

The London bombings on July 7th 2005 have made a profound impact on many aspects of British society and have made other nations reevaluate their own positions on the global issues of terrorism. These acts of hostility have not only unbalanced the political infrastructure of the British government, but have also disrupted the entire fabric of British society. There is virtually no facet of life in Great Britain that has not been affected in some way by the bombings including the cultural, political, social and economical spheres. As a country that is a major player in global politics and economics, England must answer many fundamental questions regarding its role in the global trends of terrorism and its own identity as a nation. Deep-seated issues such as individual freedoms, human rights, and foreign policy must be balanced with the countries ability to defend its self against future assaults against the British public. England's ability to cope with these issues may not only provide a greater sense of security for the country alone, but may also set a standard by which other nations can help defend their soil against similar acts of aggression.

Terrorism has assumed a vastly different face than may have been seen only a decade ago, and it continues to evolve (Atron 127). Although terrorism has existed for hundreds of years in many forms, there has been a recent shift in these radical's goals, methods, and ability to perform their actions (Atron 127). In the past many terrorists had very specific goals such as the freedom of political prisoners or the removal of a foreign force from a particular country, but recent terrorists have been fighting for an ideology that is not quite so transparent. The backing of these terrorist groups by larger organizations such

as al-Qaeda is no longer a necessity, and in many cases it is unclear who is responsible for the planning and execution of these attacks (Webster 2). With the availability of weapons of mass destruction such as biological, chemical, or radiological weapons, a new dimension of terrorism is produced (Webster 1). Globalization has also changed the way terrorist can operate. With an increased ability to communicate and access information, terrorists can be more effective than they have in the past. This new dynamic aspect of terrorism requires equally new methods to combat these fanatics.

Great Britain's political system has had to make great adjustments since the 2005 London bombings. After the bombings, it was made apparent that the British government must alter the way it defends itself against terrorists and adjust to the transformation that terrorist groups have undergone (Norman 4). Great Britain has produced legislation that would ban any persons who have committed terrorism elsewhere from entering the country, has hired 200 more anti-terrorist agents, has made it possible to deport people who plot or encourage terrorism, and has increased monies to be spent on preparing the nation against terrorist attacks (Evans 1). New technologies, such as surveillance and first response equipment, are also being developed to prevent or prepare the country in the event of future terrorist attacks (Brown 2). An increased sharing of intelligence between federal and local authorities is being encouraged. Tony Blair has developed a twelve point plan to prevent future attacks; however, many of the points have not been approved by parliament and of those that have many are not strictly

enforced (Ford 1,2). Although many steps have been put in place to protect the nation, there is still a vast amount of work to be done to fully prepare the nation for a terrorist attack.

Great Britain, as well as many other European nations, has adopted a multiculturalism policy which allows immigrants to remain immersed in their own culture without adjusting to the British way of life. Many people believe that this strategy has only proliferated terrorist ideals and has failed as an effective method to deal with immigration into the nation. Many Islamic individuals enter Great Britain without ever sending their children to British schools, being exposed to British ideals, or integrating into British society (Gallis 2). Individuals can enter Great Britain and take advantage of the freedom offered by the country while still holding on to the ethical standards offered by their country of origin. It is believed that this practice may be responsible for second and third generation individuals embracing many of the extremist views shared by terrorist organizations (Gallis 4). Most of these Islamic communities' possess their own mosques and it is suspected these religious institutions help foster or even encourage terrorist activities (Gallis 7). It has been proposed that Great Britain should alter its policy on multiculturalism in order to procure a nation devoid of terrorist activity.

As Great Britain's political sector has been affected by the threat of terrorism, so has the economic infrastructure of the nation. The aftermath of the 2005 bombings has severely altered the economics of the nation in several ways. Tourism had fallen

approximately 30 percent directly after the bombings and about 6 percent for the year. Although this appeared to be only a temporary phenomenon, the nation's economy still felt the impact of the reduced income, and the tourism trade is still down if only by marginal amounts ("tourism numbers down" 1). Business has also felt the impact of the bombings, and this is especially true in the stock market. Although the impact may not have been as detrimental to the economy as the 9/11 attacks in the United States, the initial panic and delay in trading had hurt Great Britain's economy as well as other economies around the world (Landler 1). The economical impacts are not a localized phenomenon, and a terrorist attack in any country that is a major economic player in the global economy can influence the economies of many nations around the world. This fact is one of the unfortunate consequences of globalization. One of the major concerns of business is the possibility that these institutions may be the direct target of terrorist attacks (Landler 3). The effects of terrorism are a major concern for businesses of all types including financial institutions, large corporations, and even the sciences and this trend is seen in a global context.

Great Britain is a nation composed of many cultures, religions, and ethnic groups. This fact can complicate the cultural impact terrorism has on the country. A large portion of Great Britain's population is Muslim in origin, and terrorist attacks may foster animosities between the general population of Great Britain and these particular ethnic groups which in some cases even lead to violence (Gallis 1). Although the majority of the Muslim community may not support the views of the extremists, it may be perceived that Muslims in general are responsible for these attacks, and a negative image of

Muslims is often portrayed. The cultural fabric of Great Britain, or any nation, can be thrown into turmoil by stereotyping and supporting ideas that may not be completely true. Although one may not think of Muslims as being a part of Great Britain's traditional culture, nevertheless these groups have come to make up an integral part of the cultural diversity of the country (Rushdie 2). It is important to comprehend how Muslims view themselves in the context of a citizen of Great Britain and how they perceive the more extremist factions of the Muslim community. Most Muslims living in Great Britain are actually patriotic and feel that the extremist groups are not a good representation of their community (Rushdie 1). They also believe the radical Islamic groups are basing their ideals off of beliefs that held true in the 8th century and should no longer be relevant in the modern world (Rushdie 1). To understand the cultural implication of terrorism is an important step in solving many of the problems that terrorism presents.

Terrorists prey on the fear instilled by their acts and flourish from the attention they receive from the media and similar organizations. Many of the actions of terrorists are drastic and require drastic measures to counter their attempts to spread terror and violence to the public. Some of the steps taken against these terrorist organizations have a direct impact on the society they mean to protect. Issues such as Individual freedoms and human rights are constantly at odds with the anti-terrorist measures and can have an extreme social impact on a nation (Norman 2). Proposals such as the detainment or deportation of suspected terrorists are constantly included in the legislation and force the citizens of a nation to reevaluate the questions of the importance of freedom over their own safety and national security (Norman 3). Great Britain has been toiling with these

dilemmas ever since the 2005 bombings, and the social impact of these fundamental issues have effected the entire population of the country. Privacy issues have also been of grave concern to individuals living in British society (Norman 2). Many people feel that the government is infringing on their rights in the name of national security. These issues are not only felt in British society, but have become a subject of global concern.

In the wake of the 2005 London bombings, Great Britain and many other nations have learned of their vulnerability to such attacks. Their preparedness and ability to deal with terrorism was brought to the attention of the world, and the need for reformation in these areas was exposed. Questions, such as how to respond to a larger scale attack that may involve weapons of mass destruction and how to better protect the nation, were raised. Albeit these attacks were a horrible thing, there are many lessons to be learned from such actions. Great Britain is in need of many reformations such as better communication between law enforcement agencies, giving information to the public, more advanced screening processes for individuals entering the country, laws that permit the government to investigate individuals suspected of terrorism more efficiently, the man power to protect the nation, and an increase in science and technology to prepare for and prevent future attacks (Ford 4). Although these all seem like viable options to make the nation safer, there are many obstacles that must be overcome to make this legislation occur. Not all of these options are supported by the public and the government may not wish to divert the large amount of funds to make these things manifest into a reality.

The development of science and technology can be an important asset to the prevention and response to terrorist attacks. With the threat of biological, chemical, and

radiological weapons, science can offer solutions to many of these dilemmas. From the development of vaccines to biological threats to improve equipment used in detecting terrorist activity, science has been and will be an integral part of the fight against terrorism (Adams 4). Not only is science an immense advantage to fighting terrorism, but it has also been effected by the global trends in terrorism. Scientific institutions have also become a suspected target of terrorist attacks, especially those dealing with radiological, chemical, or biological material (Adams 2). Most scientific institutions receive a vast majority of their funding from the federal government, and terrorism has severely affected where that money is distributed. Institutions involved in research in areas associated with terrorism have been receiving more funding than those interested in things such as biomedical research (Adams 7). This change in funding can adversely affect many institutions whose funding has recently been downsized.

Terrorists are people or organizations that have little or no political power, so they deploy methods that draw attention to themselves and inspire fear into a general population. It is unlikely that a government will ever be able to change the views of these radical individuals or organizations, but they can find methods to better prepare and protect themselves from terrorist activities. In a world where globalization is a dominant entity, terrorism can have far reaching affects. Nations can also use globalization to their advantage by learning from the mistakes and successes of other countries. The London bombings were only one example of how terrorism can affect a nation, and the lessons learned from this venture can be used by other states to better prepare them selves for similar attacks. It is impossible to completely stop terrorism or to be prepared for any

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form of attack, but a better sense of preparedness can save lives and reduce the impacts
terrorism can have on all aspects of a country.

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Science and Terrorism:

In the wake of the July 7th 2005 London bombings, it has come to the attention of the scientific community that these bombings and other similar acts of terrorism could have a profound impact on many of the fields of science. The London bombings allowed the scientific community to assess its preparedness to such an attack and evaluate what measures should be taken in the future. This event was not an isolated incident, and the global implications of these attacks must be realized. The effect of the London bombings and similar attacks are a concern for scientists in almost every nation and in all fields of study. A conference was held on November 28th 2005, to address these issues and included scientists from 31 nations of many different fields of expertise. The issue addressed at this conference was the scientific community's responsibilities and response to these attacks, which can be broken down into several important issues. The issues that were discussed in great detail were the effect of terrorism on scientific funding, the use of science and technology to prevent future attacks, the use of science and technology in response to an attack, scientific institutions as a potential target of terrorist acts, and the use of science and technology by terrorist.

Scientific funding can be considered the core of the scientist's ability to address the problem at hand. The majority of scientific funding is received through government grants, and this is true of academic, medical, and technological research (NIH: Grants and Funding). Industry is the second largest source of scientific funding; however, industrial

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funding is determined by different motives than funding that may be received from government institution (NIH: Grants and Funding). Since the London bombings, the direction of monies distributed by government institutions toward scientific endeavors has been vastly altered (NIH: Grants and Funding). Many institutions that focus on the research and development of tools to fight terrorism or the development of vaccines against biological agents that may be used in terrorist attacks have been awarded heftier grants than previously seen before (NIH: Grants and Funding). This new direction of funding has not come without a price, and scientists involved in academics and biomedical research are having a difficult time obtaining the funds to successfully continue much of their work (NIH: Grants and Funding). This trend is not exclusive to the London bombings. After the 9/11 attacks in New York, there were similar shifts in scientific funding (NIH: Grants and Funding). This funding issue directly effects the scientific community as a whole, and while is beneficial to many scientists it has also made life difficult for others. When considering the scientific community's responsibility to global trends in terrorism, money is always one of the first obstacles that must be overcome.

A major issue in science's responsibility in regards to terrorism is how science can find new and innovative ways to prevent future attacks and respond in the event of an attack, especially concerning attacks involving radiological, biological, or chemical weapons. After the London bombings, scientists were recommended to immediately implement existing technology in order to better control nuclear weapons, create more vaccines, protect shipping containers, ventilation systems, and key elements of the power grid (Oxely 2). It was urged that scientists also begin researching new technologies for

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an updated power grid, treatments for emerging pathogens, better emergency equipment, blast and flame retardant buildings, and new sensor equipment to detect threats such as bio-terror agents (Oxely 2). The British government also urged the implement of working and secure telecommunications and computing networks; however, this was not completely in the government's control because most of the funding for these technologies primarily comes from the industrial sector (Oxely 2). There are countless examples of how the scientific community has contributed, and is still contributing, to the protection of nations from terrorist attacks, and perhaps science is the best defense against future terrorist activities.

Many of the same technologies that protect nations from terrorist attacks can also be implemented in the response in the event of an attack. A nation can never be prepared for all scenarios; however, having a good plan in effect can lessen the damage and can prepare first responders in the event of an actual attack. It is the responsibility of scientists and the government to have ample communication networks in place in the event of a terrorist attack (Cronin 51). This is really the first wave of defense, and without an efficient communication network any other plans that are in place to respond to a terrorist attack may not be effective. Communications are not only important between emergency centers and the first responders, but there must be active communications between these groups and the scientists themselves (Cronin 54). The responders must know how to utilize the equipment designed by scientists and interpret the data these devices may present. It is important that the scientists are in direct contact with the emergency response centers, who in turn can communicate any information to the first responders.

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The first responders to a terrorist attack are an integral part of ensuring the lowest amount of casualties from the attack, especially when biological, chemical, or radiological materials are employed. It is the responsibility of scientists to develop the equipment used by first responders. This equipment may be important in detecting the use of radioactive, chemical, or biological weapons and protecting the first responders if these agents are present (Stewart 39). The utilization of decontamination units, safety suits, and vaccines would be the responsibility of many of these first responders and the efficiency and effectiveness of the equipment is the obligation of the scientists who develop them (Stewart 41). Although it is the scientific community's responsibility for the development of these technologies, it is also the government's responsibility to ensure the first responders are properly equipped and trained in the use of this equipment. The London bombings have opened the eyes of the government and the scientific community to many deficiencies that currently exist concerning the technologies that are in place to respond to a terrorist attack. Many steps have been installed to correct these deficiencies; however, in the event of a major catastrophe the preparedness of the government may not be to its full capacity, and the government and scientists must continue to work on the development and employment of new technologies (Cronin 58).

Although new technology is instrumental in preventing and responding to terrorist attacks, it can also be used in the commission of these very same acts. Technologies involved in biological, chemical, and radiological agents are utilized in many sectors of the sciences, and while under strict government regulations it is still the responsibility of scientists to ensure these materials are handled properly. Materials such as cesium-137, cobalt-60, americium, and many radioactive isotopes are used on a daily basis in

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academic research, the oil industry, and medical centers (Kelly). There is also a host of dangerous chemical and biological agents stored at these facilities such as anthrax or smallpox strains (Kelly). Any of these materials could be potentially employed in the use of a “dirty bomb,” with catastrophic effects (Kelly). Although these materials are under fairly tight regulations, restrictions should be increased in light of the potential threat of terrorism. There was a case that occurred at Fox Chase Cancer Center in Philadelphia PA, USA where a company sent too much of a radioactive isotope to a lab (McVicker). This material went unnoticed and was discarded in the trash and eventually made its way to a land fill (McVicker). The material was eventually recovered; however, the incident was a good example of the failure of government restrictions and of improper handling by the scientists involved (McVicker). Initiatives have been put in place since the London bombings to reduce access to these materials, fund material recovery and storage facilities, review licensing and security requirements, including inspection of all radioactive materials, and fund research to find alternatives to using these materials (Kelly).

Besides the use of materials for weapons, terrorist use other technologies to their advantage. The same communications used to safeguard against terrorism can be employed to aid the terrorists in their networks. With few restrictions on internet use, cell phones, and other forms of communications, terrorists develop new and innovative ways of carrying out their attacks (Kennedy 2091). This aspect of technology leads to more organized and therefore more dangerous terrorists. It is the responsibility of the government to regulate these forms of communications; however, scientists need to develop technologies that will make the government’s job easier. The employment of

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current technologies or the creation of new methods to track and screen communications between terrorists needs to be employed. This is a complex situation, because one must also take into account individual rights when attempting to monitor the communications of its citizens (Kennedy 2091).

With all of the responsibilities scientists have in preventing, preparing for, and responding to terrorist attacks, it may be overlooked that these scientific institutions could be possible targets of these attacks. Nuclear energy facilities, conventional energy sources, agriculture, transportation, water supplies, information and technology centers, and even academic institutions are all viable targets for a terrorist assault (Hoyt 128). In fact, an attack on facilities such as these could cause extensive damage and chaos within the infrastructure of a nation. Protecting against such attacks is also a joint venture between scientist, government, and the private sector. It is the responsibility of scientists to develop and employ technologies that can protect or respond to these attacks, the responsibility of government to fund and install legislation to protect from these attacks, and the responsibility of industry to provide adequate security and care when running their companies. On March 2005 the Delhi police had arrested two members of a terrorist cell in Uttamnagar West Delhi, India (Pereiri 21). After interrogation, it was discovered they were surveying Bangalore for targeting in the software industry (Pereriri 21). Although India is a long way from London, there is no reason to doubt that similar attacks may be planned for the city. Incidents like this only reinforce that the scientific community is a potential target for such attacks.

The London bombings demonstrated that terrorism is alive and well in the world today. Although these bombings were despicable acts, they may have opened the eyes of

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scientists and the government to their current strengths and weaknesses in their preparedness for a terrorist attack. The scientific community has made great strides since the events on July 7th 2005; however, there is much to be done to protect the citizens of Great Britain and of other nations around the globe. There have been many recommendations by the government and other institutions on what needs to be done, but not all of these are being carried out with great efficiency. It is also the government's responsibility to fund many of these scientific endeavors or to contract private industries to aid in response to the terror threat. The scientific community has an immense task in the near future to implement many of these plans of actions. It is up to the scientists and government alike to provide security and help to their nation. There has been a great many lessons learned after the London bombings, but whether these lessons are taken to heart will be the task of the scientists and government agencies that fund them. Science may be one of the most effective tools in combating the global threat of terrorism.

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