMICALS.

UNCHECKED POLLUTION

THE RESULT IS THAT THE AIR STINKS, THE LAND AND WATER IS DYING, AND THE PEOPLE'S HEALTH IS IN DECLINE.



Steffen Hauser, Oxford Scientific Films

UNCHECKED POLLUTION



THE GROSS NATIONAL PRODUCT OF POLAND IS DIMINISHED BY AN ESTIMATED 10% FROM POLLUTION OF VARIOUS KINDS--ABOUT HALF OF THAT FROM WORKERS SICKNESS.

UNCHECKED POLLUTION

THERE ARE AREAS OF FORMER EAST GERMANY WHERE THE AIR POLLUTION IS STILL SO BAD THAT DOCTORS REFUSE TO WORK THERE.



UNCHECKED POLLUTION: CHINA



UNCHECKED POLLUTION: CHINA

A POTENTIAL GLOBAL DISASTER. THE CHINESE ECONOMY HAS QUADRUPLED IN SIZE SINCE 1980. WILL BECOME LARGEST ECONOMY BY ABOUT 2010. BUT RAPID LOSS OF CROPLANDS DUE TO URBANIZATION IS STRAINING THE COUNTRY'S ABILITY TO FEED ITSELF.

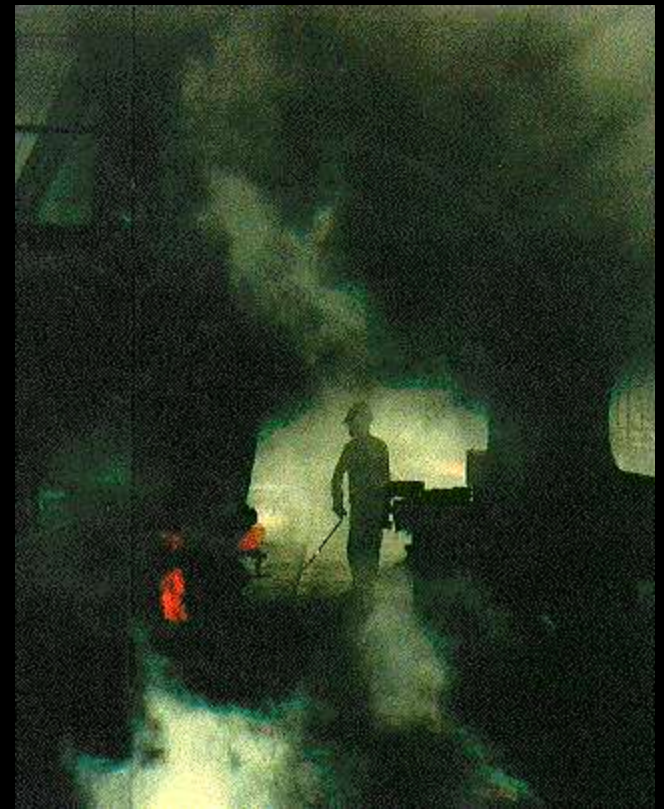
UNCHECKED POLLUTION: CHINA

- RESPIRATORY DISEASE THE LEADING CAUSE OF DEATH IN CHINA'S URBAN AREAS.
- RESPIRATORY DISEASE OCCURS AT 5 TIMES THE RATE IN THE U.S.



UNCHECKED POLLUTION: CHINA

SHANGHAI CHEMICAL PLANT, 1996.



UNCHECKED POLLUTION



ALL OF THIS COULD HAVE BEEN
AMERICA IF WE HAD NOT BEGUN TO
TAKE AT LEAST A FEW FIRST STEPS.