Academia and Technology: A Special Relationship

19 February

By Stephen Bowers, PhD

Abstract:

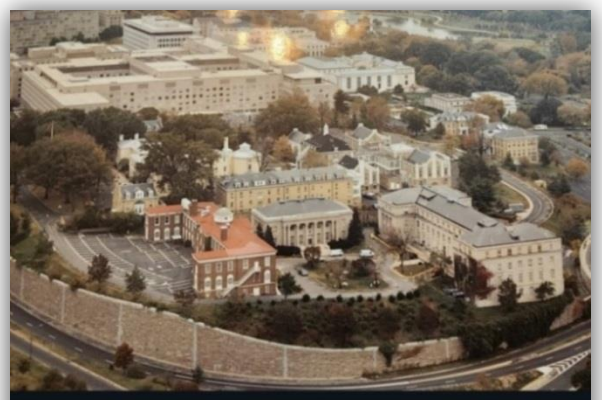
This article explores the role of innovation and collaboration between academia and industry in advancing national security, with a particular focus on the contribution of the Central Intelligence Agency's Office of Technical Service (OTS). Through the case study of Larry Plating, a chemist who worked at OTS, the study highlights the importance of technical and scientific skills in the development of new espionage devices and techniques that support intelligence operations. The article also discusses the challenges and risks associated with intelligence work, as well as the necessity for a balance between technological innovation and ethical considerations. Through the partnership between OTS and the Rochester Institute of Technology, Plating's example illustrates how cooperation between different sectors can enhance national security effectiveness and contribute to managing emerging threats.

According to anthropologists, early men would not have endured without their ability to develop innovations in their lifestyle. They became skilled tool makers and are credited with making spears and hand axes made from flint. With this, they were well on their way to the creation of implements that enhanced their prospects for survival in a hostile environment.

In the modern era, innovation is still essential to our very survival. Today both commercial and governmental matters place an increasing emphasis on innovation and efficiency. Our national security apparatus provides one of the best illustrations of the need for innovations.

Decisions about national security issues are all too often determined by organizational power and bureaucratic interests. Organizations that are not especially prominent are at a disadvantage at funding time. If they lack direct access to senior leadership they will struggle to secure necessary resources.

While much has been public about the best known of these organizations, the Central Intelligence Agency, much less is known about the CIA's Office of Technical Services. It was an outgrowth of World War Two's National Defense Research Committee. The OTS describes itself as an organization that is determined to undertake an examination of its role ln a radically reoriented and rapidly changing world.



Site of Office of Technical Services

While the OTS is a contemporary organization, its history began in October 1942 with the creation of the OSS Research and Development Branch. After the formation of the Central Intelligence Agency, the

Technical Services Staff which was created in September of 1951 became a precursor to the OTS. According to Robert W. Wallace who was the Director of Technical Service, the OTS has made countless contributions to clandestine mission of the CIA's Directorate of Operations. (https://www.spymuseum.org/host-an-event/spy-speaker-series/bob-wallace/) With this, he stressed the role of the OTS inn supporting the CIA's Directorate of Operations. However, its administrative home is the Directorate of Science and Technology.

In order to fulfill these responsibilities, the OTS partnered with an important educational institution, the Rochester Institute of Technology. While the most common perception of OTS is that it only handles tradecraft, its mission clearly goes beyond this responsibility. (Changemasters: Office of Technical Service, January 23-24, 1990, p. vii) OTS officers have often been forced into dangerous situations in the performance of their official duties.

Perceptions of the work of OTS also vary greatly. The first assumption that is often made of OTS is that its personnel are scientists who work safely within the confines of laboratories or research facilities. Their professional lives are seen as calm, consistent, and always at a distance from dangerous venues populated by CIA agents who resemble James Bond characters.

Yet, there is a second assumption that is seen in less publicized accounts of the adventures of the creators of tradecraft devices who go into the field to deliver or service their inventions. The life of OTS veteran Larry Plating reflects the often dangerous adventures as well as the research endeavors of a chemist.

Larry Plating was completing his college education in the 1960s, a decade that has been generally identified

as reshaping American society and challenging our traditional values. These were long-term changes that altered our political and social characteristics. This was also a time of tremendous changes in the technologies available to both industry and government. Many historians have focused on this decade because it witnessed domestic and foreign instability, thus forcing many Americans to view the country in a very different way.

In explaining the career path that he took, Larry Plating says that he was shielded from the tumultuous and divisive events of this decade. This was an era shaken by the Vietnam War and the increasingly violent antiwar protests with bombings of places such as the mathematics center of a large university that had taken a contract from the defense department. These protests spawned countercultural movements that challenged the very foundations of our way of life and ushered in a "generation gap" that accelerated the polarization of American life. As Larry was a war orphan whose father died during his military service, thanks to Abraham Lincoln, he was not subject to the current draft laws therefore his academic and professional interests pulled him in a different direction.

With the emergence of countercultural movements and an increase of international threats, many young people were facing spiritual, political, and military uncertainty. It was widely recognized that they suffered from malaise about their values and life in general. Social unrest had become the norm with riots sweeping through more and more American cities such as Detroit, Watts, and Philadelphia. Respect for authority had been eroded and young people, facing the prospect of participation in an increasingly unpopular war in Vietnam, had lost faith in their own government.

The American educational system, long praised as one of the best in the world, was beginning to feel the effects of a professorial class that expressed doubts about our system without offering an understanding of its values. This meant that students in the humanities were learning less about problem solving as they looked at our society and our government.

In his academic work, Larry Plating's studies were not confined to the humanities but were focused on process management and various aspects of industrial engineering. In short, they directed his interests toward problem solving. The skills and knowledge gained in this pursuit contributed to his understanding of a multitude of challenges in professional and personal matters.

As a chemist rather than a political scientist or historian, he looked at concerns from both a practical as well as a systemic perspective. This meant examining each task in terms of the accomplishment of specific, narrow objectives within the framework of overall institutional responsibilities. It also meant that he could be comfortable within the framework of a larger organization motivated not by financial profit but by service to larger concerns.

As Plating developed his career path, he was able to take this perspective in making choices while expanding his academic understanding. Consequently, as he has expressed it, he was blessed by a career that enabled him to fulfill both philosophical and intellectual needs.

In the middle of the Sixties when anti-establishment values and alternative philosophies were proliferating, this was no small accomplishment. The decade spawned a permissive society in which hippies and "flower children" were free to bask in the aura of drugs and psychedelic music that extoled the virtues of simply

being somewhere else, far removed from reality. In short, his fellow students were less serious about their world.

Typical of the era was the 1967 anti-war demonstration that took place in Washington, DC. The "flower children" proclaimed their determination to end the Vietnam War by levitating the Pentagon. The air was filled with the aroma of marijuana smoke and the "hippie anthem" of Jefferson Airplane's "White Rabbit". The covers of news magazines heralded this march in which 80,000 surrounded the Pentagon as the harbinger of things to come.

Like the 1967 "Summer of Love", an event which is still memorialized by former hippies, these demonstrations degenerated into violent self-indulgence. In spite of that, the ferocity of the time served to intimidate politicians and elites that soon expressed their sympathy with the anti-war activists.

The result was not an era of tranquility and love, but an increasingly troubling environment that shaped the international environment and presented new challenges for institutions that needed to respond to these threats.

One aspect of this global environment was that an increasing number of Americans who were acting on behalf of the United States found themselves in captivity under brutal conditions from North Korea to North Vietnam. Most Americans knew little about the conditions faced by captives who had so often been serving in the US military. Nor did they understand what motivated such people to take risks in serving their country. Brutality and isolation were the norm for those in that situation.

It was during this period that Plating was working as a chemist with the Research Development facility of Parke

Davis which was a pharmaceutical company based in Detroit. He was conducting instrumental analysis of organic chemicals when he was sought out by CIA recruiters. At that time he failed to see the connection between his skill set and the possible requirements of an agency associated with clandestine communications, secret writing, the creation of false documents, and the development of concealment devices. When offered a job, he was briefed about his responsibilities and understood the specific tasks to be undertaken each day. Eventually, he came to fully understand the world of secret writing and how his work would create opportunities for communication with Americans being held captive under inhumane conditions.

The challenge of communication had an impact on almost every aspect of intelligence work. This challenge was reflected in training for service in the field of intelligence. That training included the examination of basic forms of direct communication such as meetings, recognition signals, and the use of cutouts or transmission points. Meetings between a case officer and his agent are the most vulnerable form of communication and were to be rarely used. Secret writing which became Larry's specialty was preferable. (Philip Parker, editor. *The Cold War Spy Pocket Manual*, Casemate Publishers, Oxford, UK 2015)

Commercially developed spy camera

Meetings in general were an occasional necessity and the OTS scientists developed tools that would help their officers survive such encounters. Consumption of alcohol was common at meetings, especially in East Europe, and the officer's skill was often a function of his ability to drink a lot without suffering from the effects. One of the tools to help an officer was phony

alcohol, a beverage that had the smell and taste of Scotch, for example, but did not contain alcohol. If the officer was being targeted by an enemy agent, this enabled him to appear to be drinking without endangering himself.

The recruitment of the scientists needed for intelligence work was hindered by the special conditions of government service. First, their salaries were significantly less than those in the private sector. Second, while these people were professionals committed to the basic concepts of research, they could not publish their research or share their findings in academic conferences. Moreover, they could not obtain patents for their findings nor would they receive the prestige that private scientists could enjoy. They had to be motivated by the notion of service to their country while working in secret.

Larry Plating began his work with the CIA on 2 January 1970 and spent eighteen years working undercover. During this time he would ostensibly be a civilian employee of the Navy. Beginning in 1970, he was introduced into a mysterious world of secret writing and tasks related to secret communications. His skills as a chemist meant that the CIA did not have to send him for special training so often associated with CIA operatives. Because of his skills, he would be working throughout his career in areas with paper making and the task of determining the authenticity of foreign documents. He would be studying adhesives, material sciences, engraving, sculpting, and painting. His practical assignments pulled him toward secret messaging and the systems that carry such messages. Following that, he had a tour in secret writing counterintelligence and later in operations tradecraft

training. Plating was also sent to Carnegie Mellon University for a short course in technical management.

Secret writing should not be confused with codes and ciphers which conceal the meaning of a message. Secret writing, by contrast, conceals the message itself. There are numerous techniques for secret writing – such as invisible ink – and they can be traced to ancient times. Because they used an acidic citrus juice – most often lemon juice – the secret writing people were referred to as lemon squeezers.

All of this prepared him for service in hostile intelligence environments. Throughout this time he would be creating new systems while studying existing systems. He had to understand how they worked so he could determine their shortcomings, if any, and work to correct them. The administrative vehicle for his work was the Office of Technical Services, a mundane sounding entity which played an essential role in covert operations.

There was never any doubt about the utility of this work and he knew that people's lives depended on how well he accomplished a variety of tasks. He did not see the beneficiaries of this work but realized their survival depended on what he was doing. Eventually, he found himself serving in a variety of overseas locations working as an operational tradecraft technician. In that capacity, he was supporting people whose lives were in danger and whose success or failure would be determined by the devices he created and serviced.

The fascination of this work was enhanced by the realization that even though some might have viewed him as a technician, "a lemon squeezer" he was receiving much of the same training as operations officers. This was not always a simple and direct process. A basic rule of intelligence work is the "need to know" principle. In the early days, the field agents were often distrustful of the technical service staff members who were younger and not required to take those gadgets into the field where dirt and dampness could undermine their performance. The "need to know" principle created an artificial barrier between his and the consumers of the OTS work.

Commercial recording devised were used

Eventually, field agents recognized that technical service people had a legitimate need to know about the specific requirements of an operation. To develop instruments that worked in the field, it was absolutely necessary to know what they would encounter when they were in an operational environment. Technical requirements would vary greatly if the agent had to crawl through a swamp or make his way through a desert. If an operative is using sensitive equipment, the impact of extreme heat will be very different from that of humidity and moisture.

Larry soon learned that the complexity of implements varied greatly and in accordance with the mission the field agent had to accomplish. Electronic devices that had to be operated outside were usually sensitive and, if not cared for in a precise manner, would fail to work. Even worse, by simply looking at it you could not always tell if it had suffered through mistreatment. By

contrast, many concealment devices were hidden in secure places where weather conditions had less impact on them.

Even if a device is only used indoors, humidity is a factor. High humidity can damage the internal components of an electronic tool. A field agent using these devices outside faces even greater challenges and must constantly be on guard for condensation. Any time warm air comes in contact with a cool surface, condensation can happen. When there is condensation within electrical components, the result can be rust and corrosion. With this, the work of the technician is undermined and the field agent is poorly served.

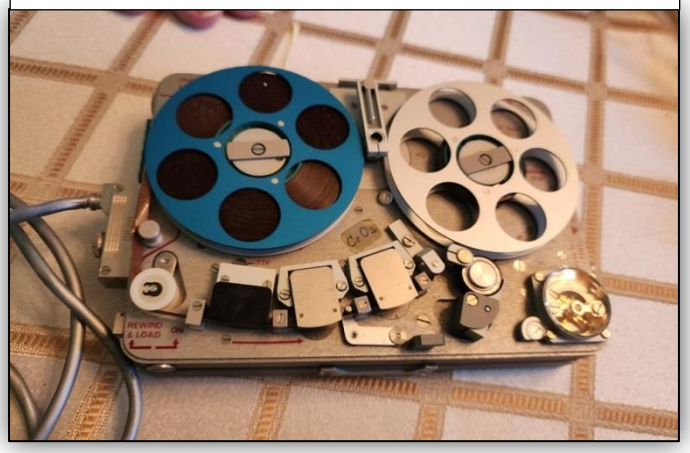
A humid environment is generally associated with heat and together they constitute a threat. While most electronics have internal fans that will circulate air, those fans can cause noise that might expose a field agent. Nothing is worse than sending an agent out with a gadget that is supposed to help him accomplish his mission but, in fact, prevents him from doing that. If you are working in a nice office, the air temperature can be easily controlled. If you environment is a jungle in South East Asia, it is an entirely different and potentially destructive matter.

Regardless of the physical environment, his task during the first eight months was to study clandestine communications tradecraft. This meant developing systems for hiding messages in plain sight. Message preparation was an essential part of this work.

In order to accomplish this, a letter containing a secret message must not attract any attention from security personnel that might examine incoming mail. Certain addresses or post marks would guarantee that

the communications would be torn apart and never make it to the intended recipient. On the other hand, there were addresses regarded as safe and Agency personnel recruited people to share their private addresses as "mail drops" for secret communications.

Early devices were primitive



Larry's work in OTS related to the fundamental elements of tradecraft. Since every operation is dependent on some kind of tradecraft, during his years with this organization he developed an understanding of most of the CIA's activities. The work done by Larry and his colleagues eventually determined the success of all of those operations.

The development of new devices for surveillance was an essential part of this work. Before Plating's arrival at OTS, work had been conducted on cameras that could be easily hidden and listening devices to record conversations that were an important part of surveillance. Most of those early devices were not particularly sophisticated but they were more effective than other items that might have been available. They did, however, represent important steps in tradecraft developments.

In general, there was an emphasis on the development of new devices, but many of those could be found among commercially available gadgets that could be employed

for intelligence related tasks. Commercial cameras such Pentax and Ricoh were often employed in intelligence operations. In this respect, technological innovations for US special operations were different from those employed by Britain. In equipping the British Special Operations Executive, London preferred to create their own laboratories and employ government scientists. By contrast, America's Office of Strategic Services turned to existing industries which would use their own facilities to create the necessary tools.

Especially significant during Plating's service in OTS was the development of miniature bugging devices. As you can see pictured here, this bug could be easily hidden inside the targeted facility and will be beyond detection by routine observation.

The work of the OTS also involved tradecraft produced by allies' services. The British played an important role in sharing tradecraft. One of the many items that the British shared with the OTS was a Spot Test Outfit that had been produced for the British by the Laboratory Chemicals Group in Poole.

The importance of this device stems from the fact that a reagent is a central part of a chemical reaction. A reagent is a substance that makes a chemical reaction possible and is used in a variety of tests. More recently this is vital in the development of medical countermeasures to provide protection against biological agents. Today there is an exponentially

larger number of potential threats creating a need for protection and this is today as in the past an essential part of the work of chemists in the OTS.

With our usual emphasis on the development of technologies for use by spies, it is easy to forget that the scientists employed by OTS frequently found themselves in dangerous situations. After all, the devices they created had to be delivered to the users and this meant journeys into threatening environments. Although he never carried a gun, in 1975, Larry Plating found himself in a dangerous situation while serving in Southeast Asia.

In fulfillment of his OTS mission he had to fly to Phnom Penh as Cambodia was falling to the Khmer Rouge. This meant flying from Vietnam to Phnom Penh where the airport was almost completely closed. Only a few soldiers were there to demonstrate some vestige of government control. Under fire by a communist RPG7, Plating was thrown back and took refuge in a nearby bunker. He accomplished his mission in several hours and left Cambodia before sunset in order to return to Vietnam.

His dangerous assignments continued in Vietnam, Thailand, and Laos. In fact, he spent five years in Southeast Asia during the turbulent 1970s. Much of his work involved training people in secret writing for their service in confronting communist insurgents who

killed hundreds of trained agents. While he developed close relationships with his students, he never learned what eventually happened to them.

For Larry Plating, service is the OTS brought world-wide travel and was scientifically stimulating. But it also brought danger as well as involvement in the most decisive exploits of a quarter of a century. He not only saw history but was a vital part of the historic events of the Cold War era.

This shows how one individual can be instrumental in harnessing the strength of academia such as the Rochester Institute of Technology with the capabilities of industry in the service of national security. The larger issue in Plating's story is how this chemist became part of a system that stressed innovation and cooperation between industry and government. Even more importantly, it reminds us of the vital role of innovation and partnerships. Without this, the authority of the OTS would have been undermined and its functions allocated to other administrative entities.