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**WAITING FOR TERROR:
HOW REALISTIC IS THE BIOLOGICAL,
CHEMICAL AND NUCLEAR THREAT?**

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OXFORD RESEARCH GROUP

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WAITING FOR TERROR: HOW REALISTIC IS THE BIOLOGICAL, CHEMICAL AND NUCLEAR THREAT?

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Executive Summary

There is no agreed and unambiguous definition of terrorism. There is, therefore, no agreed list of terrorist groups. It is clear, however, that terrorism is on the increase. It is estimated that only 11 terrorist groups were active in 1968. In the past 33 years, there has been a fivefold increase in the number of terrorist groups operating in the world. Five types of terrorism can be usefully identified, each of which has distinct characteristics. These are: terrorism by an individual; terrorism by religious fundamentalists; political terrorism, usually with nationalist aims; terrorism by extreme political groups, right and left wing; terrorism carried out by single issue groups, such as anti-abortionists and radical ecologists; and terrorism by millennial groups.

Religious terrorism

Religious terrorists are generally the most fanatical of all terrorists. They are willing, and even anxious, to die for their cause. Religious terrorists are prepared to commit almost limitless violence against almost any target. Of all the terrorists groups, the religious ones are the most likely to acquire and use weapons of mass destruction. The AUM group started this process by its nerve gas attack in Tokyo. It may only be a matter of time before a religious terrorist group makes and uses a nuclear explosive. Two main groups of religious terrorists, the Islamic Fundamentalists and the Christian White Supremacists, are operating today. Both justify and legitimise terrorist violence on the basis of their religious beliefs. White supremacist groups preach a virulent anti-Semitic, white supremacist theology, vilifying Jews and non-whites as the children of Satan.

Political-nationalist terrorism

Most terrorist groups with political aims are nationalist, usually aiming to create an independent homeland. Typical examples are the Basque Fatherland and Liberty group (Euzkadi ta Askatasuna or ETA as it is usually called), the Tamil Tigers, groups within the Palestinian Liberation Organisation (PLO) and groups in Northern Ireland.

Right-wing terrorist groups

Right-wing terrorists generally believe that conflict and violence are essential elements in society. Extreme right-wing groups in America are closely aligned with religious fundamentalist movements, as they are in Eastern Europe, Israel, Japan, and South Africa. In Western Europe, however, right-wing extremism is generally not connected with a religion. Violent neo-Nazi and neo-Fascist terrorist groups operate mainly in France, Germany, Italy, the Netherlands, and Sweden.

The number of international terrorist attacks

According to the US Department of State, the annual number of significant international terrorist attacks over the past 20 years has varied between 274 and 666, with an average of 459. During 2000, a total of 405 persons were killed and 791 were wounded in the 423 international terrorist attacks. In 1999, the figures were 233 killed and 706 wounded. In 1998, the figures 741 persons killed and 5,952 injured. In modern times, the most common type of international terrorist attack has involved bombings - roughly half of the total. Attacks on installations with other weapons (like hand grenades, rocket-propelled grenades, and bazookas), fire-bombings, drive-by shootings, and other sabotage accounted for about 20 per

cent of the international terrorist incidents. Hijackings, assassinations, kidnappings and the taking of hostages account for the bulk of the remainder.

Terrorist use of chemical weapons

Of the three types of weapons of mass destruction - chemical, biological, or nuclear - chemical ones are the most accessible to terrorists. Methods of preparing chemical-warfare agents are described in the open literature. It is relatively easy to obtain the chemicals required to do so, and then to prepare the agent. There are five main categories of chemical-warfare agents - incapacitating, choking, blister, blood, and nerve agents. Terrorists are most likely to use nerve agents. Nerve agents include the G-agents, that are non-persistent and cause death mainly after inhalation, and the V-agents, which are persistent and can be absorbed through the skin. Nerve agents attack the nervous system. Within minutes of a significant exposure, increasingly severe symptoms appear. At high doses, coughing and breathing problems begin to happen. The person may begin to go into convulsions, deep coma and finally death. A minute drop of a nerve gas, inhaled or absorbed through the skin or eyes, is enough to kill. Terrorists would only need to produce a fraction of a litre of a nerve agent to kill a large number of people. It would be very difficult to prevent them from getting hold of the chemicals needed to produce such a quantity of nerve gas.

Terrorist use of biological weapons

Biological warfare agents are disease-carrying substances and organisms, including bacteria, viruses, rickettsiae, and fungi. Diseases caused by bacteria include anthrax, cholera, pneumonic plague, and typhoid. In humans, viruses cause, for example, AIDS, flu, polio, and smallpox. Viruses are carried in body fluids or are spread by coughs and sneezes. Rickettsias are bacteria that can only live inside cells that behave as host cells, such as viruses. Carried by lice, ticks and fleas, they cause diseases like typhus, Q-fever, and Rocky Mountain spotted fever. Terrorists could acquire biological agents from civilian or medical research laboratories, from someone working in the laboratory or by theft. Biological agents can also be acquired from materials taken from nature. Examples are the bacteria clostridium botulinum and bacteria causing anthrax and brucellosis.

Ease of acquisition is one reason why terrorists are likely to find biological agents attractive. Quite a large volume of a virulent strain of the agent would, however, be required for an effective terrorist attack. A disadvantage of biological agents is their incubation period - the period between the time when an individual absorbs the agent and the time when the disease manifests itself. Incubation periods can vary between a few days and a few weeks. Another disadvantage is that it would be very difficult to predict the number of people likely to be killed in a biological attack. Anthrax is likely to be the biological agent preferred by terrorists because: it is very lethal, inhalation anthrax is almost always fatal; it is relatively easily produced in large quantities at low cost; knowledge about anthrax and its production is widely available in the open literature; it is very stable and can be stored for a very long period as a dry powder; and it is relatively easy to disperse as an aerosol with crude sprayers.

Terrorist use of nuclear weapons

After the recent terrorist attacks in New York and Washington and the use of chemical weapons by the AUM group, the next rung on the terrorist ladder of escalation may well be the acquisition and use of a nuclear weapon. Many believe that the most likely way in which a terrorist group would acquire a nuclear explosive is by stealing a nuclear weapon from a military stockpile or by stealing one while it was being transported. But it is not only the ex-

Soviet nuclear arsenal that we should worry about. As plutonium and highly enriched uranium become more available worldwide, it is increasingly possible for a terrorist group to steal, or otherwise illegally acquire, civil or military fissile material that could be used to fabricate a nuclear explosive device. The group could then detonate, or threaten to detonate, its nuclear explosive or threaten to detonate it. Of particular concern is the growing trade in civil mixed-oxide (MOX) nuclear fuel. Mixing plutonium oxide with uranium oxide produces MOX. The plutonium oxide is produced in reprocessing plants by separating it from spent nuclear-power reactor fuel elements. If terrorists acquire MOX fuel, they could relatively easily remove the plutonium oxide from it chemically and use it to fabricate nuclear weapons. The global trade in MOX, therefore, increases the risk of nuclear terrorism.

Concern about the theft of fissile materials has been considerably enhanced by recent incidents of the smuggling of such materials from Russia. These smuggling incidents, which are almost certainly the tip of an iceberg, suggest that a significant black-market in fissile materials exists. Even if a crude nuclear device using plutonium, when detonated, did not produce a significant nuclear explosion, the explosion of the chemical high explosives would disperse the plutonium widely. If an incendiary material, such as an aluminium-iron oxide (thermite), were mixed with the high explosives, the explosion would be accompanied by a fierce fire. A high proportion of the plutonium is likely to remain unfissioned and would be dispersed by the explosion or volatilised by the fierce heat. The dispersal of plutonium would make a large part of a city uninhabitable until decontaminated, a procedure which could take many months or years. If one kilogram of plutonium is uniformly distributed it will contaminate about 600 square kilometres to a level of one micro-curie per square metre, the maximum permissible level allowed for plutonium by international regulations. This means that a very large area will have to be evacuated and decontaminated, an expensive procedure that could take years.

The urgent need for effective intelligence

The importance of effective intelligence in countering terrorism cannot be over estimated. The penetration of terrorist groups by undercover intelligence agents or double agents is of critical importance. Experience shows that setting up effective intelligence activities against terrorist groups is extremely challenging. Rivalries between intelligence agencies within countries and lack of cooperation in intelligence matters between countries seriously reduce the effectiveness of intelligence, to say the least. The intelligence and security agencies, in their fight against terrorism, face an awesome task that will require the acquisition of any new technological developments relevant to counter-terrorist activities, a close study of new terrorist threats, and, perhaps most importantly, an imaginative approach to the issues. In the age of the Internet, knowledge is available to all. This, and the revolution in communications, have had a considerable impact on society and have removed one of the few advantages of the intelligence community. In future, success in countering terrorism will depend on the effective application of ingenuity and innovation.

Future trends in terrorism

Some of the crucial assets of industrialised societies - such as large power stations, fuel dumps, liquid gas storage sites, centralised computer networks, major telecommunication centres, major transport centres - without which the society cannot operate effectively, are highly centralised and, therefore, vulnerable to attack or sabotage by terrorist groups. Examples are attacks on computer networks, called cyberterrorism, and attacks on large nuclear-power stations. Cyberterrorism has attractions for terrorists. It can be conducted at a great distance and costs little. It would not involve the use of explosives or weapons and,

perhaps most importantly for the terrorist, it would attract a great deal of coverage on the media. Computers and any problems with them fascinate the public and media people.

Apart from acquiring fissile material and fabricating a nuclear explosive, future nuclear terrorists may attack a nuclear-power plant, releasing large amounts of radioactivity, and gaining much publicity - the lifeblood of terrorists. Current trends in terrorism suggest that political terrorism with separatist or nationalist aims is likely to decrease as time goes on and terrorism by single issue groups is likely to remain roughly constant. But other types of terrorism are likely to increase. Of particular concern are more frequent and more violent terrorist actions by religious fundamentalists, particularly Islamic fundamentalist groups and American Christian white supremacists, and by groups on the extreme right of politics.

1. WHAT IS TERRORISM?

There is no entirely satisfactory definition of terrorism. Law enforcement and intelligence agencies have adopted their own descriptions of terrorism in order to do their jobs. America's Federal Bureau of Investigation, for example, regards terrorism as:

"the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives".

The US State Department, however, emphasises the international aspects of 'terrorism', describing it as:

"violence perpetrated against non-combatant target by subnational groups or clandestine state agents, usually intended to influence an audience. 'International terrorism' is terrorism involving the citizens or territory of more than one country".
(1)

An official definition of terrorism is given in the British Terrorism Act 2000:

"the use or threat of action where the use or threat is designed to influence the government or to intimidate the public or a section of the public, and the use or threat is made for the purpose of advancing a political, religious or ideological cause. Action falls within the Act if it involves serious violence against a person, involves serious damage to property, endangers a person's life, other than that of the person committing the action, creates a serious risk to the health or safety of the public or a section of the public, or is designed seriously to interfere with or seriously to disrupt an electronic system." (2)

Coercive intimidation using unpredictable violence to achieve a political objective is the key element in terrorist violence. In Paul Wilkinson's words:

"what distinguishes terrorism from other forms of violence is the deliberate and systematic use of coercive intimidation". (3)

Terrorist violence - whether it involves bombing, attacking individuals or installations, hijacking aircraft, hostage taking, shooting, kidnapping, taking hostages, or threatening violence - are criminal and subversive actions but the essential character of terrorism is that its purpose is to further a cause - political, nationalistic, religious. Innocent civilians and property are the usual targets of terrorist violence. The terrorists' purpose is generally to use fear to disrupt the economic, social, and political life of the society attacked. 'Kill one, scare ten thousand'. They use fear to achieve their political or religious goals, goals they cannot achieve by conventional political means. In the spectrum of human violence, terrorist violence overlaps at one end with violence by an individual and at the other end with guerrilla warfare. Guerrillas fight, to some extent at least, under the rules of warfare. Terrorists do not operate in these ways; they do not operate according to any recognised rule.

Types of terrorists

Because there is no agreed and unambiguous definition of terrorism there is no agreed list of terrorist groups. The data bank at the Centre for the Study of Terrorism and Political Violence at the University of St Andrews (4), for example, lists about 50 known terrorist groups operating today. Bruce Hoffman, an expert in terrorism, estimates that only 11 terrorist groups were active in 1968 (5). In the past 33 years, there has been a fivefold increase in the number of terrorist groups operating in the world.

Up to the end of the 1960s terrorists (as labelled by the governing authorities) were generally fighting for the independence of their countries from colonial rule. Since then, however, most terrorism arises from religious, political, ethnic, cultural, nationalistic, and ideological conflicts. The goal of many modern groups consists of more than one of these elements. Groups such as the Provisional Irish Republican Army, the Ulster Volunteer Force, the Tamil Tigers in Sri Lanka, Sikh groups in India's Punjab region, have political, nationalist and religious purposes; in these cases, however, the political element dominates.

Bearing this difficulty in mind, five types of terrorism can be usefully identified, each of which has distinct characteristics. These are: terrorism by an individual; terrorism by religious fundamentalists; political terrorism, usually with nationalist aims; terrorism by extreme political groups, right and left wing; terrorism carried out by single issue groups, such as anti-abortionists and radical ecologists; and terrorism by millennial groups.

Terrorism by an individual

An act of violence by one person can be called an act of terrorism if the individual believes he/she is acting for a cause or if his/her aim is to 'change society'. An example of an individual terrorist is Theodore Kaczynski, an American mathematician and former university professor (6). Arrested on 3 April 1996, Kaczynski, then 54 years old, was charged in Sacramento, California, with three murders and attacks on two people using bombs.

Baruch Goldstein, an American Jewish immigrant to Israel who settled in Kyriat Arba near Hebron, is another example of an individual terrorist. On 25 February 1994, Goldstein, a member of the extreme right-wing group Kahane-chai, opened fire with an automatic rifle in the Mosque at the Cave of Machpelah in Hebron, the burial place of the Patriarch Abraham, killing 29 Palestinians and wounding dozens of others.

The best-known terrorist act by an individual is probably the assassination in November 1995 of Israel's Prime Minister Yitzhak Rabin. A fanatical Israeli law student, Yigal Amir, a member of the right-wing group Eyal, did the killing. Amir justified the killing of Rabin by arguing that the Prime Minister's plan to give up Israeli territory violated Jewish religious tenets.

Religious terrorism

Religious terrorists are generally the most fanatical of all terrorists. They believe that their terrorist violence is a divine duty, a response to a God-given religious command; religious terrorists are willing, and even anxious, to die for their cause. In the words of Bruce Hoffman, religious terrorism,

"assumes a transcendental dimension, and its perpetrators are thereby unconstrained by the political, moral, or practical constraints that seem to affect other terrorists. Whereas secular terrorists generally consider indiscriminate violence immoral and counterproductive, religious terrorists regard such violence not only as morally justified, but as a necessary expedient for the attainment of their goals." (4)

Religious terrorists are prepared to commit almost limitless violence against almost any target. Any person who is not a member of the terrorist's religion or religious sect is a legitimate target. This means that of all the terrorists groups, the religious ones are the most likely to escalate violence to the use of weapons of mass destruction. The AUM group started this process with its nerve gas attack in Tokyo. It may only be a matter of time before a religious terrorist group makes and uses a nuclear explosive.

Islamic fundamentalists

There are currently two main groups of religious terrorists today, the Islamic fundamentalists and the white supremacists. The Islamic groups generally conduct terrorism as a form of Holy War, to be continued until total victory is won. The uncompromising attitude of, for example, the Shi'a Islamic fundamentalists was explained by the Mullah Hussein Mussawi, the leader of Hizbollah until he was assassinated by an Israeli helicopter raid in Lebanon in 1994:

"We are not fighting so that the enemy recognises us and offers us something. We are fighting to wipe out the enemy".

Hizbollah (the Party of God), the best-known radical Shi'a group (also known as Islamic Jihad), operates from Lebanon - in the Bekaa Valley, Beirut, and southern Lebanon. Hizbollah mainly attacks Israeli targets but it has also been involved in many attacks against American targets, including the bombing, by a suicide bomber driving a tipper truck carrying about 5,000 kilograms of explosives, of the US Marine Barracks on 23 October 1983 in Beirut and the bombing of the annex to the US Embassy in Beirut in 1984. On 23 October 1983, the same day as the US Marine Barracks was bombed, another lorry, carrying 1,800 kilograms of explosive, destroyed the French military compound in Beirut. The two bombings in October 1983 killed 298 soldiers. They signalled the arrival of the so-called suicide bomber.

Another Islamic militant group, the Covenant of the Islamic Resistance Movement, founded in Gaza in 1988 by Sheikh Ahmed Yassin and usually called Hamas, its Arabic acronym, is committed to fight Israel to the end: "Israel will exist and continue to exist until Islam will obliterate it". Hamas and Hizbollah are closely related. Members of Hamas and Hizbollah have carried out most of the suicide bombings in Israel.

Osama Bin Laden – the world's best-known terrorist, has become the world's most infamous terrorist. At 41 years-old multi-millionaire Osama Bin Laden is the youngest son of a wealthy Saudi businessman. In the 1970s he developed a worldwide organization to recruit Muslim terrorists to fight against the Soviets in Afghanistan, organising training camps for young Muslims during the Afghan War of the 1980's. His activities against the Soviet occupation of Afghanistan were much encouraged by the Americans. Bin Laden runs the Al Qaeda (The Base), a 5,000-strong militant Islamic terrorist group. In 1988, he formed a network devoted to terror and subversion – the "International Islamic Front for Jihad against America and Israel", incorporating groups with vehement anti-American and anti-Israel ideologies. According to a US Congressional report prepared by the Congressional Research Service, released on 13 September 2001, his terrorist network has been "identified or suspected" in at least 34 countries and has access to anti-aircraft missiles and chemical weapons.

On August 20, 1998, the U.S. military struck facilities in Afghanistan and Sudan thought to belong to Osama bin Laden's network in retaliation for the carefully coordinated attacks, on 7 August 1998, on US embassies in Nairobi, Kenya and Dar es Salaam, Tanzania. Bin Laden has also been associated with the killings of Western tourists by militant Islamic groups in Egypt, the 1993 World Trade Center bombing, the 1995 explosion of a car bomb in Riyadh, Saudi Arabia; the 1995 truck bomb in Dhahran, Saudi Arabia that killed 19 U.S. servicemen; and the motorboat attack on the USS Cole off Yemen in October 2000 that killed 17 American sailors.

Bin Laden and his network aim to provoke a war between Islam and the West and to overthrow Muslim governments, such as those of Egypt and Saudi Arabia. The Bin Laden network is suspected of supporting terrorists in Afghanistan, Bosnia, Chechnya, Tajikistan, Somalia, and Yemen. It is alleged that Bin Laden was associated with the attacks on 11

September 2001 on the World Trade Center, New York and the Pentagon, Washington that killed nearly 7,000 people.

In February 1998 Bin Laden issued a fatwa (a religious decree), calling for the liberation of Muslim holy places in Saudi Arabia and Israel, as well as the death of Americans and their allies, and called for a holy war against Americans. He seems to be motivated by his fervent opposition to the presence of American troops near the holy sites of Mecca, Saudi Arabia, in violation, according to him, of the principle that 'the feet of infidels must not sully the Ka'ba'.

White supremacists

The other main radical religious terrorist groups are made up from Christian white supremacists in the United States. Like the Islamic fundamentalists, the Christian white supremacists justify and legitimise terrorist violence on the basis of their religious beliefs. Christian white supremacists are part of the American radical right wing.

White supremacist groups preach a virulent anti-Semitic, white supremacist theology, vilifying Jews and non-whites as the children of Satan. A number of these groups are involved in the movement known as Christian Identity, including a number of influential Identity churches across the USA, the modern version of which emerged in the 1940s. The most important of them are Aryan Nations and the Order (also called the Silent Brotherhood), a splinter group of the Aryan Nations. Many of the members of these groups have a messianic belief in the Second Coming of Christ, although, of course, a white Aryan Christ.

Members of Christian Identity, the orthodoxy of the extreme right in America, come mainly from conservative Protestant churches. Christian Identity shares with Protestant fundamentalism an apocalyptic belief but with a crucial difference. Christian white supremacists are generally opposed to any form of government above the level of local government. They believe that Jews control the American government, financial centres and media. They call the American government the "Zionist Occupation Government" or the ZOG; their main purpose is to overthrow the ZOG.

The most horrendous terrorist action in the USA, committed by an American, was the bombing of the Alfred Murrah Federal Building in Oklahoma City on 19 April 1995 that killed 168 people including 19 children by a bomb containing more than two tonnes of an ammonium nitrate-diesel mixture. The Oklahoma bomber, Timothy McVeigh, was a member of an anarchic far-right group called the Patriots.

Political-nationalist terrorism

Most terrorist groups with political aims are nationalist, usually aiming to create an independent homeland. Generally speaking such groups oppose a perceived illegitimate exercise of power over a people or region. Their concerns largely revolve around the right to political self-determination of a pre-defined community, the protection of 'local' traditions and/or a minority language and sometimes ethnic or religious elements. Typical examples are the Basque Fatherland and Liberty group (Euzkadi ta Askatasuna or ETA as it is usually called), the Tamil Tigers, groups within the Palestinian Liberation Organisation (PLO) and groups in Northern Ireland.

ETA

ETA was founded in 1959 to establish an independent homeland in the Basque region in the northeast of Spain (provinces of Vizcaya, Guipuzcoa, Alava and Navarra) and the southwest of France (departments of Labourd, Basse-Navarra and Soule). In 1974, ETA split into two factions, ETA/Political-Military (ETApm) and ETA-Military (ETAm). A degree of home rule was granted to the Basques by the Spanish government in 1982, since when ETApm has not

been active. It eventually rejected the armed struggle as a means of achieving political change. ETAm, however, continues to make lethal terrorist attacks, convinced that the armed struggle is necessary to achieve independence for the Basques.

The strength of ETA is estimated to be several hundred. Its main activities are the bombing of Spanish government targets and the assassination of Spanish officials, particularly those in the security forces. More than 800 people have been killed in ETA attacks. ETA was responsible for the explosion of a car bomb on 27 August 2001 in a car park at Barajas airport, Madrid. This was probably part of a campaign by ETA to harm Spain's economy by attacking its crucial tourist industry.

The Tamil Tigers

The aim of the Tamil Tigers (Tigers of Tamil Eelam) separatist movement is to create an independent state for the Tamils in the north and east of Sri Lanka. About 20 per cent of the population of Sri Lanka (18 million people) are Tamil and 75 per cent are Sinhalese. The Sinhalese are mostly Buddhists and the Tamils are mainly Hindus.

At first, the Tamil Tigers limited themselves to a few assassinations and armed robberies. In 1983, the Tamil Tigers began a very violent campaign, starting with an attack on Jaffna that killed thirteen Sinhalese troops. By 1986, with help from the large Tamil population in India, the Tamil Tigers had become a formidable fighting force. Violent acts of terrorism and military operations brought a significant fraction of northern Sri Lanka under Tamil Tiger control. In an attempt to re-establish its authority, the government attacked, by land and air, the regions in the north controlled by the Tamil Tigers.

The Tamil Tigers became notorious for its attacks with suicide bombers. On 4 July 1996, a Tamil Tiger rebel with explosives strapped to her body threw herself in front of a government motorcade in Jaffna. In addition to the bomber, the explosion killed at least 21 people and wounded at least 50, including women and children and a government official.

The PLO

The PLO is an umbrella organisation, established in 1964, containing a number of individual terrorist groups. The main ones represented on the PLO Executive Committee are Al-Fatah; the Popular Front for the Liberation of Palestine (PFLP); the Democratic Front for the Liberation of Palestine (DFLP); the Arab Liberation Front (ALF); the Palestine Popular Struggle Front (PPSF); and the Palestinian Liberation Front (PLF).

On 14 October 1974, the United Nations General Assembly recognised the PLO as 'the representative of the Palestinian people'. On 13 November 1974, Yasser Arafat delivered a speech to the General Assembly, being treated in all respects as a head of state. Arafat and the PLO then focused more on politics than the armed struggle. Some groups disagreed with Arafat's new approach although the intensity of Palestinian violence was reduced.

In November 1988, Yasser Arafat, the leader of the PLO, announced that the organisation was stopping its terrorist activities against Israel. Since then, Al-Fatah, which was founded in 1958, joined the PLO in 1968 and won the PLO leadership in 1969, has adopted the strategy of confining its fighting to attacks on Israeli soldiers and Jewish settlers on the West Bank and Gaza. There are important non-PLO Palestinian groups in conflict with Israel. Some were horrified by Arafat's change of policy and continued their terrorist activities against Israel. The best known is the Popular Front for the Liberation of Palestine - General Command (PFLP-GC).

These Palestinian groups are generally regarded as terrorist groups because they are sub-national groups who members do not work for an official organisation. Israeli security agents

commit acts - such as assassinations, kidnappings, shootings and bombings - that, if committed by a member of a subnational-group, would be called terrorist acts. But, because these agents work for a government, they are not called terrorists. As PLO members join the security forces of the Palestinian Authority they, in turn, will probably no longer be called terrorists.

The PLO groups are a diverse set; some have a tendency to split into factions. The **DFLP**, for example, is a Marxist group headed by Quiz Abdul Kari that split from the PFLP in 1969. Believing that a Palestine state can be achieved only through a popular revolution, the DFLP opposes any negotiation with Israel. With a strength estimated to be about 500, it is located in Lebanon, Syria, and the occupied territories and has received financial and military aid from Syria and Libya.

DFLP operations have all taken place in Israel and the occupied territories. In the 1970s, it carried out many bombings, some of which were spectacular. It was, for example, responsible for the massacre in the village of Maillot in Israel killing 25 Israelis, 21 of them teenage children, and injuring more than 100 people. Since 1988, the DFLP has been mainly involved in border raids.

The **PFLP** is a Marxist-Leninist group founded by George Abash and responsible for a large number of violent acts. Abash justified the group's indiscriminate use of violence:

"When we hijack a plane it has more effect than if we killed a hundred Israelis in battle. For decades world opinion has been neither for nor against the Palestinians. It simply ignored us. At least the world is talking about us now."

The PFLP has specialised in hijacking commercial airliners. On a single day in September 1970, the PFLP took control of three airliners flying from New York to Europe, taking hostage a total of 475 passengers. The seizure of a fourth aircraft was attempted but failed. One of the aircraft was flown to Cairo and blown up. The other two were flown to Jordan where they were joined by another aircraft, containing more than 100 passengers and crew. These three aircraft were also blown up. All the hostages were released in exchange for seven Palestinian fighters imprisoned in Switzerland. In 1976, PFLP fighters hijacked an Air France airliner, holding 103 passengers and crew hostage at Uganda's Entebbe airport. Israeli commandoes rescued the hostages. During the operation, seven of the PFLP hijackers, 20 Ugandan troops, and an Israeli commando were killed.

The **PFLP-GC**, led by Ahmad Jibril, a former captain in the Syrian Army, is violently opposed to Arafat's policy and to the PLO. Reported to have several hundred members and closely allied with and supported by Syria and Iran, PFLP-GC continues to support international terrorism. With headquarters in Damascus, Syria, and bases in Lebanon, the PFLP-GC has been responsible for some dramatic terrorist attacks, carrying out many cross-border terrorist attacks on Israel by novel methods, such as hot-air balloons and motorised gliders.

Of the PLO groups, **Al-Fatah** is historically the most important perhaps because Yasser Arafat was at its head. Al-Fatah joined the PLO in 1968 and within a year was acknowledged as its leader. In the 1960s and up to 1974, Al-Fatah carried out numerous acts of international terrorism in Western Europe and the Middle East. Al-Fatah formed close political and financial ties to Saudi Arabia, Kuwait and other moderate Gulf States, ties that were disrupted by Arafat's support for Iraqi leader Saddam Hussein during the 1990-91 Gulf War. It also received weapons, explosives and training from the ex-Soviet Union and some former communist regimes in Eastern Europe and weapons from China and North Korea. With about 7,000 fighters, Al-Fatah was a formidable fighting force, maintaining several elements, such as Force 17 and the Al-Fatah Special Operations Group, organised in military fashion and

having intelligence wings. Force 17 was formed in the early 1970s as a bodyguard force for Yasser Arafat and other senior PLO leaders.

The 33-year old conflict between the PLO and Israel has been a very violent one. There are no accurate numbers of deaths and injuries but since 1964 more than 12,000 people have been killed, mostly Palestinians.

Terrorist groups in Northern Ireland

The main terrorist groups in Northern Ireland are Republican (Catholic), with the goal of uniting Northern Ireland with Eire, and Loyalist (Protestant), wanting to remain within the United Kingdom. Each has been responsible for a great deal of violence over the past 30 years. In 1970, the Irish Republican Army (IRA) split into the Official IRA and the Provisional IRA (PIRA). The PIRA soon became one of the world's major terrorist groups, operating mainly in Northern Ireland but also in mainland Britain, Continental Europe and Eire. PIRA bombings on the mainland included bombs exploded in London, Bristol, Coventry, Liverpool, Manchester, and Southampton. It is generally assumed that the PIRA has links with the Northern Irish Sinn Fein political party.

According to the Research Institute for the Study of Conflict and Terrorism, between 1970 and August 1994, when the PIRA declared a ceasefire, terrorism in Northern Ireland accounted for the deaths of about 3,000 people and injuries to more than 30,000 people, out of a total population of 1.5 million. Of the 3,000 or so people killed, about 10 per cent were officers of the Royal Ulster Constabulary (RUC), about 15 per cent were British soldiers, about 7 per cent were from the Ulster Defence Regiment (UDR), and the bulk, 68 per cent, were civilians. During this period, of the more than 36,000 people injured, two thirds were civilian. About 1,500 of these deaths were caused by PIRA violence and most of the rest by Loyalist paramilitary organisations, such as the Ulster Volunteer Force and the Ulster Freedom Fighters. Although the level of violence in Northern Ireland has considerably reduced, the PIRA will remain a force to be reckoned with until the political future of Northern Ireland is finally determined and all the terrorist groups disarmed. Between 1970 and 1994, there were about 65,000 terrorist incidents in Northern Ireland; more than 15,000 people were charged with terrorist offences; about 11,000 firearms were captured and more than 100 tonnes of explosives found. About 34,000 of the terrorist incidents were shootings, about 14,000 explosions or the defusing of bombs and about 17,000 were armed robberies. All of this took place in a country with a population about the same as the population of Southampton.

Even at the peak of its operations, The PIRA was a relatively small organisation, with some 100 active members in the Belfast area, about 80 in Londonderry, and 40 or so in South Armagh. In November 1997, dissident members of the PIRA, opposed to the 'peace process', formed the 'real' IRA (rIRA). With a membership believed to be a dozen or two, and weapons taken from IRA dumps, the rIRA has been responsible for a number of bombings. It admitted to be responsible for exploding a car bomb in the centre of Omagh, County Omagh, on 15 August 1998, the single worst incident in Northern Ireland since 1970 with 29 people being killed.

Another terrorist group opposed to the Northern Ireland peace process is the Continuity IRA, formed in 1996 and made up of a dozen or two people from other republican groups, particularly the IRA. It has been responsible for bombings in Northern Ireland and London. And on 20 September 2000, the Continuity IRA fired an anti-tank missile at the MI5 headquarters at Vauxhall Bridge, London.

After the 'peace' agreement signed in Belfast over Easter 1998, Nationalist (loyalist) dissidents from the Orange Volunteers, the Ulster Volunteer Force, the Ulster Freedom Fighters and the Loyalist Volunteer Force formed a group called the Red Hand Defenders (RHD), with the goal of destabilising the society in Northern Ireland even though the majority

of the people of Ulster supported the Easter agreement. The RHD claimed responsibility for the murder of Rosemary Nelson, the Roman Catholic solicitor in Northern Ireland murdered in Lurgan on 15 March 1999. The RHD is also suspected of setting off the car bomb in London in July 2001 and of other terrorist activities, including bombings and killings in Northern Ireland.

Other terrorist groups operating in Europe

Many people have been killed in the conflict between the Turkish government the Partiya Karkeren Kurdistan, the Kurdish Worker's Party (PKK) or Apocus. The PKK is a Kurdish group, founded in the mid-1970s with the aim of establishing a Marxist state in southeast Turkey, a region containing a large number of Kurds. The PKK has at least 3,000 active combatants and some thousands of supporters and operates mainly against Turkish Government forces in southeast Turkey. These operations have, over the past 20 years, killed more than 13,000 people.

Two radical left-wing groups have been operating in Greece for the past 20 years or so, Epanastatikos Laikos Agonas (ELA), or the Revolutionary People's Struggle, and Epanastatiki Organosi 17 Novemvri or the Revolutionary Organization 17 November. With about 30 active members, ELA, which began operating on 29 April 1975 by firebombing eight cars belonging to American servicemen in the military base at Elefsina, aims to provoke a Marxist revolution. Bombing is its main activity. The group 17 November, named after the November 1973 student protest against the Greek military junta, was founded in 1975. 17 November is a Marxist group, anti-American and anti-Turkish, opposed to Greek membership of the European Union and NATO, and hostile to the presence of American military bases in Greece. 17 November has only a few active members, probably no more than 15, and operates mainly in the metropolitan area of Athens. The group has carried out nearly 100 attacks, assassinating 21 people (including US diplomatic and military personnel, Greek politicians, publishers, policemen, and industrialists).

Latin American groups

The Peruvian terrorist group Sendero Luminoso (Shining Path) is one of the world's most ruthless terrorist groups. Formed in the late 1960s by Abimael Guzman Reynoso, then a university professor; it has about 3,000 combatants. Its aim is to destroy existing Peruvian institutions and replace them with a peasant revolutionary regime and to rid Peru of foreign influences. It has extensive links with the drug business in Peru. Shining Path has attacked nearly all the foreign embassies in Peru, foreign businesses, foreign aid projects, as well as Peruvian government and commercial targets.

Also operating in Peru is the Tupac Amaru Revolutionary Movement (MRTA), a traditional Marxist revolutionary movement, formed in 1983 and led by Nestor Cerpa and Victor Polay with the aim of eliminating foreign influences from Peru and establishing a Marxist regime in Peru. MRTA has about 1,000 combatants and is responsible for more attacks against American targets than any other group in Latin America, including the bombing of the US Consulate and American businesses. The conflict between the Peruvian military forces, on the one side, and Shining Path and MRTA, on the other side, has killed more than 28,000 people since 1980.

Other radical left-wing terrorist groups operating in Latin America include: the Nestor Paz Zamora Commission (CNPZ), which has operated in Bolivia since October 1990; the Revolutionary Armed Forces of Columbia (FARC) established in 1964, by Manuel Marulanda, as the military arm of the Columbian Communist Party; the Emanuel Rodriguez Patriotic Front (FPMR) founded in 1983 as the armed wing of the Chilean Communist party; the Lautaro Youth Movement (MJL) which became active in the late 1980s in Chile; the Morazanist Patriotic Front (FPM) founded in the late 1980s in Honduras; the National

Liberation Army (ELM) of Bolivia; and the National Liberation Army (ELN) formed in Columbia in 1963.

The conflict in Columbia between the Columbian military and security forces and the FARC and ELN groups, has been particularly violent, killing a total of about 30,000 people.

Asian groups

The New People's Army (NPA), the armed wing of the Communist Party of the Philippines established in 1968 to overthrow the Philippine government by armed struggle, using both urban terrorism and guerrilla warfare in rural areas. It has attacked government officials, police officers, and army officers as well as Americans involved in counter-insurgency operations in the Philippines. The NPA reportedly has about 10,000 fighters; the conflict between the group and the Philippine armed forces has killed about 21,000 people.

On 30 May 1972, three Japanese men, members of a terrorist group called the Japanese Red Army (JRA), travelled on an Air France flight from Rome to Tel Aviv. In Tel Aviv airport, they extracted machine guns from their luggage and opened fire on the people around them; they also threw hand grenades into the crowd. Twenty-eight people were killed and 70 wounded. The gunmen were operating with the PFLP. The JRA and PFLP have also combined again to attack targets in Singapore, Kuwait, Amsterdam, and Paris. The JRA broke away from the Japanese Communist League Red Army Faction in about 1970. With links with other left-wing terrorist groups in Japan - such as the Anti-War Democratic Front - JRA aims to overthrow the Japanese government and monarchy. With about 30 active members it has been based in the Syrian controlled areas of Lebanon.

Right-wing terrorist groups

Right-wing terrorists generally believe that conflict and violence are essential elements in society. Extreme right-wing groups in America are closely aligned with religious fundamentalist movements, as they are in Eastern Europe, Israel, Japan, and South Africa. In Western Europe, however, right-wing extremism is generally not connected with a religion.

Violent neo-Nazi and neo-Fascist terrorist groups operate mainly in France, Germany, Italy, the Netherlands, and Sweden. The violence and terrorism of these extreme right-wing groups "has included desecration of Jewish cemeteries and synagogues, vandalism and arson, violent attacks on foreign workers in Europe, fire bombing of shelters housing foreign asylum seekers, rare assassinations and occasional spectacular bombings of public places such as the 1980 Munich Oktoberfest, the Italicus Express in Bologna and a Jewish synagogue in Rue Copernic, Paris." (7)

The number of international terrorist attacks and the harm done

According to the US Department of State, the annual number of international terrorist attacks over the past 20 years has varied between 274 and 666, with an average of 459 (8). During 2000, a total of 405 persons were killed and 791 were wounded in the 423 international terrorist attacks. In 1999, the figures were 233 killed and 706 wounded. The year 1998 had the lowest number, 274, of attacks but the highest number of killed and wounded on record, with 741 persons killed and 5,952 injured. This high total arose from the bombings in August 1998 of the American Embassies in Nairobi, Kenya and Dar es Salaam, Tanzania. In Nairobi, 291 persons were killed in the attack, and about 5,000 were wounded. In Dar es Salaam, 10 persons were killed and 77 were wounded. Osama Bin Laden, his military commander Muhammad Atef, and members of the al-Qaeda terrorist group - a total of 22 persons - were charged with the bombings. In modern times, the most common type of international terrorist attack has involved bombings - roughly half of the total. Attacks on installations with other

weapons (like hand grenades, rocket-propelled grenades, and bazookas), fire-bombings, drive-by shootings, and other sabotage accounted for about 20 per cent of the international terrorist incidents. Hijackings, assassinations, kidnappings and the taking of hostages account for the bulk of the remainder.

A crucial aspect of international terrorist violence is the way its lethality has increased over the past thirty years. During the 1980s the number of international incidents was about 50 per cent more than in the 1970s; but twice as many people were killed. Diplomatic targets accounted for about a quarter of the international incidents since 1968; about another quarter were business targets; about 20 per cent were airlines; and less than 10 per cent were military installations.

2. TERRORIST USE OF CHEMICAL WEAPONS

Terrorists need to move continually to higher levels of violence. As wars become more violent, like society itself, it is perhaps not surprising that terrorists follow suit. To achieve the dramatic effects they seek, they must move to ever-higher rungs on the ladder of escalation. The frequent sights on television of great violence in inter-state and civil wars, and in violent crime, show them that only extremely violent actions command TV coverage. And TV coverage is an essential ingredient of a successful terrorist action. Publicity is 'the oxygen' of terrorism.

Of the three types of weapons of mass destruction - chemical, biological, or nuclear - chemical ones are the most accessible to terrorists, as the AUM group demonstrated in Japan. Methods of manufacturing chemical-warfare agents are described in the open literature. It is relatively easy to obtain the chemicals required to do so, and then to prepare the agent. The lethality of chemical weapons was brought home when, for example, Iraq used them against its Kurdish civilians at Halabja in March 1988, killing about 4,000 Kurds and injuring 7,000.

Chemical warfare agents

There are five main categories of chemical-warfare agents - incapacitating, choking, blister, blood, and nerve agents. Terrorists are most likely to use nerve agents.

The nerve agents

There are two main groups of nerve agents - the **G-agents**, that are non-persistent and cause death mainly after inhalation, and the **V-agents**, which are persistent and can be absorbed through the skin (9). The most lethal nerve agents are three G-agents – tabun (GA), soman (GB), and sarin (GD) - and a V-agent (VX). VX, which typifies V agents, is more persistent and more lethal than the G-agents. Of the latter, soman is much more lethal and rapid in action than sarin which in turn is more lethal (about three times more) than tabun. Overall the "G" agents tend to be non-persistent. Some of these agents can be thickened using a polymer. By thickening a "G" agent, its persistence can be increased. The "G" agents tend to be volatile liquids. A reasonably competent chemist would have no difficulty in making tabun, sarin, or soman.

Tabun in its pure state is a colourless liquid with a 'fruity smell'; industrial tabun is brownish in colour and smells like bitter almonds because of the formation of hydrogen cyanide. Of the nerve agents, tabun is the easiest to prepare, requiring no special chemical apparatus. It is, therefore, the nerve agent most likely to be of most interest to terrorists. Tabun is prepared in two stages. In the first stage, dimethylamino-phosphoryl dichloride is prepared from dimethylamine and phosphoryl chloride. In the second stage, tabun is prepared from dimethylamino-phosphoryl dichloride and sodium cyanide in the presence of ethyl alcohol. The chemicals needed to prepare tabun - dimethylamine, sodium cyanide, and phosphoryl chloride - can be obtained on the open market. Relatively large amounts of phosphoryl chloride are required. Ten grams of phosphoryl chloride are needed to produce one gram of tabun.

Sarin was discovered in Germany in 1938. It is a colourless liquid with no smell. An easily volatile substance, it is mainly taken into the body by inhalation. Sarin has not yet been used in a large amount during warfare although the Iraqis, in an attack on the village of Birjinni, probably used it on 25 August 1988. Sarin is somewhat more difficult to prepare than tabun but, as the AUM group showed, its preparation is well within the capabilities of a terrorist group. It is made by first preparing dimethyl methylphosphonate by rearranging trimethyl

phosphite using methyl iodide. Sarin is then prepared by treating dimethyl methylphosphonate with phosphorus pentachloride and then with sodium fluoride and propyl alcohol.

Soman has the chemical name pinacolyl methylphosphonofluoridate; it is related to sarin. It is a colourless liquid when pure; the industrial product is yellowish brown in colour. When pure it has a fruity smell; the industrial product smells like camphor. So far as is known, it has never been used in warfare. Soman is a fairly volatile substance, taken into the body by inhalation or through the skin.

VX is a colourless liquid with no smell. It is a very persistent substance, like a non-volatile oil, and will remain on material and the ground for long periods. It is taken up by the body through the skin or through inhalation if in gaseous or in an aerosol form. The AUM group used VX, contained in a hypodermic needle, to attack Takahito Hamaguchi in Osaka on 12 December 1994. He died in hospital two days later (10).

The symptoms of exposure to a nerve agent

Nerve agents (whether in the form of a gas, aerosol, or liquid) enter the body through the skin, by inhalation, or by digestion. The time that it takes for a nerve agent to begin acting on the body depends on how the agent enters the body. Poisoning will occur quickly if the nerve agent is inhaled into the lung because it then rapidly diffuses through the body. A nerve agent absorbed through the skin will take longer to act because it will have to travel to the blood vessels. Nerve agents attack the nervous system. Within minutes of a significant exposure, increasingly severe symptoms appear.

Nerve agents are organophosphorus compounds, like insecticides such as sheep dip. In the body, they inactivate an enzyme in the body called acetylcholinesterase, that is essential for the normal functioning of the nervous system, inhibiting its normal actions. In the body, nerve impulses are transmitted between nerve fibres and various organs and muscles by the compound acetylcholine. When acetylcholine has done its job it is destroyed by acetylcholinesterase, so that the nerve fibres can transmit more impulses. The action of the nerve agent is to inhibit the acetylcholinesterase so that it cannot break down the acetylcholine which accumulates and blocks the nerve function. Inhibiting the break down of acetylcholine causes violent muscle spasms (11).

The initial symptoms will vary according to which agent the individual is exposed to and the amount of the agent absorbed into the body. When an individual is exposed to low amounts of a nerve agent (as a gas or aerosol) the initial symptoms are a running nose, contraction of the pupils of the eyes, blurred vision, uncontrollable crying, headache, slurred speech, nausea, vomiting, hallucinations and reduced mental capabilities, urinary distress, pronounced chest pains, and an increase in the production of saliva. At higher doses, coughing and breathing problems begin to happen. The person may begin to go into convulsions, deep coma and finally death. At even higher doses, an exposed individual will very rapidly go into convulsions and die from suffocation as both the nervous and respiratory systems fail at the same time. A minute drop of a nerve gas, inhaled or absorbed through the skin or eyes, is enough to kill. Terrorists would only need to produce a fraction of a litre of a nerve agent to kill a large number of people. It would be very difficult to prevent them from getting hold of the chemicals needed to produce such a quantity of nerve gas.

The dispersal of a nerve agent

Having made a nerve agent, terrorists would need to disperse it. The technology for dispersal is not difficult to master. Terrorists could, for example, make or acquire a device to produce

an aerosol so that the nerve agent is released as a cloud of droplets. The device could be placed so that the aerosol cloud passes into a city's underground-train tunnel system. If this were done effectively during the rush hour a very large number of people could be killed. Alternatively, the aerosol could be released into the ventilation system of, say, a large city office block.

3. TERRORIST USE OF BIOLOGICAL WEAPONS

As has become tragically clear from the anthrax attacks in the US in October and November 2001, biological weapons can be highly lethal. If dispersed effectively biological weapons can be the most lethal of the weapons of mass destruction, apart perhaps from thermonuclear weapons. An official American study compared the number of deaths from an attack with nuclear weapons having an explosive yield equivalent to that of 12,500 tonnes of TNT (the size of the nuclear weapon that destroyed Hiroshima) with 30 kilograms of anthrax spores. The nuclear weapon would kill between 23,000 and 80,000 people whereas the anthrax would kill between 30,000 and 100,000. Ten grams of anthrax spores could theoretically produce as many deaths as about a ton of the nerve agent sarin.

There have been a number of incidents in which terrorists have been found in possession of biological agents (12). In 1972, members of the Order of the Rising Sun were arrested in Chicago with about 35 kilograms of typhoid bacteria cultures. The right-wing group intended to poison water supplies in Chicago, St. Louis and other cities. In 1984, members of the Rajneesh cult contaminated salad bars in The Dalles, Oregon, with bacteria that cause typhoid fever. Seven hundred and fifty people became ill although none died. In the 1980s, a house used by the Red Army Faction in Paris was found to contain a large amount of botulinum toxin. And the AUM group made unsuccessful attempts to disseminate botulinum toxin (in Tokyo in April 1990 and June 1993) and anthrax in Tokyo (13).

AUM cultured the anthrax bacteria in drums of liquid in the basement of its eight-storey building in the Tokyo suburb of Kameido. The liquid was pumped to the roof and sprayed into the air for 24 hours. No one reported symptoms of anthrax and it was assumed that the attack failed. But this may be wishful thinking. Scientists at Northern Arizona University, Flagstaff, have found that samples of the fluid sprayed by the AUM group contain many healthy anthrax bacteria. But these are of the Sterne strain that do not cause disease in humans. It is suggested that the AUM group was using the harmless anthrax bacteria to practice their techniques before moving on the virulent ones (14). The attention of the police may have discouraged them from doing so.

How terrorists could acquire biological agents

Terrorists could relatively easily acquire biological agents from civilian or medical research laboratories, from someone working in the laboratory or by theft. Alternatively, they could buy them from legitimate suppliers. The case of Larry Harris, a member of the white supremacist group Aryan Nations, shows how easy it is to acquire biological agents. Harris telephoned the American Type Culture Collection in Maryland and ordered three vials of freeze-dried bacteria that cause bubonic plague. Federal Express delivered the vials. While they were in transit, Harris called the supplier to ask where they were. The supplier became suspicious and contacted the authorities and Harris was charged with mail fraud. Had he waited for the delivery he would not have been caught (15).

Biological agents can be acquired from materials taken from nature. For example, the bacteria *Clostridium botulinum* is present in soil. A small sample could be cultured to provide very large amounts of *Clostridium botulinum* for the large-scale contamination of food, possibly in food-processing factories. Many infected people would become seriously ill; some would die. Also obtainable from natural sources in the environment are anthrax, brucellosis, and plague. The spores of anthrax survive for decades. They could be collected from soil taken from areas where anthrax is endemic in cattle. The same thing could be done for brucellosis.

Ease of acquisition is one reason why terrorists are likely to find biological agents attractive (16). They are also cheap. The cost of killing a person with a biological weapon is a very small fraction of doing so with a nuclear or chemical weapon or even a conventional weapon. Another attraction is that biological agents are relatively easily dispersed. A slurry of anthrax spores could, for example, be prepared and deposited in underground train tunnels. The slurry would dry and the spores scattered through the tunnel system by passing trains. Large numbers of people could be killed. A better way of dispersing biological agents would be to dry the agent – perhaps freeze dry it- and then use an aerosol to spread it. Water supplies would be very vulnerable to contamination by biological agents. The disadvantage of biological agents is their incubation period – the period between the time when an individual absorbs the agent and the time when the disease manifests itself. Incubation periods can vary between a few days and a few weeks.

Biological agents

Biological warfare agents are disease-carrying substances and organisms, including bacteria; viruses; rickettsiae; and fungi (17). Bacteria, consisting of a single cell, are the smallest organisms that can reproduce themselves. Diseases caused by bacteria include anthrax, cholera, pneumonic plague, and typhoid. Bacteria cause illnesses by invading tissues or producing toxins or both. Toxins produced by bacteria include botulinum, ricin, tetanus and diphtheria.

Viruses, the simplest form of organisms, cannot reproduce by themselves but do so by colonising cells and reprogramming them to produce other viruses. In humans, viruses cause, for example, AIDS, flu, polio, and smallpox. Viruses are carried in body fluids or are spread by coughs and sneezes. **Rickettsias** are bacteria that can only live inside cells that behave as host cells, such as viruses. Carried by lice, ticks and fleas, they cause diseases like typhus, Q-fever, and Rocky Mountain spotted fever. **Fungi** are more complex organisms than bacteria and reproduce by forming spores. Fungi cause disease like coccidioidomycosis.

Terrorists could choose between a bewildering variety of biological agents. A partial list of biological agents, published by the US Department of Defense, includes: anthrax; botulinum toxins; brucellosis; cholera; clostridium perfringens toxins; congo-Crimean hemorrhagic fever; Ebola haemorrhagic fever; plague; Q fever; ricin; Rift Valley fever; saxitoxin; smallpox; staphylococcal enterotoxin B; tichothecene myotoxins; tularaemia; Venezuelan equine encephalitis. Any of these could be used in a terrorist attack.

Anthrax is likely to be the biological agent preferred by terrorists because: it is very lethal, inhalation anthrax is almost always fatal; it is easily produced in large quantities at low cost; knowledge about anthrax and its production is widely available in the open literature; it is very stable and can be stored for a very long period as a dry powder as used in the attacks in America in October and November 2001; and it is relatively easy to disperse as an aerosol with crude sprayers. About 80 percent of a population, each of which inhaled about 10,000 spores of anthrax, would die. Less than one millionth of a gram would be fatal within about 6 days of exposure. The US Congress's Office of Technology Assessment estimates that 100 kilograms of anthrax, released from a low-flying aircraft over a large city on a clear, calm night, could kill one to three million people.

Genetic engineering

Genetic engineering has given scientists the capability to produce new biological warfare agents. The findings from the Human Genome Project and the Human Genome Diversity Project could be used to develop new biological weapons. The genes that determine the lethality of the bacteria that produce diseases, like anthrax and plague, can be identified. These genes can be sliced into bacteria that are normally harmless. Deadly genes from anthrax, for example, could be put into the bacteria *Escherichia Coli*, very prolific bacteria in the human gut. The newly made deadly *E. Coli* could be rapidly produced in large quantities. They would be particularly lethal because the body would be familiar with them and so would be unlikely to produce anti-bodies. People infected with them would, therefore, not fight the disease. This has already been achieved. The AUM group successfully re-engineered *E. Coli*, placing botulinum toxin inside it.

Another possible type of genetic weapon involves genetic-homing weapons, such as specific genetic viruses, that could 'target a genetic structure shared by particular ethnic groups or specific human attributes'. Using differences in DNA from different groups of people, it may be possible to attach different things to DNA that will kill people from a specific group. In other words, differences between blacks and whites, and between Jews and non-Jews, and between Norwegians and Danes, may be determined and exploited to kill only a specific groups, of, say, blacks or Jews.

The possibility that genetic engineering will make available a biological weapon to attack a specific ethnic group is a horrifying one. The more countries that are involved in biotechnological developments, the more likely it is that terrorists will acquire lethal and effective biological agents.

4. TERRORIST USE OF NUCLEAR WEAPONS

After the recent terror attacks in New York and Washington and the use of chemical weapons by the AUM group, the next rung on the terrorist ladder of escalation may well be the acquisition and use of a nuclear weapon. Many believe that the most likely way in which a terrorist group would acquire a nuclear explosive is by stealing a nuclear weapon from a military stockpile or by stealing one while it was being transported.

But it is not only the ex-Soviet nuclear arsenal that we should worry about. As plutonium and highly enriched uranium become more available worldwide, it is increasingly possible for a terrorist group to steal, or otherwise illegally acquire, civil or military fissile material that could be used to fabricate a nuclear explosive device. The group could then detonate, or threaten to detonate, its nuclear explosive.

Of particular concern is the growing trade in civil mixed-oxide (MOX) nuclear fuel. Mixing plutonium oxide with uranium oxide produces MOX. The plutonium oxide is produced in reprocessing plants by separating it from spent nuclear-power reactor fuel elements. If terrorists acquire MOX fuel, they could relatively easily remove the plutonium oxide and use it to fabricate nuclear weapons. The global trade in MOX, therefore, increases the risk of nuclear terrorism.

Concern about the theft of fissile materials has been considerably enhanced by recent incidents of the smuggling of such materials from Russia. For example, in December 1994, the Czech authorities seized three kilograms of highly enriched uranium. And there are reports that security police confiscated nearly 40 kilograms of weapons-grade uranium in December 1993 in Odessa in the Ukraine. And during 1994, more than 400 grammes of weapons-grade plutonium were seized in Germany. These and other smuggling incidents, which are almost certainly the tip of an iceberg, suggest that a significant black-market in fissile materials exists (18).

Designs of primitive nuclear explosives

Terrorist groups are likely to be satisfied with a nuclear explosive device that is far less sophisticated than the types of nuclear weapons demanded by the military. The military demand that their nuclear weapons are highly reliable and explode with an explosive yield that can be accurately predicted. A terrorist group would be much less demanding and satisfied with a relatively unsophisticated device. A gun-type nuclear explosive device, using highly enriched uranium as the fissile material, is the simplest crude device to design and construct and the most likely one to produce a powerful nuclear explosion. But it would be harder for a terrorist group to acquire highly enriched uranium than plutonium.

With plutonium, terrorists could fabricate a crude version of the atomic bomb that destroyed Nagasaki. This would involve using a solid sphere of plutonium metal as the fissile material in an implosion type of nuclear explosive device. It is the most difficult of the three to design and construct. But it is within the capabilities of a significantly large terrorist group to do so. An implosion type nuclear device could also be constructed using plutonium oxide as the fissile material. This is perhaps the most likely nuclear device to be constructed by terrorists because of the increasing and widespread availability of plutonium oxide. It may also be the most attractive of the three designs to terrorists because of the threat of the widespread dispersion of large amounts of plutonium even if the device produces no nuclear explosion.

In a nuclear explosive using the 'gun technique', a mass of enriched uranium less than the critical mass is fired down a 'gun barrel' into another less-than-critical mass of uranium. The sum of the two masses is greater than critical. This design was used in the nuclear weapon that destroyed Hiroshima. One mass of highly enriched uranium was fired down the barrel from a naval gun into the second mass placed at the muzzle. A nuclear explosion occurs when the critical mass is assembled. The gun technique cannot be used to assemble a super-critical mass of plutonium in a nuclear explosive device; a technique called implosion must be used. The implosion technique can, however, be used to assemble a super-critical mass of highly enriched uranium. In a nuclear explosive using the implosion design, the plutonium or highly enriched uranium is surrounded by conventional high explosives. When exploded, the high explosive uniformly compresses the sphere of fissile material. The compression reduces the volume of the sphere of fissile material in the core and increases its density. The critical mass is inversely proportional to the square of the density. The original less-than-critical mass of fissile material will, after compression, become super-critical, a fission chain reaction will take place. If the super-critical mass of plutonium is held together long enough, a sufficient number of fission reactions will take place to produce a nuclear explosion.

A sophisticated terrorist group should have little difficulty in building a primitive nuclear explosive device using highly enriched uranium. Now and in the near future, a terrorist group may find it easier to acquire civil plutonium than highly enriched uranium. The amount of plutonium available from civil reprocessing plants will rapidly increase, particularly as more reprocessing capacity becomes operational. As the amount of plutonium separated from spent nuclear-power reactor fuel elements increases, it will be stored in a number of countries and become easier to obtain plutonium illegally. The risk that a terrorist group may acquire plutonium and fabricate a nuclear device must be taken very seriously. A crude nuclear weapon using highly enriched uranium or plutonium may explode with an explosive power equivalent to that of a hundred or more tonnes of TNT. It might have an explosive yield of a thousand tonnes. To put this in context, the largest conventional bomb used in World War II contained about 10 tonnes of TNT; it was christened "the earthquake bomb". And the largest terrorist bomb used by terrorists, the one that destroyed the city building in Oklahoma, weighed about 3 tonnes.

The dispersion of plutonium

Even if a crude nuclear device using plutonium, when detonated, did not produce a significant nuclear explosion, the explosion of the chemical high explosives would disperse the plutonium widely. If an incendiary material, such as an aluminium-iron oxide (thermite), were mixed with the high explosives, the explosion would be accompanied by a fierce fire. A high proportion of the plutonium is likely to remain unfissioned and would be dispersed by the explosion or volatilised by the fierce heat. Much of the plutonium is likely to be dispersed in this way as small particles of plutonium oxide taken up into the atmosphere in the fire-ball and scattered far and wide downwind. A large fraction of the particles are likely to be smaller than three microns in diameter, and would, therefore, be able to be breathed into, and retained by, the lung. Here they would be very likely to cause lung cancer by irradiating the surrounding tissue with alpha-particles. This is why inhaled plutonium is so highly toxic.

The dispersal of plutonium would make a large part of the city uninhabitable until decontaminated, a procedure which could take many months or years. If one kilogram of plutonium is uniformly distributed it will contaminate about 600 square kilometres to a level of one micro-curie per square metre, the maximum permissible level allowed for plutonium by international regulations. This means that a very large area will have to be evacuated and decontaminated, an expensive procedure that could take years.

The threat of dispersion of many kilograms of plutonium makes a crude nuclear explosive device a particularly attractive weapon for a terrorist group, the threat being enhanced by the general population's justifiable fear of radioactivity.

5. KEYS TO COUNTER-TERRORISM

The physical protection of key chemical, biological and nuclear materials

If a terrorist group wants to fabricate a biological, chemical or nuclear weapon of mass destruction, it must acquire, legally or illegally, one or more of a number of key materials. To make nerve agents the terrorist group would need, for example, supplies of phosphoryl chloride and dimethylamine; for biological weapons it would need, for example, access to anthrax, plague or botulinum bacteria; and for nuclear weapons it would have to have plutonium or highly enriched uranium.

Clearly, action to prevent the acquisition by terrorists of weapons of mass destruction should focus on the physical protection of the key materials. Of these, special attention should be given to phosphoryl chloride and plutonium. This protection must take into account the relatively small amounts of the materials needed to make a weapon of mass destruction. Society may decide that the terrorist risk of acquiring and using a weapon of mass destruction, and the awesome consequences of such use, are sufficiently awesome that some activities should be given up. An obvious example is the reprocessing of spent nuclear-power reactor fuel to separate the plutonium from it and the use of this plutonium to produce mixed-oxide (MOX) fuel for nuclear reactors.

MOX is a mixture of uranium oxide and plutonium oxide. The steps of chemically separating the plutonium oxide from uranium oxide, converting the oxide into plutonium metal, and assembling the metal or plutonium oxide together with conventional explosive to produce a nuclear explosion are not technologically demanding and do not require materials from specialist suppliers. The information required to carry out these operations is freely available in the open literature. At least three different methods of separating plutonium oxide from uranium oxide are described in detail in the open literature (19).

None of the concepts involved in understanding how to separate the plutonium are difficult; a second-year undergraduate would be able to devise a suitable procedure by reading standard reference works, consulting the open literature in scientific journals and by searching the World Wide Web. A small number, three or so, of people with appropriate skills could separate the plutonium from MOX and design and fabricate a crude nuclear explosive. All the nuclear-physics data needed to design a crude nuclear explosive device are also available in the open literature. The storage and fabrication of MOX fuel assemblies, their transportation and storage at conventional nuclear-power stations on a scale currently envisaged by the nuclear industry will be extremely difficult to safeguard and protect. The risk of diversion or theft of MOX fuel by terrorist groups is an alarming possibility. The risk of theft of MOX is probably greatest when it is being transported. The international trade in MOX, involving the global transport of MOX, increases this risk considerably.

The urgent need for effective intelligence

Considering the number of successful terrorist attacks that have taken place over the years, it must be said that the security and intelligence agencies have not risen to the challenge presented by terrorist groups. British experience in combating both nationalist and loyalist terrorism in Northern Ireland drives this home. There are a large number of intelligence agencies, working for the Royal Ulster Constabulary, Special Branch, military intelligence, the British Army, and so on. There is considerable rivalry between these agencies, which causes a considerable loss of efficiency. Moreover, there is little cooperation and sharing of information.

The intelligence and security communities should take the threat of the acquisition and use of weapons of mass destruction much more seriously than they do at the moment. The ability of the intelligence community to identify and predict threats of terrorist attacks with weapons of mass destruction is crucial if such attacks are to be prevented. The importance of effective intelligence in countering terrorism cannot be over estimated. Monitoring the communications of terrorist groups – the activity known as signal intelligence (SIGINT) – has been crucial to this end. Modern terrorists can, however, take steps to protect their communication systems, including, for example, the use of encryption, frustrating the efforts of SIGINT. The penetration of terrorist groups by undercover intelligence agents or double agents (human intelligence or HUMINT) is, therefore, of critical importance. In fact, counter-terrorism is likely to succeed only if HUMINT can be made effective. This is why it is, to say the least, not going to be easy to defeat terrorism, particularly fundamentalist terrorism.

Experience shows that setting up effective intelligence activities against terrorist groups is extremely challenging. Rivalries between intelligence agencies within countries and lack of cooperation in intelligence matters between countries seriously reduce the effectiveness of intelligence, to say the least. One influential and powerful person, who has adequate access to the political leadership, should lead intelligence and security agencies within countries. The leaders of national intelligence agencies should be in frequent contact and national data banks should be integrated and made available to regional and international authorities.

Effective and single leadership, regional and international cooperation and flexibility should be the keys to good counter-terrorism intelligence. In the context of improving international cooperation, an encouraging development is the establishment of the Terrorism Prevention Branch of the United Nations, within the Center for International Crime Prevention. A new European body, Europol, set up in 1998, is a step in the improvement of regional cooperation against terrorism. Nearly 200 people are employed at the Europol headquarters in The Hague. On 21 September 2001, ten days after the terrorist attacks on New York and Washington, the EU Interior Ministers agreed to give Europol new powers, including a European arrest warrant; a framework decision replacing extradition with a procedure for handing over perpetrators of terrorist attacks on the basis of a European arrest warrant; close cooperation between police and intelligence services; close cooperation between EU and US security agencies; better access to data; rapid transfer of relevant information to Europol; a team of counter-terrorist specialists at Europol; stricter procedures in connection with issuing visas; and improvement of airport security and aviation safety standards. The intelligence and security agencies, in their fight against terrorism, face an awesome task that will require the acquisition of any new technological developments relevant to counter-terrorist activities, a close study of new terrorist threats, and, perhaps most importantly, an imaginative approach to the issues.

In the age of the Internet, knowledge is available to all. This, and the revolution in communications, have had a considerable impact on society and have removed one of the advantages of the intelligence community. In future, success in countering terrorism will depend on the effective application of ingenuity and innovation.

6. FUTURE TERRORISM

Some of the crucial assets of industrialised societies - such as large power stations, fuel dumps, liquid gas storage sites, centralised computer networks, major telecommunication centres, major transport centres - without which the society cannot operate effectively, are highly centralised and, therefore, vulnerable to attack or sabotage by terrorist groups. Examples are attacks on computer networks, called cyberterrorism, and attacks on large nuclear-power stations.

Cyberterrorism

The term cyberterrorism relates the virtual world of computers, which store, process, and communicate information, with the violent and unpredictable world of terrorism. Cyberterrorism must not be confused with other abuses of computers, such as computer crime, hacking, information warfare, tapping computers. Mark Pollitt, a special agent for the FBI, has given a suitably narrow definition of cyberterrorism:

"Cyberterrorism is the premeditated, politically motivated attack against information, computer systems, computer programs, and data which result in violence against non-combatant targets by sub national groups or clandestine agents."

Cyberterrorism has attractions for terrorists. It can be conducted at a great distance and costs little. It would not involve the use of explosives or weapons and, perhaps most importantly for the terrorist, it would attract a great deal of coverage on the media. Computers and any problems with them fascinate the public and media people. Concern about potential threats to the security of America's critical infrastructures lead President Bill Clinton's White House to set up a Commission - the President's Commission on Critical Infrastructure Protection. The Commission examined areas of vulnerability vis-à-vis a wide range of threats, identifying eight infrastructures: telecommunications, banking and finance, electrical power, oil and gas distribution and storage, water supply, transportation, emergency services, and government services. In its report (20), published in October 1997, the commission concluded that the threats to critical infrastructures were real and that, because they are mutually dependent and interconnected, they could be vulnerable in new ways. The report stated:

"Intentional exploitation of these new vulnerabilities could have severe consequences for our economy, security, and way of life."

As a consequence of the Commission's work, a number of agencies were established in the USA, including the National Infrastructure Protection Center, the Critical Infrastructure Assurance Office, the National Infrastructure Assurance Council, and private sector Information Sharing and Assessment Centers. To protect its computer networks, the Pentagon established a Joint Task Force, Computer Network Defense.

Some cyberattacks on infrastructures, on, for example, those controlling water supplies, transportation systems, and emergency services, could result in deaths and injuries. Others could cause considerable economic damage by, for example, interfering with stock market activities in ways that could precipitate inflation or depression.

Attacks on nuclear-power plants

Konrad Kellen lists other nuclear activities that a sub-national group may become involved in, apart from acquiring fissile material and fabricating a nuclear explosive. These include:

"making or stealing of a nuclear weapon and its detonation; the making or stealing of a nuclear weapon for blackmail; the damaging of a nuclear plant for radioactive release; the attack on a nuclear-weapons site to spread alarm; the attack on a nuclear plant to spread alarm; the holding of a nuclear plant for blackmail; the holding off-site of nuclear plant personnel; the theft of fissionable material for blackmail or radioactive release; the theft or sabotage of things nuclear for demonstration purposes; and an attack on a transporter of nuclear weapons or materials". (21)

Of these possible terrorist activities, of particular concern is an attack on a nuclear-power plant. A modern nuclear-power station generates, enough electricity to provide the electrical power needs of a city with a population of a million or more people. The attractiveness to terrorists of attacking such a nuclear-power station is obvious. The possibility of releasing large amounts of radioactivity is another reason why terrorists may in the future attack a nuclear reactor.

Nuclear-power reactors are widespread. Today, 438 nuclear-power reactors are operating in 31 countries. Some countries are particularly dependent on nuclear power for the generation of electricity. France generates 76 per cent of its electricity by nuclear power; Lithuania generates 74 per cent of its electricity by nuclear power; and Belgium 57 per cent. Sweden, the Ukraine, Slovakia, Slovenia, Bulgaria, Hungary, South Korea and Switzerland all generate between 35 and 55 per cent of their electricity by nuclear power. These countries would be particularly vulnerable to a terrorist attack on their nuclear-power reactors.

A terrorist attack on a nuclear-power reactor could release radioactivity. The risk of extensive radioactive contamination considerably enhances the danger of a terrorist attack on a nuclear-power station. An attack on a nuclear-power plant would attract a huge amount of media publicity. A major aim of terrorists is to maximise media coverage of their activities to publicise their cause that again increases its attractiveness.

Future trends in terrorism

Current trends in terrorism suggest that political terrorism with separatist or nationalist aims is likely to decrease as time goes on and terrorism by single issue groups is likely to remain roughly constant. But other types of terrorism are likely to increase. Of particular concern are more frequent and more violent terrorist actions by religious fundamentalists, particularly Islamic fundamentalist groups and American Christian white supremacists, and by groups on the extreme right of politics. All the indications are that the level of terrorist violence will continue to escalate. Now that terrorists have used nerve agents we must expect them, particularly the fundamentalist groups, to continue to use weapons of mass destruction with increasing effectiveness. An obvious candidate for future terrorist use is a nuclear explosive.

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Appendix 1

Active international terrorist groups listed by the Department of State

Section I lists the 29 groups currently designated by the US Secretary of State as Foreign Terrorist Organizations. Section II includes other terrorist groups active during 2000.

I. Designated Non-US Terrorist Organizations

Abu Nidal organization - a.k.a. Fatah Revolutionary Council,
Arab Revolutionary Brigades, Black September, and Revolutionary Organization of Socialist Muslims
Abu Sayyaf Group
Armed Islamic Group
Aum Supreme Truth - a.k.a. Aum Shinrikyo, Aleph
Basque Fatherland and Liberty - a.k.a. Euzkadi Ta Askatasuna
Al-Gama'a al-Islamiyya (Islamic Group, IG)
HAMAS (Islamic Resistance Movement)
Harakat ul-Mujahidin (HUM)
Hizbollah (Party of God) - a.k.a. Islamic Jihad, Revolutionary Justice Organization, Organization of the Oppressed on Earth, and Islamic Jihad for the Liberation of Palestine
Islamic Movement of Uzbekistan (IMU)
Japanese Red Army (JRA) - a.k.a. Anti-Imperialist
International Brigade (AIIB)
Al-Jihad - a.k.a. Egyptian Islamic Jihad, Jihad Group, Islamic Jihad
Kach and Kahane Chai
Kurdistan Workers' Party (PKK)
Liberation Tigers of Tamil Eelam (LTTE) - Other known front organisations: World Tamil Association (WTA), World Tamil Movement (WTM), the Federation of Associations of Canadian Tamils (FACT), the Ellalan Force, and the Sangilian Force.
Mujahedin-e Khalq Organization (MEK or MKO) - a.k.a. The National Liberation Army of Iran (NLA, the militant wing of The MEK), the People's Mujahedin of Iran (PMOI), and National Council of Resistance (NCR)
National Liberation Army (ELN)-Colombia
The Palestine Islamic Jihad (PIJ)
Palestine Liberation Front (PLF)
Popular Front for the Liberation of Palestine (PFLP)
Popular Front for the Liberation of Palestine-General Command (PFLP-GC)
Al-Qaeda
Revolutionary Armed Forces of Colombia (FARC)
Revolutionary Organization 17 November (17 November)
Revolutionary People's Liberation Party/Front (DHKP/C) – a.k.a. Devrimci Sol
Revolutionary Left), Dev Sol
Revolutionary People's Struggle (ELA)
Sendero Luminoso (Shining Path, or SL)
Tupac Amaru Revolutionary Movement (MRTA)

II. Other Terrorist Groups

Alex Boncayao Brigade (ABB)

Army for the Liberation of Rwanda (ALIR) - a.k.a. Interahamwe, Former Armed Forces (ex-FAR)

Continuity Irish Republican Army (CIRA) - a.k.a. Continuity
Army Council

First of October Antifascist Resistance Group (GRAPO) Grupo de Resistencia Anti-Fascista
Premero de Octubre

Irish Republican Army (IRA) - a.k.a. Provisional Irish Republican Army (PIRA), the Provos

Jaish-e-Mohammed (JEM) (Army of Mohammed)

Lashkar-e-Tayyiba (LT) (Army of the Righteous)

Loyalist Volunteer Force (LVF)

New People's Army (NPA)

Orange Volunteers (OV)

People Against Gangsterism and Drugs (PAGAD)

Real IRA (RIRA) - a.k.a. True IRA

Red Hand Defenders (RHD)

Revolutionary United Front (RUF)

United Self-Defense Forces/Group of Colombia (AUC-
Autodefensas Unidas de Colombia)

Appendix 2

Total number of deaths and injuries in various regions, 1995 to 2000 inclusive, caused by international terrorism

Region	Number of deaths and injuries
Asia	9713
Africa	5782
Middle East	2190
West Europe	1232
Latin America	299
Eurasia	199
North America	7

Reference: US Department of State, Patterns of Global Terrorism: 1999. Background Information on Terrorist Groups, Washington D.C.: US Department of State, April 2000.

Reference: US Department of State, Patterns of Global Terrorism: 1999. Background Information on Terrorist Groups, Washington D.C.: US Department of State, April 2000.