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Nuclear, Biological, and Chemical Weapons and Missiles: The Current Situation and Trends

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Summary

Nuclear, biological, and chemical weapons (NBCW) pose the most serious threats to the United States and its foreign interests. Ballistic and cruise missiles, aircraft, covert forces, and terrorist groups are considered possible means of delivering these weapons of mass destruction. The total number of nuclear, biological, and chemical weapons stockpiled throughout the world is decreasing as the major powers scale back their inventories, but some additional countries and groups are trying to acquire these weapons. U.S. and allied policy makers debate the rate of proliferation and the nature and extent of the threat to the United States and its allies, and the weapons' effects on international stability. These issues and the policy preferences of various segments of the security policy communities in the United States and overseas have led to markedly different approaches to countering NBC weapons and missile threats. The purpose of this paper is to assemble current information on the status of weapons programs around the globe and analyze patterns regarding the threats posed by these weapons.

China, France, Russia, the United Kingdom, and the United States have well-established arsenals of nuclear weapons and are considered nuclear-weapon states under the Nuclear Non-Proliferation Treaty (NPT). India and Pakistan tested nuclear weapons in 1998; Israel is believed to have numerous nuclear weapons; and North Korea is thought to have one or two. U.S. intelligence officials predict more countries will acquire them in the next decade or so. About a dozen countries have offensive biological weapons programs, and about 17 countries were reportedly known or likely to have had chemical weapons when the Chemical Weapons Convention went into effect. The number of countries and subnational groups that will be able to produce at least small quantities of CW and BW weapons is likely to grow as new technologies are developed and the international flow of goods, people, and technology continues to increase. The number that will produce and stockpile WMD may decrease if diplomatic efforts, arms control treaties, nonproliferation regimes, and security strategies are effective. While the United States and Russia are reducing their intercontinental missile inventories and have eliminated intermediate-range missiles, China is modernizing and expanding its missile force, and North Korea, Iran, Israel, India, and Pakistan are building short- and medium-range missiles and are developing longer-range missiles. Dozens of countries have or are developing ballistic missiles and more are likely to acquire them.

From the United States and Europe, across North Africa and the Middle East, through South Asia to Northeast Asia, nuclear, biological, or chemical weapons and missiles will probably be a potential threat for the foreseeable future. More countries and groups will have the ability to inflict mass casualties and mass destruction on their adversaries within their country, within their region, and even those at a great distance. While the threats of nuclear, biological, and chemical warfare associated with the Cold War are greatly diminished, new threats have emerged and more may develop in the coming decade as elements in North Korea, Russia, China, and other countries continue to export weapons technology.

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Nuclear, Biological, and Chemical Weapons and Missiles: The Current Situation and Trends

Background

Only nuclear, biological, or chemical weapons (NBCW) could now threaten the national integrity of the United States or could inflict massive casualties and destruction on the country.¹ These weapons are also a threat to U.S. troops abroad, U.S. allies, and regional stability. With the end of the Cold War and the diminished strategic Soviet threat, U.S. policy makers have been able to give greater attention to the potential use of nuclear, biological, and chemical weapons by less powerful countries or terrorist groups. For these reasons, there is concern in Congress about the countries and groups that have NBC weapons, are developing them, or trying to acquire them, and about those who have or seek missile delivery systems. President Clinton reported to Congress that “Weapons of mass destruction pose the greatest potential threat to global stability and security. Proliferation of advanced weapons and technologies threatens to provide rogue states, terrorists and international crime organizations with the means to inflict terrible damage on the United States, our allies and U.S. citizens and troops abroad.”² The Bush Administration has focused on weapons programs and restructuring of the military to deal with aspects of a growing NBCW and missile threat.³

But world leaders debate the extent of the threats, and whether the threats are growing or receding. Some U.S. and foreign analysts emphasize positive developments, such as the demise of the Soviet Union and progress made in U.S.-Russian arms control and international arms control. Others emphasize negative developments such as the nuclear tests by India and Pakistan; missile tests by North Korea, Iran, India, and Pakistan; continuing transfers of dangerous technology particularly by China, Russia, and North Korea; and a growing interest in weapons of mass destruction among terrorists. The purpose of this report is to contribute to discussions of U.S. policies on these complex national security issues by providing information and analysis regarding the current threat and trends in nuclear, biological, and chemical weapons and missiles.

¹Nuclear and biological weapons can cause massive casualties and other damage. The effects of chemical weapons are generally confined to smaller geographic areas and cause fewer casualties but can create panic in a poorly protected population.

²*A National Security Strategy for A New Century*. Released by the White House Press Secretary, January 5, 2000, p. 6.

³Wolfowitz, Paul, Testimony before the Senate Committee on Armed Services, July 12, 2001.

Implications for U.S. Policy Decisions

Numerous laws address the proliferation, development, testing, production, stockpiling, and use of these weapons.⁴ Potential NBCW and missile (NBCW+M) threats to U.S. security interests impinge on numerous national security and foreign policy decisions. Whether potential adversaries have and are likely to use NBCW+M is often instrumental in determining:

- ! the size and nature of the U.S. military force structure
- ! U.S. acquisition of weapon systems and equipment
- ! U.S. doctrine and strategy for homeland defense and military operations abroad
- ! foreign policy and economic policy toward those countries and their neighbors.

The status and trends of these strategic weapons are key factors in national and international debates regarding:

- ! whether the most dangerous threat or the most likely threat to U.S. security is NBCW delivered by terrorists, missiles, aircraft, or ships
- ! whether likely adversaries are acquiring NBC weapons and missiles as deterrence or as an offensive military capability to use against the United States or its allies
- ! whether intelligence estimates should be based on the capability of countries and terrorist groups to acquire and use NBC weapons and missiles or on their perceived intent to acquire and use them
- ! whether U.S. intelligence collection and analysis resources are adequate
- ! whether the United States should emphasize a strategy of deterrence or a strategy of independent national defense
- ! the appropriate mix of active defense, passive defense, arms control, and economic growth through expanded exports.

Resolution of these difficult issues is critical in determining sound U.S. national security policies. Some analysts conclude that issues that are “too hard” – such as how to counter biological weapons attacks in the United States by terrorists, or how to prevent particular countries from acquiring NBCW – are necessarily put on a back burner. Others contend such threats should be a primary focus of U.S. defense policy. Some argue that economic interests have overruled security concerns in determining whether to exercise U.S. political and economic clout to slow the proliferation of NBC weapons and missiles. Other analysts and policy makers emphasize the view that U.S. economic strength is the basis for U.S. security and must be protected.

While economic policy has been a large benefactor of the post Cold War period, the U.S. government has also taken many steps to address NBC weapons.⁵ Still, most

⁴See, *Nuclear, Biological, Chemical, and Missile Proliferation Sanctions: Current Law*, by Dianne Rennack, CRS Report 98-116 F, updated July 21, 2000.

⁵See, *Proliferation Control Regimes: Background and Status*, CRS Report 97-343, (continued...)

analysts agree much remains to be done to reduce the WMD threat. In October 1996, President Clinton described the situation as follows:

...we have worked patiently and pragmatically to reduce the threat of weapons of mass destruction, to take on the challenge of terrorism, to build an open trading system for the 21st century, to help secure the gains that peace and freedom are making around the world. We are making the future more secure by lifting the danger of weapons of mass destruction.⁶

Countries that Have or May Soon Acquire NBC Weapons and Missiles

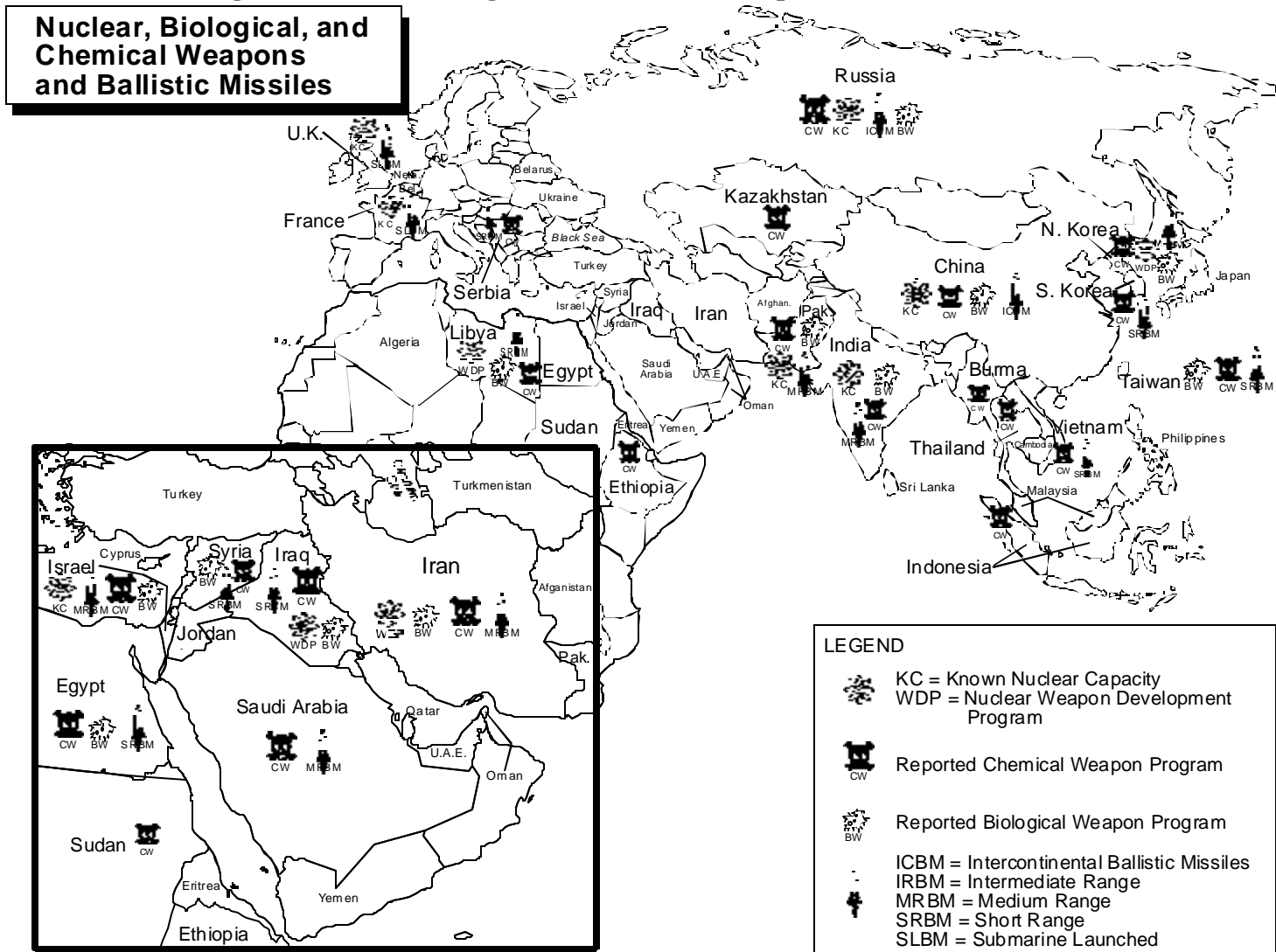
About twenty-five countries, according to various U.S. government sources, are suspected of having nuclear, biological, or chemical weapons (NBCW) or of seeking such weapons. While the government has not listed all the countries with NBCW programs in unclassified reports, it has identified some of the countries. The media, foreign governments, and the academic community have identified others. Table 1 lists about two dozen countries that have, or may have had these weapon programs within the last several years, based on a combination of sources. While the total number of nuclear, biological, and chemical weapon countries is in approximate accord with U.S. government totals, some of the listed countries may not be the same as those referred to by the Secretary of Defense, Director of Central Intelligence, or other officials in public reports.

The total number has not grown significantly since the end of the Cold War, as a few countries have abolished their programs and others have acquired weapons. What is perhaps more significant is which particular countries are actively building NBCW inventories and their increasing capabilities to deliver these weapons, taking advantage of widely available missile technology. Also significant is the potential for additional countries, or possibly terrorist groups, to produce NBC weapons using available technology.

⁵(...continued)
updated March 30, 2000.

⁶Clinton, William J. President. *Foreign Policy Speech*, in Detroit, Michigan, October 22, 1996.

Figure 1. Nuclear, Biological, and Chemical Weapons and Ballistic Missiles



Source: Information based on public media and defense journals. Map adapted by CRS from Magellan Geographix. Used with permission. Many other countries have missiles, but no known NW, BW, or CW programs.

Nuclear Weapon Arsenals and Programs

Five countries have well-established arsenals of nuclear weapons and are considered nuclear-weapon states under the Nuclear Non-Proliferation Treaty (NPT): China, France, Russia, the United Kingdom, and the United States.⁷

India, Pakistan, Israel, and possibly North Korea are reported to have nuclear weapons but are not considered nuclear-weapon states under the NPT. India tested a nuclear device in May 1974 and tested several more in May 1998. Israel is said to have produced its first atomic weapon in the late 1960s and may now have between 100 and 200 weapons.⁸ Pakistan responded to India's 1998 test by testing a number of nuclear devices in May 1998. North Korea "probably has one, possibly two, nuclear weapons."⁹ As part of the Agreed Framework, North Korea has frozen its graphite-moderated reactors including the plutonium reprocessing plant, and halted the construction of two other reactors, but already had enough material for one or two weapons. Each of these countries has aircraft with which they could deliver nuclear weapons; each has missiles that may now or soon be able to deliver their nuclear weapons. India and Israel may also be developing ship-based missiles.¹⁰

Iran, Iraq, and Libya are reportedly trying to develop nuclear weapons. Iran has a number of civilian nuclear facilities and reportedly has a covert program to develop nuclear weapons. Iraq's nuclear weapon program was stalled by the Gulf War and UN inspections, but it could probably produce nuclear weapons in a relatively short time if it is able to import fissile material or the equipment to produce it. Libya's attempts to develop nuclear weapons apparently have not made much progress.

Other governments have relinquished their nuclear weapons (Belarus, Kazakhstan, Ukraine, and South Africa) or have abandoned or forsworn nuclear weapon programs (Argentina, Brazil, Germany, Japan, South Korea, Sweden, and Taiwan). Nuclear technology is increasingly available, and nuclear weapon materials and production equipment may be available on the international black-market or may be transferred from one state to another. Additional countries may therefore be able to develop nuclear

⁷For a discussion of U.S. nuclear forces, see *U.S. Nuclear Weapons: Policy, Force Structure, and Arms Control Issues*, CRS Report RL30345, by Amy F. Woolf, Oct. 1, 1999.

⁸Spector, Leonard S. *Nuclear Ambitions*. Boulder, Westview Press, 1990, p. 155; Cohen, Avner. *Israel and the Bomb*. New York, Columbia University Press, 1998, p. 1; "Completing the Deterrence Triangle," Carnegie Endowment for International Peace, Non-Proliferation Project, v. 3, no. 18, June 29, 2000.

⁹U.S. National Intelligence Council. *Global Trends 2015: A Dialogue About the Future with Nongovernment Experts*. NIC 2000-02, December 2000, p. 36.

¹⁰For further information see, *Nuclear Weapons and Ballistic Missile Proliferation in India and Pakistan*, by K. Allan Kronstadt, CRS Report RL30623; *Pakistan-U.S. Relations*, by Barbara Ann LePoer, CRS Issue Brief IB94041; *Nuclear Nonproliferation Issues*, by Carl Behrens, CRS Issue Brief IB98039.

weapons if they are able to obtain fissile material. Even terrorist groups may acquire and use radiological weapons which use a conventional explosive to disperse deadly radioactive material: in the mid-1990s, Chechen rebels and the Aum Shinrikyo cult tried to acquire and use radioactive materials as terrorist devices.

Biological Weapon Arsenals and Programs

Almost a dozen countries have offensive BW programs.¹¹ Public information sources indicate two countries (Iraq and Egypt) are known to have BW, and several countries are likely to have BW, suspected of having BW, or are seeking BW. In addition, a number of subnational terrorist groups have reportedly tried to develop or acquire BW. Because much of the material and equipment used to produce BW has legitimate medical, agricultural, or industrial purposes, and because BW could possibly be produced covertly in a relatively small facility, other countries or groups may have undetected BW programs. However, experts in the field say terrorist groups would have difficulty obtaining sufficient materials and know-how to grow, handle, store and disperse biological agents to have a large-scale lethal effect.¹² A small volume of biological agent or toxin, if properly dispersed, could cause massive casualties in an unprotected densely populated area. The material could be sprayed from an aircraft or drone; from submunitions delivered by artillery, rockets, cruise or ballistic missiles; or disseminated by terrorists. Each of the countries that reportedly have offensive BW programs have aircraft, artillery, and missiles. During the Gulf War, Iraq had BW warheads on some of its short-range missiles but apparently did not use those weapons.

Chemical Weapon Arsenals and Programs

“At least sixteen states ... currently have active CW programs,” according to a statement by a CIA official in 1999.¹³ Unclassified, public sources have named about countries (including the United States) that were reportedly known or likely to have had chemical weapons inventories in the late 1990s. Additional countries and a few terrorist groups were suspected of having or seeking CW.

Under the Chemical Weapons Convention (CWC), which went into effect in 1997, member countries will have to destroy their stockpiles by 2007. The United States, Russia, South Korea, and India acknowledged CW inventories, and all but Russia have begun destroying the CW weapons and materials. Eleven countries also reported facilities for the production of CW and have pledged to destroy them or convert them to civilian uses. Other countries may be prevented from acquiring precursor materials needed to

¹¹Lauder, John A. Special Assistant for Nonproliferation to the Director of Central Intelligence. Unclassified Statement to the Commission to Assess the Organization of the Federal Government to Combat the Proliferation of Weapons of Mass Destruction, as prepared for delivery on 29 April 1999, p. 4.

¹²Leitenberg, Milton. “An Assessment of the Threat of the Use of Biological Weapons or Biological Agents,” September 18, 2000, p. 18.

¹³*Ibid.*

produce chemical weapons by export control and monitoring mechanisms. The effect of the CWC has probably been to reduce the number of parties with chemical weapons and to reduce the likelihood they will be used. But it is not clear which countries still have CW programs because the Convention has not been aggressively implemented and there have been no challenge inspections.¹⁴ Several countries that ratified the CWC have probably terminated their CW programs, but it is suspected that some signatories (such as Iran and Sudan) and several countries that have not signed the CWC (Egypt, Iraq, Israel, Libya, North Korea, and Syria) may still be developing or producing CW.

Technology and materials for the production of lethal chemical agents are available internationally, and production facilities can be concealed, so it is possible that additional countries and subnational groups may now, or soon, have CW capabilities. In 1995, the Japanese religious cult Aum Shinrikyo launched attacks in the Tokyo subway with sarin, a chemical nerve agent. While the number of producers of small quantities of CW could increase, restrictions established under the CWC will probably limit large-scale production and stockpiles among CWC states parties.¹⁵ The extent to which the worldwide CW threat decreases or increases in the coming decade depends in part on how effectively the CWC is implemented.

Chemical agents can be delivered by aircraft, drones, artillery, rocket launchers, submunitions on cruise or ballistic missiles, dispersion from a chemical reaction or manual or mechanical release. All but three of the countries that reportedly have had or have sought chemical weapons also have missiles and other means of delivery. Several countries reportedly have CW warheads for their missiles.

¹⁴Tucker, Jonathan B. "The Chemical Weapons Convention: Has it Enhanced U.S. Security?" *Arms Control Today*, April 2001, pp. 8-12.

¹⁵*Chemical Weapons Convention: Issues for Congress*, CRS Issue Brief IB94029, by Steven Bowman.

Table 1. The State of Proliferation

	Nuclear Weapons	Biological Weapons	Chemical Weapons	Ballistic Missiles (Longest)
Algeria	— ^a	Research?	Suspected	SRBM
China	Known	Likely ^b	Has Had	ICBM
Egypt	—	Known R&D	Likely	SRBM
Ethiopia	—	—	Likely ^c	—
France	Known	Ended	Ended	SLBM
India	Known ^d	—	Has Had ^e	MRBM
Indonesia	—	—	Sought	—
Iran	Seeking	Likely	Has Had ^f	MRBM
Iraq	Seeking	Known ^g	Known ^g	SRBM
Israel	Known ^h	Likely R&D	Likely	MRBM
Kazakhstan	Ended	—	Suspected ⁱ	SRBM
Libya	Seeking	Research	Likely ^j	MRBM
Myanmar	—	—	Likely	—
North Korea	Likely ^k	Likely	Known	IRBM
Pakistan	Known ^l	— ^m	Likely	MRBM
Russia	Known	Suspected ⁿ	Known	ICBM
Saudi Arabia	— ^o	—	Suspected ^p	MRBM
South Africa	Ended	Ended	Suspected	Ended
South Korea	Ended	—	Suspected	SRBM
Sudan	—	^q	Suspected ^r	—
Syria	—	Seeking	Known	SRBM
Taiwan	Ended	Suspected ^s	Likely	SRBM
Thailand	—	—	Suspected	—
United Kingdom	Known	Ended	Ended	SLBM
United States	Known	Ended	Known	ICBM
Vietnam	—	—	Likely	SRBM
Yugoslavia (Serbia & Montenegro)	—	—	Known ^t	Suspected

Terms Used In Table 1

! **Missiles:** The table indicates the range group of the longest range ballistic missile in the possession of each country that also has nuclear, chemical, or biological weapons. India, Iran, North Korea, and Pakistan are developing, but do not yet possess, longer range ballistic missiles.

SRBM: Short Range Ballistic Missile, <1000 km (620 mi.)

MRBM: Medium Range Ballistic Missile, 1001-3000 km (621-1860 mi.)

IRBM: Intermediate Range Ballistic Missile, 3001-5500 km (1861-3410mi.)

ICBM: Intercontinental Ballistic Missile, >5500 km (3410 mi.)

SLBM: Submarine Launched Ballistic Missile

Sources: Primary sources used in the production of the table were:

Proliferation Threat and Response. Office of the Secretary of Defense: April 1996, and November 1997.

The Arms Control Reporter. Institute for Defense and Disarmament Studies.

Adherence To and Compliance With Arms Control Agreements. Arms Control and Disarmament Agency: 1996 Annual Report.

The Nonproliferation Review. Center for Nonproliferation Studies at the Monterey Institute of International Studies, various issues.

Report of the Commission to Assess the Ballistic Missile Threat to the United States, Executive Summary, July 15, 1998.

Table 1 Notes

^a A few indicators suggest a possible military use of Algeria's 15 MWt Es Salam reactor at Ain Oussera, and evoked suspicion that Algeria is developing nuclear weapons. Rodney W. Jones, Mark G. McDonough with Toby Dalton and Gregory Koblentz, *Tracking Nuclear Proliferation*, Carnegie Endowment for International Peace, 1998, p.163.

^b ACDA reported in 1996 that China previously had a biological weapon (BW) program and that it was highly probable that China remained noncompliant with obligations under the BW Convention. *Adherence to and Compliance With Arms Control Agreements*, Arms Control and Disarmament Agency, 1996. U.S. Department of Defense, *Proliferation: Threat and Response*, 1997 stated, "China likely has maintained the offensive biological warfare program it is believed to have had before acceding to the BWC."

^c Ethiopia was termed a "probable" chemical weapons possessor by Rear Admiral Thomas Brooks, Director of Naval Intelligence, statement before the House Committee on Armed Services, Subcommittee on Sea Power, Strategic and Critical Materials, March 7, 1991, p.107.

^d India detonated a nuclear device in 1974 and several more in 1998.

^e When it became a state party to the Chemical Weapons Convention, India admitted that it had produced a chemical weapons stockpile, but has since hosted all required CWC inspections. It retains the capability to produce CW. *Proliferation: Threat and Response, January 2001*, p. 25.

^f Iran used chemical weapons in 1987 during the Iran-Iraq War and also supplied Libya with chemical weapons which were later used in Chad. *Proliferation: Threat and Response*, 1996, pp. 15-16. "It is

also believed to be conducting research on nerve agents.” *Proliferation: Threat and Response*, January 2001, p. 36

^g Iraq claims its CW and BW stockpiles have been destroyed, but UN inspection officials suspect small stockpiles, possibly including missile warheads, remain. Iraq used CW against Iran and against its own Kurdish population in the 1980s.

^h Although press reports and the academic community generally report that Israel has nuclear weapons, many of which could be deployed with its missile force, neither the Israeli nor U.S. government has officially acknowledged their existence.

ⁱ Kazakhstan reportedly retained some Soviet-era CW stockpiles.

^j Libya used Iranian supplied chemical weapons in Chad, and according to *Proliferation: Threat and Response*, 1996, Libya has begun domestic production of chemical weapons.

^k It is believed that North Korea has produced enough weapons grade material for at least one nuclear weapon and may have produced a nuclear weapon. Estimates as to the potential number of weapons it could produce vary: State Department estimates 2; CIA estimates 1-2; Russian Defense Ministry estimates 2-3. Former Secretary of Defense Perry has stated that if North Korea has achieved greater technological capabilities than is currently believed, they “could make five bombs out of the amount of plutonium we estimate they have.” Nicksch, Larry, North Korea’s Nuclear Weapons Program, CRS Issue Brief IB91141, pp. 3-5. The National Intelligence Council reported, “P’yongyang probably has one, possibly two, nuclear Weapons.” *Global Trends 2015*, December 2000, p. 36.

^l Pakistan detonated several nuclear devices in May 1998.

^m “Pakistan is believed to have the resources and capabilities to support a limited biological warfare research and development effort,” according to DoD’s *Proliferation: Threat and Response*, January 2001, p. 28.

ⁿ Russia has acknowledged it had a clandestine BW program and claims to have stopped production. However, the U.S. is not assured that Russia is in compliance with the Biological Weapons Convention.

^o Saudi Arabia has reportedly shown interest in funding the Pakistani nuclear programs and may be seeking to acquire a nuclear capacity. See: Shahram Chubin, “Eliminating Weapons of Mass Destruction: The Persian Gulf Case,” The Henry L. Stimson Center, March 1997, p. 20; “Saudi Arabia: Weapons of Mass Destruction Capabilities and Programs,” Center for Nonproliferation Studies, Monterey Institute of International Studies; *New York Times*, July 10, 1999; *Reuters*, August 3, 1999; *New York Times*, August 7, 1994.

^p There are unconfirmed reports that Saudi Arabia may have developed chemical warheads for its CSS-2 missiles. NBC Capabilities, Saudi Arabia, *Jane’s NBC Defense Systems 1998-1999*. Also, *Defense and Foreign Affairs Weekly*, April 1991, reports Chinese assistance to Saudi Arabia in developing chemical warheads. Also, in the *Arms Control Reporter* as of March 13, 1991 and May 1992, 704.E-0.10.

^q CIA stated that: “Given its history of developing chemical weapons and its close relationship with Iraq, Sudan may be interested in a Biological weapons program as well”. Director of Central Intelligence, Report to Congress on the Acquisitions of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, July 1999.

^r The same DCI Report to Congress states that, “Sudan has been developing the capability to produce chemical weapons for many years [and] has obtained help from many countries including Iraq.”

^s According to the U.S. Arms Control and Disarmament Agency, Taiwan has been upgrading its biotechnology capabilities, but the “evidence indicating a BW program is not sufficient to determine

if Taiwan is engaged in activities prohibited by the BWC.” ACDA, *Adherence to and Compliance with Arms Control Agreements: 1997, Annual Report to Congress*.

^t Pentagon officials believe that the Yugoslav army has stocks of lethal and non lethal chemical weapons. Judith Miller, “U.S. Officials Suspect Deadly Chemical Weapons in Yugoslav Army Arsenal,” *New York Times*, April 16, 1999. William Potter of the Monterey Institute said Yugoslavia has the capability to produce nuclear Weapons. *European Stars and Stripes*, May 29, 2000, p. 2.

Missile Arsenals and Programs

Nearly all countries that reportedly have or are seeking nuclear, biological, or chemical weapons also have ballistic missiles – four do not¹⁶. About 15 other countries have ballistic missile programs but no known NBCW capability.¹⁷ The five established nuclear powers – China, France, Russia, the United Kingdom, and the United States – and possibly North Korea¹⁸ have intercontinental ballistic missiles or submarine launched ballistic missiles. In the late 1980s, Saudi Arabia bought medium range ballistic missiles (MRBMs, 1000-3000 km) from China. Israel, India, Pakistan, and Iran have MRBMs and are probably working to develop intermediate range ballistic missiles (IRBMs, 3000-5500 km) and, perhaps eventually intercontinental ballistic missiles (ICBMs, >5500 km).¹⁹ Libya reportedly bought Nodong MRBMs from North Korea.²⁰ At least 25 other

¹⁶The ballistic missiles referred to in this paper are guided during a portion of their ascent, then follow a ballistic (unguided and unpowered) trajectory over the remainder of the flight. Cruise missiles are continually powered by an air-breathing or rocket engine and are generally guided for their entire flight. Excluded are all air-to-air, surface-to-air, antitank, anti-ship, and air-to-surface missiles, unguided artillery rockets, and satellite launch vehicles.

¹⁷Countries with ballistic missiles but no known NBCW are: Afghanistan, Argentina, Armenia, Belarus, Bulgaria, Czech Republic, Greece, Netherlands, Romania, Slovakia, Turkey, Turkmenistan, Ukraine, United Arab Emirates, and Yemen. For further discussion of the missiles held by each country, see *Missile Survey: Ballistic and Cruise Missiles of Foreign Countries*, by Robert Shuey, CRS Report RL30427.

¹⁸North Korea test fired a Taep'o-dong 1 with a third stage that failed. If North Korea can make the third stage function properly, and if it has a reentry vehicle to protect a warhead, it might be able to deliver a small payload to ICBM range. According to the September 1999 intelligence estimate on missile threats, North Korea may also have developed and have ready to test the Taep'o-dong 2 ICBM, which, with a third stage, could deliver a large warhead to most areas of the United States. With two stages it could deliver a large warhead to points in Hawaii and Alaska.

¹⁹Israel produces the Jericho 1 SRBM and Jericho 2 MRBM and is developing the Jericho 3 which various reports describe as an IRBM or an ICBM. Israel also produces space launch vehicles that could be converted to ballistic missiles, possibly ICBMs. India has developed and tested the Agni MRBM and space launch vehicles. Pakistan's Ghauri and Iran's Shahab 3 are both MRBMs based on North Korea's Nodong. Both those countries are developing longer range missiles. See *Missile Survey*, CRS Report RL30427.

²⁰Testimony by CIA Director George Tenet before the Senate Select Committee on Intelligence, February 7, 2001, tended to confirm press reports that Libya acquired Nodong missiles from North Korea: “You have to worry about what the North Koreans are going to

(continued...)

countries have short range ballistic missiles (SRBMs, <1000 km). For the last five years, North Korea has been the primary exporter of missiles and missile technology, but firms in Russia and China continue to help foreign programs. Organizations in those two countries have recently supplied material, components, and technical assistance to Iran, India, Libya, Pakistan, Syria, and even North Korea.²¹

Trends Regarding NBC Weapons and Missiles

The ebb and flow of nuclear, biological, and chemical weapons technology around the globe and the rise and fall of aggressive governments have varied the overall risk that some country or group will attack another with weapons of mass destruction. The risk is increasing in some regions while decreasing in others. Despite several encouraging developments, nuclear, biological, and chemical weapons and missiles continue to pose severe threats to many populations. NBCW are the greatest threat to U.S. national security, and it is likely that more countries and groups will be able to threaten the United States and its allies with these weapons in the coming decades.

Positive Developments

- ! The demise of the Soviet Union has greatly decreased the likelihood of a world conflagration in a massive exchange of nuclear weapons and diminished the chance of massive biological or chemical attacks.
- ! The reduction of weapons under the START process, continuing unilateral reductions, and improved safeguarding of nuclear weapons and materials continue to decrease the likelihood of nuclear war in Europe and North America, an accidental launching, and the proliferation of nuclear weapons.
- ! The Chemical Weapons Convention has entered into force and decreased the likelihood of large-scale CW production and use.
- ! The Comprehensive Test Ban Treaty has been signed by many countries and may reduce the likelihood that some additional countries will develop, test, and deploy nuclear weapons.²²

²⁰(...continued)

do and who they proliferate (sic). ... Everybody has a medium-range ballistic missile capability. Libyans have one, the Iranians have one – everybody wants to acquire that capability.”

²¹Central Intelligence Agency, *Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Weapons, 1 July through 31 December 1999*; and “Russia Sells Missile Technology to North Korea,” *Washington Times*, June 30, 2000.

²²See, *Nuclear Weapons: Comprehensive Test Ban Treaty*, by Jonathan Medalia, CRS (continued...)

- ! Members of the Biological Weapons Convention are trying to create a workable verification protocol.
- ! China acceded to the NPT, stopped nuclear tests, signed the CTBT, and pledged to improve its record on nonproliferation.
- ! North Korea has agreed to stop producing fissile material and suspend missile tests, and has offered to abandon ICBM development in exchange for satellite launch services.
- ! President Putin signed the law on ratification of START II, with certain conditions.²³
- ! The Nuclear Non-Proliferation Treaty has been extended and the 2000 review conference did not derail the global consensus to hold fast nonproliferation goals.
- ! The settlement between Israel and Egypt and the political moderation that is apparently occurring in Iran are reducing some of the tensions that could lead to an NBCW exchange in the region.
- ! The risk of NBCW warfare in Southeast Asia has been diminished with the end of the Vietnam war and Cambodian civil strife.
- ! While the risk of NBCW war on the Korean peninsula remains a serious concern, it has probably peaked and may be further reduced in the coming years through ongoing diplomacy.
- ! The risk of NBC warfare in South America was reduced by the decisions of Argentina and Brazil to abandon nuclear weapons programs and the development of advanced missiles.

The perceived need for NBCW could be further reduced by a Middle East peace agreement, political moderation of Iran, continued containment of Iraq, reconciliation on the Korean peninsula, resolution of issues between India and Pakistan and between China and Taiwan.

²²(...continued)

Issue Brief IB92009.

²³Approved on April 18, 2000, the Russian ratification law allows for withdrawal from the treaty if the U.S. abrogates the ABM Treaty or deploys nuclear weapons in new NATO countries. It also makes START II entry into force conditional on U.S. acceptance of the 1997 U.S.-Russian agreements on the ABM Treaty. See *Nuclear Arms Control: the U.S.-Russian Agenda*, by Amy Woolf, CRS Issue Brief IB98030.

Table 2. International Commitments

Country	NPT	CWC	BWC	CTBT	NSG	MTCR	IAEA
Algeria	A	R	–	S	–	–	P
China	A	R	A	S	–	Pledged	P
Egypt	R	–	S	S	–	–	P
Ethiopia	R	R	R	S	–	–	P
France	A	R	A	R	P	P	P
India	–	R	R	–	–	–	Partial
Indonesia	R	R	R	S	–	–	P
Iran	R	R	R	S	–	–	P
Iraq	R	–	R	–	–	–	P
Israel	–	S	–	S	–	Adherent	Partial
Kazakhstan	A	S	–	S	–	–	P
Libya	R	–	A	–	–	–	P
Myanmar (Burma)	A	S	S	S	–	–	P
North Korea	A	–	A	–	–	–	P
Pakistan	–	R	R	–	–	–	Partial
Russia	R	R	R	R	P	P	P
Saudi Arabia	A	R	R	–	–	–	–
South Africa	A	R	R	R	P	P	P
South Korea	R	–	R	R	P	P	P
Sudan	R	A	–	–	–	–	P
Syria	R	–	S	–	–	–	P
Taiwan	R	–	R	–	–	–	
Thailand	A	S	R	S	–	–	P
United Kingdom	R	R	R	R	P	P	P
United States	R	R	R	S	P	P	P
Vietnam	A	R	A	S	–	–	P
Yugoslavia (Serbia & Montenegro)	R	A	R	S	–	–	P

Abbreviations

NPT - Nuclear Non-Proliferation Treaty

CWC - Chemical Weapons Convention

BWC - Biological Weapons Convention

CTBT - Comprehensive Test Ban Treaty

NSG - Nuclear Suppliers Group

MTCR - Missile Technology Control Regime

IAEA - Safeguards Agreement with the International Atomic Energy Agency

A - Acceded

P - Participant

R - Ratified

S - Signed

Pledged - Unilaterally agreed not to export missiles that meet MTCR thresholds

Adherent- Entered an international agreement with the U.S. to abide by MTCR

Sources for Table 2:

U.S. Arms Control & Disarmament Agency [<http://www.acda.gov>]

International Atomic Energy Agency [<http://www.iaea.or.at>]

“Inventory of International Nonproliferation Organizations and Regimes,” Center for Nonproliferation Studies, Monterey Institute of International Studies: [<http://cns.miis.edu/pubs/reports/pdfs/9707inve.pdf>]

Negative Developments

Several countries continue to acquire NBC weapons and missiles, increase the number of weapons in their inventories, enhance the capabilities of their weapons, and establish doctrine for the operational use of strategic weapons, largely offsetting positive developments cited above.

- ! Russia continues to maintain thousands of nuclear weapons and has military doctrine that calls for the use of nuclear weapons to assure victory on the battlefield. Russia has large stockpiles of nuclear, chemical, and biological weapons material. Several Russian organizations have provided missile technology to Iran, North Korea, and other potentially hostile countries.²⁴
- ! China is expanding and modernizing its nuclear missile force though its size is not expected to approach that of the United States or Russia. China maintains CW and possibly BW stocks and provides missile technology to Iran, Pakistan, North Korea,

²⁴*Nuclear Weapons in Russia: Safety, Security, and Control Issues*, by Amy Woolf, CRS Issue Brief IB98038.

and perhaps other countries. China's vertical and horizontal proliferation increase the risk of NBC or missile warfare. The threatening posture of the People's Republic of China toward Taiwan is a particular source of tension.²⁵

- ! South Asia is frequently called the most likely location for nuclear war. India and Pakistan each tested nuclear devices in 1998, both are building medium range missiles, both probably have chemical weapons. Despite international pressures, the parties have not begun to negotiate a settlement of the Kashmir conflict.²⁶
- ! Iran is reportedly trying to develop nuclear weapons, and is thought to have chemical and biological weapons as well as medium range missiles.²⁷
- ! Iraq was reportedly close to building a nuclear weapon before the Gulf War, and had CW, BW, and missiles. It has used CW against Iran and Iraqi Kurds and fired missiles at coalition forces in Saudi Arabia and at Israeli cities. Since it has denied access to UN weapons inspectors, U.S. military officials suspect Iraq has resumed its NBC+M programs.
- ! Syria, Libya, Egypt, and Israel probably have CW and missile programs and may have BW programs; Israel reportedly has numerous nuclear weapons.
- ! North Korea remains unpredictable, has frequently been belligerent, and is armed with CW, BW, missiles, and probably nuclear weapons.²⁸
- ! Terrorists are apparently interested in, and probably capable of acquiring chemical weapons and possibly biological and radioactive weapons.

²⁵See *China: Ballistic and Cruise Missiles*, CRS Report 97-391 F, by Shirley A. Kan, updated June 20, 2000; *Chinese Proliferation of Weapons of Mass Destruction: Current Issues*. CRS Issue Brief IB92056 by Shirley A. Kan.

²⁶See *Nuclear Weapons and Ballistic Missile Proliferation in India and Pakistan: Issues for Congress*, CRS Report RL30623, by K. Alan Kronstadt, July 31, 2000.

²⁷See *Weapons of Mass Destruction in the Middle East*, CRS Report RL30408, January 14, 2000; *Iran: Arms and Technology Acquisitions*, by Kenneth Katzman, CRS Report RL30551; *Iran: Current Developments and U.S. Policy*, by Kenneth Katzman, CRS Issue Brief IB93033.

²⁸National Intelligence Council, *Global Trends 2015*, p. 36. South Korea's Defense White Paper issued in December 2000 found no change in the North Korean military threat. See also, *North Korea's Nuclear Weapons Program*, by Larry Niksch, CRS Issue Brief IB91141.

Contributing Factors

A number of factors have been cited that could prompt the spread of dangerous technology to additional countries and groups and might increase the likelihood that NBCW+M will be used:

- ! Technological developments (NBCW, computer, and production technology)
- ! Increased availability of information
- ! Increased ability to travel
- ! Increased ability to trade in open markets
- ! Growing disparities in conventional military capabilities
- ! Growing disparities in strategic defenses
- ! Continuing prestige of nuclear power
- ! Growing prestige of missile capabilities
- ! Perceived utility of NBCW threats to deter U.S. intervention, and
- ! Indications of disdain by major powers for certain arms control agreements and international cooperation on nonproliferation.

As mentioned, the reduction of global and regional tension helps reduce the perceived need for mass destruction weapons. Economic and political integration are also thought to reduce proliferation. The strong and credible U.S. deterrent capability might weaken the likelihood that some hostile countries will acquire or use NBCW. Analysts debate whether U.S. development of a National Missile Defense system will further deter the proliferation and use of NBCW+M or will incite further proliferation.

Trends in Nuclear Weapons

The total number of nuclear warheads in the world has decreased and will probably continue to decrease over the next few decades as the United States and Russia reduce their stockpiles. The nuclear inventories of China, India, and Pakistan are small, but all will probably be expanded. There is no indication the alleged nuclear arsenal of Israel will significantly increase or decrease in the near future.

However, the number of nations with nuclear weapons has increased, with the addition of India, Pakistan and probably North Korea, and may increase further if Iran, Iraq, Libya, and other countries are not dissuaded from acquiring sensitive materials and technology and building nuclear devices and delivery systems. Jayantha Dhanapala, Under Secretary General for Disarmament Affairs at the United Nations, described nuclear proliferation as “the gravest threat to international peace and security of our time—the gravest threat, indeed, to the future of humankind.”²⁹

²⁹Dhanapala, Jayantha. “The NPT at a Crossroads,” *The Nonproliferation Review*, Spring 2000, p. 138.

Director of Defense Intelligence Vice Admiral Thomas R. Wilson predicted:

We will continue to face strategic nuclear threats – from Russia and China, and eventually from North Korea and other ‘rogue’ states. While the total number of warheads targeted against us will be much lower than during the Cold War, the mix of threat nations, force structures, capabilities, and employment doctrines will complicate the strategic threat picture. ...

Several rogue states will likely acquire nuclear weapons during the next decade or so, and some existing nuclear states will undoubtedly increase their inventories. As these trends unfold, the prospects for limited nuclear weapons use in a regional conflict will rise. So too will the potential for a terrorist or some other subnational group to acquire and use a weapon.³⁰

Even though Russia will probably continue to reduce its strategic forces below START II levels because of financial constraints, it is widely predicted Russia will maintain the ability for the foreseeable future to strike the United States with hundreds of warheads given the size of the existing arsenal and the priority Russia continues to give its strategic forces. Russia’s strategic forces are designed to deter nuclear and conventional aggression, but Russia “is prepared to conduct limited nuclear strikes” to repel an enemy or change the course of battle. However, it is deemed unlikely that Russia will launch an accidental or unauthorized nuclear attack against the United States.³¹

China is improving its strategic nuclear force with planned deployments of new mobile ICBMs, possibly with multiple reentry vehicles carrying nuclear warheads, and upgraded command, control, and communications. Its small strategic deterrent force will improve significantly in numbers (to several tens of missiles), accuracy, reliability, and survivability in the next 20 years.³² According to a recent DoD report, China is concentrating on building its political, diplomatic, and economic power for achieving its national goals and considers its nuclear weapons primarily a deterrent. But, “If a third party were to intervene militarily in a regional conflict involving China, the PLA would employ all means necessary in the hope of inflicting high casualties and weakening the intervening party’s resolve.”³³ The National Intelligence Council judges “an unauthorized launch of a Chinese strategic missile is highly unlikely.”³⁴ China is also expanding and modernizing its tactical missile forces and is attempting to intimidate Taiwan with SRBMs, likely armed with conventional warheads although they are capable of delivering NBCW.

Director of Central Intelligence George Tenet noted India and Pakistan have intensified their nuclear rivalry with tests of nuclear weapons and MRBMs in 1998, and both have

³⁰Wilson, pp. 6, 10.

³¹U.S. National Intelligence Council. “Foreign Missile Developments and the Ballistic Missile Threat to the United States,” September 1999, pp. 8 and 9; Wilson, p. 13.

³²Wilson, p. 14.

³³U.S. Department of Defense. “Annual Report on the Military Power of the People’s Republic of China,” June 22, 2000, pp. 2 and 7.

³⁴U.S. National Intelligence Council, p. 9.

begun to establish doctrine, tactics, and contingency plans for the use of nuclear weapons. In his view, in the spring 1999, “the two countries narrowly averted a full-scale war in Kashmir, which could have escalated to the nuclear level.”³⁵ While the nuclear competition between India and Pakistan is dangerous, most analysts conclude India’s quest for nuclear weapons is driven primarily by its desire for the status of a major power and by its regional competition with China.

North Korea, Iran, Iraq, and Libya are developing, or trying to develop, NBCW and longer-range missiles to deter U.S. intervention and to intimidate their neighbors. Some analysts doubt these countries would overtly attack the United States with NBCW because of the U.S. ability to conduct an overwhelming counterattack. But others contend NBCW capabilities in these countries could limit U.S. military options to defend its interests out of concern that the adversary might inflict massive casualties on U.S. forces or allies.

The United States government works hard to decrease the risk of NBCW war, the spread of NBCW+M, and the U.S. vulnerability to the weapons. U.S. leadership has been critical for the Non-Proliferation Treaty, the International Atomic Energy Agency, the Nuclear Suppliers Group, Zangger Committee, the Fissile Material Production ban, strengthening the Biological Weapons Convention, the Chemical Weapons Convention, Australia Group, Missile Technology Control Regime, Wassenaar Arrangement, START I, II, and III, North Korea Agreed Framework, and bilateral efforts with numerous countries to discourage the spread of weapons technology and the acquisition, deployment, or use of NBCW+M. But various constituencies have criticized some recent U.S. actions as stimulating NBCW+M proliferation: policies such as the development of a national missile defense; threats to abrogate the Anti-Ballistic Missile Treaty; discussions of regional missile defense systems in Asia and the Middle East; refusal to consent to ratification of the Comprehensive Test Ban Treaty; and perceived elevation of economic goals above nonproliferation goals; although proponents strongly defend their actions as being in the best national interest.

Proponents of missile defense also argue the defensive posture is less threatening than the strategy of nuclear deterrence and vulnerability (mutual assured destruction) that ruled the Cold War.

Risks of Nuclear Conflict

It is possible that as more countries acquire nuclear weapons or expand their nuclear arsenals, the likelihood they will use nuclear weapons will increase. The acquisition of nuclear weapons by countries with inadequate command and control systems, vague strategic doctrine (or aggressive operational doctrine), and poor intelligence on enemy capabilities and intentions could particularly increase the risk of nuclear warfare. The official U.S. assessment: “The probability that a missile with a weapon of mass destruction would be used against *US forces or interests* is higher today than during most of the Cold War,

³⁵Tenet, George. Director of Central Intelligence. “The Worldwide Threat in 2000: Global Realities of Our National Security,” Testimony before the Senate Select Committee on Intelligence, February 2, 2000, pp. 3, 5, and 37.

and will continue to grow.”³⁶ But several European and Canadian defense experts have expressed the view that the threat of nuclear war has diminished substantially over the past decade and their feeling of safety has increased.³⁷

The nuclear arsenals of China, India, and Pakistan are now considered primarily to be deterrent forces. The CIA estimates “Countries with emerging ICBM capabilities are likely to view their relatively few ICBMs more as weapons of deterrence than as weapons of war, recognizing that their use could bring devastating consequences.”³⁸ But some analysts are concerned these countries, like Russia, may be adopting doctrine calling for the tactical use of nuclear weapons under dire circumstances in regional conflicts. Others worry that the very existence of nuclear weapons in the arsenals of antagonist countries raises the probability of nuclear war through miscalculation or desperation, if not in response to national doctrine. Other analysts contend the possession of nuclear weapons by one country in a conflict is likely to deter other countries from using their own nuclear weapons or, generally, attempting to conquer the nuclear-armed country.³⁹

The following chart is a notional representation of the likelihood of nuclear conflict occurring somewhere in the world.

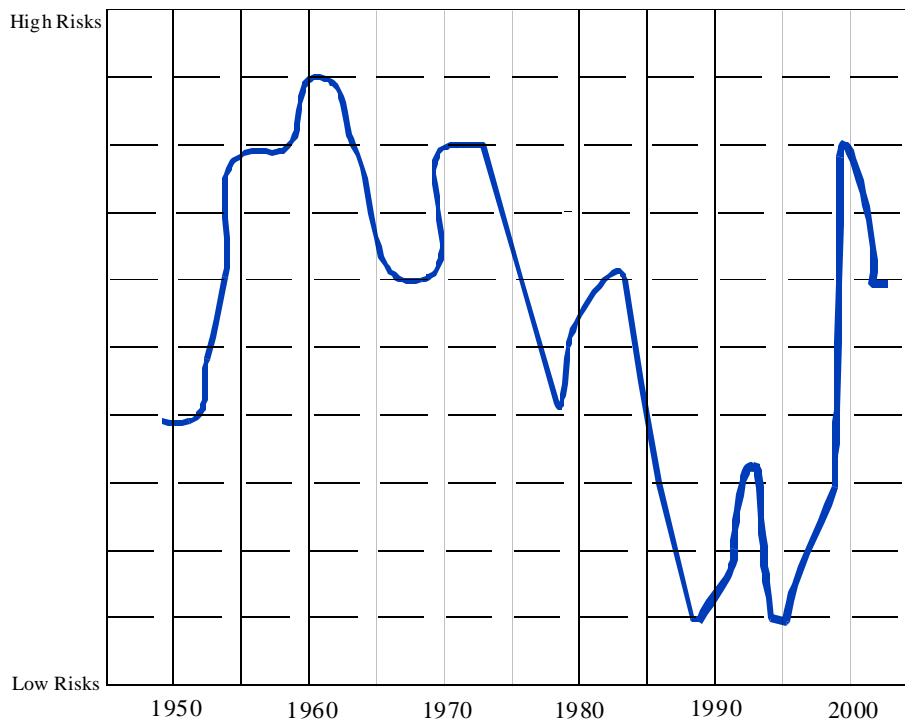
³⁶Walpole, Robert. National Intelligence Officer for Strategic and Nuclear Programs. Testimony before the Senate Governmental Affairs Committee, Subcommittee on International Security, Proliferation, and Federal Services, September 21, 2000. (His emphasis.)

³⁷*The Ottawa Citizen*, August 25, 2000, cited in the *Ballistic Missile Defense Organization External Affairs Digest*, August 31, 2000; Carnegie Endowment for International Peace, “Why U.S. Allies Do Not See a Missile Threat,” September 21, 2000.

³⁸National Intelligence Council, *Foreign Missile Developments and the Ballistic Missile Threat to the United States Through 2015*, September 1999, p. 7.

³⁹For further discussion of deterrence, see *Nuclear Weapons and Ballistic Missile Proliferation in India and Pakistan*, by K. Alan Krondstadt, CRS Report RL30623; and “Israel’s Nuclear History,” *Jane’s Intelligence Review*, July 2000, p. 14.

Figure 2. Worldwide Risks of a Nuclear Attack From Any Source, Late 1940s-2000



This graphic is based on analysis of nuclear risks associated with particular historical situations and relationships between principal antagonists.

The levels of probability are based on factors such as:

- ! the existence of nuclear weapons and delivery systems in various countries
- ! information on the readiness of those weapons for use (weaponization, deployment, alert status)
- ! evidence indicating that the conditions for using nuclear weapons in a country's strategy and doctrine were close to being met
- ! the level of conflict between a nuclear-armed state and its adversary(ies)
- ! the perceived level of threat to the viability of the nuclear-armed state and
- ! the level of frustration with a long confrontation that was inflicting heavy casualties, draining national resources and patience, and challenging the leader's credibility, even if not threatening national integrity.

The probability that a future nuclear war is more likely to occur in Asia or the Middle East may assuage the concerns of Europeans who lived under the threat of a Soviet attack for decades. Also the fact that a future nuclear attack may consist of a small number of detonations rather than a catastrophic exchange of hundreds or thousands of nuclear warheads may lead some to feel the threat is reduced. Here we are considering the probability of a nuclear attack regardless of scale and regardless of location.

According to most national security analysts, high risks of nuclear warfare climbed in the early 1950s and probably peaked during the Cuban Missile Crisis. Tensions remained relatively high through the 1960s, leading to a high risk Sino-Soviet confrontation in 1969. A series of events in the early 1980s raised the risks of US-USSR nuclear warfare, but that risk declined steadily beginning in the late 1980s. In the 1990s, new risks emerged in the Middle East, South Asia, and on the Korean Peninsula. The clash in Kargil was probably the greatest risk of nuclear war since the end of the Cold War. Some key events related to nuclear risk are listed below:

- 1945 USSR Subjugates Poland
- 1948 USSR Completes Subjugation of East Europe
- 1949 USSR Atomic test
- 1950-53 Korean War
- 1953 Russia tests H-Bomb
- 1954- 55 Formosa Strait Crisis
- 1956 Mid-East War, Hungary Uprising,
- 1961 Berlin
- 1962 Cuban Missile Crisis
- 1963 Berlin
- 1964 China Atomic Test
- 1968 Prague Spring, VN Tet Offensive, USS Pueblo Seized
- 1969 Height of Sino-Soviet confrontation – Border Clash
- 1973 Mid-East War
- 1974 Indian Atomic Test
- 1977 USSR begins deploying SS-20 intermediate-range missiles
- 1979 USSR-Afghan War, US and USSR military buildups
- 1981 Martial law imposed on Poland
- 1983 Heightened Cold War tension; peaceful coexistence doubted by Andropov and Reagan; USSR shoots down KAL007; U.S. deploys Pershing 2 intermediate-range missiles in Europe
- 1985-86 Gorbachev ascendancy, revision of Soviet military doctrine
- 1989 Berlin Wall torn down
- 1990 Germany reunified
- 1991 Threats of CW attacks during the Gulf War Soviet Union dissolved; U.S. & Soviet nuclear weapons reductions
- 1993 North Korean nuclear diversion discovered; U.S. and Russia sign START II
- 1994 Agreed Framework on North Korea signed
- 1995 Nuclear Non-Proliferation Treaty extended indefinitely
- 1998 India and Pakistan test nuclear devices; North Korea, Pakistan, India, and Iran test missiles
- 1999 Kargil clash, India and Pakistan alert forces
- 2000 Kashmir conflict continues; North Korea talks with South Korea

Trends in Biological and Chemical Weapons

The entry into force of the Chemical Weapons Convention and establishment of the Organization for the Prevention of Chemical Weapons have had positive effects in reducing

international transfers of weapons materials and equipment and in bringing about the destruction of CW stocks. Several countries that were thought to have CW have joined the Convention and accepted the requirement to destroy their CW stockpiles. The probability of large-scale CW attack will probably decline as these stocks are destroyed, especially if restrictions on CW development and trade are enforced. And yet chemical weapons remain in the arsenals of some aggressive countries and possibly some terrorist groups and trade in CW ingredients continues.

The negotiating members of the Biological Weapons Convention developed a draft protocol to establish measures to verify the legitimate activities of biotechnology plants around the world. But the United States found the safeguards insufficient and too intrusive. The covert development of biological weapons, especially in non-member states, remains hard to detect; the use of BW is hard to defend against; and a BW attack could cause enormous casualties or destruction of crops. International trade in BW material, equipment, and technology remains a concern. In the coming decades, as biotechnology makes further advances and international flows of information, people, and goods continue to grow, the threat of BW warfare may also increase.

Director of Defense Intelligence, Vice Admiral Wilson noted biological and chemical weapons are relatively easy to develop, hide, and deploy and said, "I expect these weapons to be widely proliferated, and they could be used in a regional conflict over the next 15 years. I am also concerned that sub-national groups or individuals will use chemical or biological agents in a terrorist or insurgent operation."⁴⁰ The General Accounting Office criticized the Administration for not having developed a comprehensive assessment of the domestic and international threat of CW and BW attacks by terrorists. They reported that, even without sophisticated knowledge or dissemination methods, terrorists could attack with toxic industrial chemicals such as chlorine. But, GAO judged,

terrorists would need a relatively high sophistication to successfully cause mass casualties with some other chemical and most biological agents. Specialized knowledge would be needed to acquire the right biological agent or precursor chemicals, process the chemical or biological agent, improvise a weapon or device, and effectively disseminate the agent to cause mass casualties.⁴¹

As Jonathan Tucker noted, the fact that large cities are quite vulnerable to terrorist CW and BW attacks does not demonstrate an existing threat from such terrorist attacks.⁴²

⁴⁰Wilson, p. 10.

⁴¹U.S. General Accounting Office. *Combating Terrorism: Need for Comprehensive Threat and Risk Assessments of Chemical and Biological Attacks*, GAO/NSIAD-99-163, September 1999, pp. 2-3.

⁴²Tucker, Jonathan B. *Toxic Terror: Assessing Terrorist Use of Chemical and Biological Weapons*. Monterey Institute of International Studies. Cambridge, Massachusetts, MIT Press, 2000, p. 1.

The Central Intelligence Agency has identified several dangerous trends:⁴³

- ! Developments in biotechnology, including genetic engineering, may produce a wide variety of live agents and toxins that are difficult to detect and counter; and new CW agents and mixtures of CW and BW agents are being developed.
- ! Some countries, such as Iran, are building self-sufficiency in the production of CW and BW agents, producing more of the necessary equipment and materials so they do not have to depend on imports.
- ! Countries are using the natural overlap between weapons programs and civilian applications of chemical and biological materials to conceal CW and BW production.
- ! Countries with CW and BW capabilities are acquiring sophisticated delivery systems including cruise and ballistic missiles.
- ! Scientists with experience in CW and BW production continue to leave countries of the former Soviet Union.
- ! Controlling exports of dual-use technology is ever more difficult.
- ! About one dozen terrorist groups have sought CW, BW, and nuclear material or expressed interest in them; a number of the countries with CW and BW capabilities have sponsored terrorists.

Trends in Missiles

There are conflicting trends in the area of missile threats to the United States and U.S. interests – several developments tend to alleviate concern but several others cause concern. Beneficial developments include the following:

- ! Russia is down to about 1000 strategic missiles with 4,500 warheads – far less than half the earlier Soviet arsenal and well ahead of scheduled reductions under START I. Russia has ratified START II, with certain conditions, and has begun preliminary discussion on further reductions. Belarus, Kazakhstan, and Ukraine have eliminated their strategic missiles and nuclear weapons. The intelligence community estimates Russia will retain a formidable strategic force but will reduce its size below arms control limits primarily for financial reasons.⁴⁴

⁴³Lauder, John A. Special Assistant for Nonproliferation. *Worldwide WMD Threat*, presentation to the Commission to Assess the Organization of the Federal Government to Combat the Proliferation of Weapons of Mass Destruction, April 29, 1999, pp. 4 and 5.

⁴⁴National Intelligence Council, p. 9.

- ! The MTCR has added many new partners, growing from 7 in 1987 to 332 by 2001, but China has still not pursued participation.
- ! In September 1999, North Korea agreed to suspend long range missile tests while it is engaged with the United States in talks on improving relations. In response to policy recommendations of former Secretary of Defense Perry, the Clinton administration offered North Korea political and economic concessions and a pledge not to use U.S. missiles against North Korea. In July 2000, Kim Jong-Il suggested an offer to the visiting Russian President Vladimir Putin that North Korea would abandon its long-range missile program in exchange for international assistance in launching North Korean satellites.⁴⁵ North Korean officials later confirmed the offer in writing, and still later said it was a joke. North Korea's intentions on this issue remain unclear.
- ! The United States signed a memorandum of understanding with Israel strengthening the U.S. commitment to help against WMD and long range missile attacks, to enhance Israeli defensive and deterrent capabilities, and to upgrade bilateral military and technological cooperation.
- ! The United States successfully tested its National Missile Defense, Theater High Altitude Area Defense, and Patriot PAC-3 although it also had several unsuccessful tests. Israel and Taiwan also tested theater missile defense systems.

Several other developments in the area of missile proliferation were more ominous:

- ! In August 1998, North Korea tested a three-stage space launch vehicle/missile that demonstrated the potential to deliver a small warhead over 5,000 km. North Korea is building underground missile facilities near the borders with South Korea and with China.
- ! North Korea exported missiles and production technology for Scud-variants, including the Nodong, a single-stage MRBM. Recipients of its missile technology included Iran, Pakistan, Egypt, Syria, Vietnam, and Libya. Iran and Pakistan each tested MRBMs reportedly based on the Nodong and both are developing longer range missiles.
- ! In April 1999, South Korea tested a missile believed to be capable of traveling 300 km or more. The United States and South Korea replaced their 1972 agreement that Seoul would not build missiles with a range greater than 180 km. Under the new agreement, South Korea to build missiles up to the MTCR threshold of 300 km range with a 500 kg. warhead. In March 2001 South Korea's membership in the MTCR was announced. South Korea also plans to build satellite launch vehicles and a launch facility.

⁴⁵*Washington Post*, July 20, 2000. North Korean officials have since reaffirmed the offer and partially clarified it to Russian and U.S. officials.

- ! In 1998 Iraq blocked inspectors of the United Nations Special Commission (UNSCOM) as they attempted to discover and destroy Iraq's nuclear, chemical, and biological weapons and missiles. The United Nations replaced UNSCOM with the United Nations Monitoring and Verification and Inspection Commission but that organization has never been permitted to operate in Iraq. Meanwhile Iraq continues to build and test short range missiles and is suspected of developing weapons of mass destruction.
- ! India announced its intention to produce the Agni MRBM, test fired an Agni II which is to have a range of between 2,000 and 3,000 km, and is developing longer range missiles.
- ! Both India and Pakistan tested nuclear explosive devices in 1998 and both may have developed nuclear warheads for some of their ballistic missiles.
- ! Numerous Russian firms and institutions have reportedly supplied missile technology to foreign countries including Iran and North Korea. Russia test fired several of its existing missiles and deployed a second regiment of Topol-M ICBMs.
- ! In 1998, China did not accept a U.S. proposal that it become a partner in the Missile Technology Control Regime (MTCR) in return for a larger U.S. quota of authorized satellite launches and other incentives. According to CIA, China has supplied additional missile technology to Pakistan, Iran, North Korea, Libya, and other countries.
- ! By 2000, China had deployed 150-200 SRBMs to areas near the Taiwan Strait, continued to threaten Taiwan, and test fired a new mobile strategic missile, the DF-31.
- ! Taiwan is reportedly considering an offensive missile force to deter and counter China's missiles.
- ! A French-British firm sold Black Shahine land attack cruise missiles to the United Arab Emirates.

Given these contrasting developments and other factors that will be mentioned below, there is a range of views on the seriousness of the missile threat to the United States. The 1999 intelligence estimate said that "during the next 15 years the United States most likely will face ICBM threats from Russia, China, and North Korea, probably from Iran, and possibly from Iraq, although the threats will consist of dramatically fewer weapons than today because of significant reductions we expect in Russian strategic forces."⁴⁶ It elaborated that North Korea could convert its Taep'o-dong 1 space launch vehicle into an ICBM capable

⁴⁶National Intelligence Council. "Foreign Missile Developments and the Ballistic Missile Threat to the United States Through 2015," unclassified, September 1999, p. 7.

of reaching parts of the United States with a light CW/BW payload and could test the more powerful Taep'o-dong 2 at anytime (rather than within 5 years as often stated in the press) which could deliver a large payload anywhere in the United States. As soon as the missile is tested successfully it would be deemed to "be available for the country to use as a threat or in a military role."⁴⁷ Iran was said to be able to build an ICBM with Russian help and test it between 2005 and 2010, or it could build a Taep'o-dong type ICBM, possibly with North Korean help in the next few years.⁴⁸

Lieutenant General Ronald Kadish, Director of the Ballistic Missile Defense Organization, has said the missile threat is "real and now," and that U.S. security depends on the ability to defeat that threat. He explained, "Employing active defenses would provide basic protection, help preserve freedom of action, and "remove a hostile state's capability to coerce U.S. foreign policy or shape national security decisions."⁴⁹ Under Secretary of Defense Walter Slocombe buttressed this position, saying missile defense complements U.S. deterrence, diplomacy, and arms control measures by "enhancing the credibility of U.S. global security commitments" in the face of missile threats to U.S. cities.⁵⁰

Some officials in the Clinton White House, Department of State, Department of Defense, and Central Intelligence Agency reportedly thought the estimated threat should not be based merely on the technological capability of countries to acquire missiles, but should be leavened with political, economic, and social factors that might decrease the determination of a country to acquire or to use missiles against the United States, its troops, or its allies.⁵¹ Joseph Cirincione of the Carnegie Endowment for International Peace argues the recent estimates exaggerate the missile threat and termed the Rumsfeld report "somewhat hysterical" in that it asserts new nations could deploy ICBMs with little or no warning.⁵²

⁴⁷Ibid., pp.2 and 7. The estimate noted that North Korea would require an operable third stage and a survivable reentry vehicle, which apparently have not been observed, to produce an ICBM. The Commission to Assess the Ballistic Missile Threat to the United States (Rumsfeld Commission) concluded North Korea and Iran could "inflict major destruction on the U.S. within about five years of a decision to acquire such a [ballistic missile] capability (10 years in the case of Iraq)." Many interpreted that statement to indicate the threat would materialize in 2004, but North Korea could have made the decision some years ago and be much closer to the capability. The Clinton administration subsequently reported it would not be able to deploy a national missile defense before 2005 and that became the target date for meeting a developing North Korean threat even though Pyongyang tested the Taep'o-dong 1 in August 1998 and was expected to test the Taep'o-dong 2 in 1999 or 2000.

⁴⁸Ibid., p. 8

⁴⁹U.S. Department of State. *Washington File*, "Ballistic Missile Defense Organization Director Answers Critics," June 16, 2000, p. 1.

⁵⁰Slocombe, Walter B. "The Administration's Approach," *The Washington Quarterly*, v. 23, no. 3, Summer 2000, pp. 79-80.

⁵¹Sciolino, Elaine and Steven Lee Meyers. "U.S. Study Reopens Division Over Nuclear Missile Threat," *New York Times*, July 5, 2000, p. 1.

⁵²"The Ballistic Missile Threat Evolves," by Joseph Cirincione, Carnegie Endowment for
(continued...)

Several analysts have questioned the sophistication of North Korea's missile program, the likely progress in Iran's missile program, and the level of success in India's and Pakistan's nuclear tests. The Bush administration is convinced of the current and developing WMD and missile threat.

The great emphasis on the long-range missile threat and efforts to defend against that potential threat, in the view of some analysts, detracts from the more likely threats to U.S. security posed by terrorists armed with NBCW, by foreign ships in U.S. ports, or by short-range ballistic or cruise missiles launched from ships stationed off the U.S. coasts. But the intelligence community has found the threat of shipborne missile attack to be remote, and former Secretary of Defense Cohen noted, "To say that we can't protect against everything [e.g., all possible terrorist attacks] doesn't mean that we shouldn't protect against those that can cause us catastrophic harm."⁵³

There is less controversy over the threat of missiles that can attack U.S. forces overseas and U.S. allies. Over the past few years, the number of countries with short range ballistic missiles (SRBMs) has grown – Scud missiles and basic missile production technology are widely available.

Another concern is vertical proliferation – the improvements and new designs being made by China, North Korea, Iran, Syria, India, and Pakistan. These countries are improving the range and accuracy of their missiles and significantly increasing their numbers of missiles. Basic missiles and missile technology are fairly readily available, and these countries are increasing the sophistication of their missiles. Technologies to watch for include stage separation, multiple warheads, submunitions, improved guidance, and penetration aids.

North Korea reportedly has about 500 Scuds and 100 Nodong missiles and has exported hundreds of missiles to the Middle East.⁵⁴ Israel, India, and North Korea have developed multistage missiles, a key step in building intercontinental missiles. Pakistan and Iran may soon test two or three stage missiles. Vice Admiral Wilson said that he expects "the number of ballistic missiles with ranges between 500 and 3,000 kilometers to increase significantly during the next 15 years and to become more accurate and destructive. Likewise, the potential for widespread proliferation of land attack cruise missiles is high. ...

⁵²(...continued)

International Peace, Non-Proliferation Project Issue Brief, vol. II, no. 13, Sept. 10, 1999. Comments on the 1999 intelligence estimate and on the report of the Commission to Assess the Ballistic Missile Threat to the United States.

⁵³Sciolino, p.1.

⁵⁴Schwartz, Thomas, General, U.S. Army, Commander of United Nations Command and ROK/U.S. Combined Forces Command. Testimony before the Senate Armed Services Committee, March 7, 2000.

Major air and sea ports, logistics bases and facilities, troop concentrations, and fixed communications nodes will be increasingly at risk.”⁵⁵

The new medium-range missiles are “significantly altering strategic balances in the Middle East and Asia.”⁵⁶

Another dangerous trend is the spread of production technology, as North Korea, China, and various groups in Russia have helped other countries design, test, and produce their own missiles. With their help, Pakistan and Iran test fired medium-range ballistic missiles in April and July 1998 respectively. The Russian and Chinese governments have promised to restrict missile technology exports, but it is not yet clear they will be able to do so or are committed to the effort. While North Korea is voluntarily abstaining from missile flight tests, it has not agreed to limit missile developments, deployments, or exports. Even Iran, Libya, and Egypt have been identified as sources of missiles or some missile production technology.

Assessments

Although the potential scale of NBCW warfare has diminished with the end of the Cold War, the number of countries or groups that could initiate a nuclear, biological, or chemical attack may be increasing. The number of countries with missiles is increasing, and countries have frequently used missiles in combat or as a tool of intimidation. The zone of particular concern spreads from North Africa across the Middle East, through South Asia to Northeast Asia. Within this band of countries, Israel, India, Pakistan, and China reportedly have nuclear weapons and are working to improve their warheads and delivery systems. North Korea probably has nuclear weapons and Libya, Iran, Iraq are trying to develop nuclear weapons. Chemical weapon and missile development programs are rife in this zone, and several of the countries are reportedly developing biological weapons.

Russia supplies Iran civilian nuclear, biological, and chemical technologies that enhance Iran’s weapons programs. In the past, China has supplied nuclear weapons technology to Pakistan and CW production equipment to Iran but has apparently improved its export control policies in recent years.⁵⁷ North Korea, China, and Russia continue to be primary suppliers of missile technology. Some countries in the Middle East have acquired the means to produce and develop missiles and are potential or actual suppliers to less advanced countries.

According to Vice Admiral Wilson, the Director of the Defense Intelligence Agency, “All told, the prospects of limiting proliferation are slim, and the global WMD threat to US-

⁵⁵Wilson, p. 11.

⁵⁶Director of Central Intelligence, February 2, 2000, p. 5.

⁵⁷U.S. Director of Central Intelligence. “Unclassified Report to Congress on the Acquisition of Technology Related to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 January through 30 June 1999,” pp. 9 and 10

allied territory, interests, forces, and facilities will increase significantly.”⁵⁸ A former head of CIA’s Nonproliferation Center concluded that the United States and its allies are not on top of the NBCW proliferation problem, “We are not even staying even. We are slipping.”⁵⁹

Former Secretary of Defense Cohen described the dangers posed by the “more than 25 countries [that] either have or may be developing nuclear, biological, and chemical weapons,”⁶⁰ and said:

America’s military superiority cannot shield us completely from this threat. Indeed, a paradox of the new strategic environment is that American military superiority actually *increases* the threat of nuclear, biological and chemical attack against us by creating incentives for adversaries to challenge us asymmetrically.

In December 2000, the National Intelligence Council reported, “The probability that a missile armed with WMD would be used against US forces or interests is higher today than during most of the Cold War and will continue to grow.” It predicted that between 2000 and 2015, “the likelihood will increase ... that WMD will be used either against the United States or its forces, facilities, and interests overseas.”⁶¹

⁵⁸Wilson, Thomas R., Vice Admiral, Director, Defense Intelligence Agency. *Military Threats and Security Challenges Through 2015*. Statement before the Senate Select Committee on Intelligence, February 2, 2000, p.10.

⁵⁹Oehler, Gordon C. *Conference on Countering Chemical and Biological Weapons: The Threat*. Jane’s Information Group, Nov. 19, 1997.

⁶⁰Office of the Secretary of Defense. “Proliferation: Threat and Response 1997,” November 25, 1997.

⁶¹U.S. National Intelligence Council. *Global Trends 2015: A Dialogue About the Future with Nongovernment Experts*. NIC 2000-02, December 2000, p. 38 and p. 9.