***History of Steganography***

Throughout history, a multitude of methods and variations have been used to hide information. David Kahn's The Codebreakers provides an excellent accounting of this history. Bruce Norman recounts numerous tales of cryptography and steganography during times of war in Secret Warfare: The Battle of Codes and Ciphers.

One of the first documents describing steganography is from the Histories of Herodotus. In ancient Greece, text was written on wax covered tablets. In one story Demeratus wanted to notify Sparta that Xerxes intended to invade Greece. To avoid capture, he scraped the wax off of the tablets and wrote a message on the underlying wood. He then covered the tablets with wax again. The tablets appeared to be blank and unused so they passed inspection by sentries without question.

Another ingenious method was to shave the head of a messenger and tattoo a message or image on the messengers head. After allowing his hair to grow, the message would be undetected until the head was shaved again. Another common form of invisible writing is through the use of Invisible inks. Such inks were used with much success as recently as WWII. An innocent letter may contain a very different message written between the lines .

Early in WWII steganographic technology consisted almost exclusively of invisible inks .Common sources for invisible inks are milk, vinegar, fruit juices and urine. All of these darken when heated. With the improvement of technology and the ease as to the decoding of these invisible inks, more sophisticated inks were developed which react to various chemicals. Some messages had to be "developed" much as photographs are developed with a number of chemicals in processing labs. Null ciphers (unencrypted messages) were also used. The real message is "camouflaged" in an innocent sounding message. Due to the "sound" of many open coded messages, the suspect communications were detected by mail filters. However "innocent" messages were allowed to flow through. An example of a message containing such a null cipher from is:

Fishing freshwater bends and saltwater

coasts rewards anyone feeling stressed.

Resourceful anglers usually find masterful

leapers fun and admit swordfish rank

overwhelming anyday.

By taking the third letter in each word, the following message emerges :

Send Lawyers, Guns, and Money.

The following message was actually sent by a German Spy in WWII :

Apparently neutral's protest is thoroughly discounted

and ignored. Isman hard hit. Blockade issue affects

pretext for embargo on by products, ejecting suets and

vegetable oils.

Taking the second letter in each word the following message emerges:

Pershing sails from NY June 1.

As message detection improved, new technologies were developed which could pass more information and be even less conspicuous. The Germans developed microdot technology which FBI Director J. Edgar Hoover referred to as "the enemy's masterpiece of espionage." Microdots are photographs the size of a printed period having the clarity of standard-sized typewritten pages. The first microdots were discovered masquerading as a period on a typed envelope carried by a German agent in 1941. The message was not hidden, nor encrypted. It was just so small as to not draw attention to itself (for a while). Besides being so small, microdots permitted the transmission of large amounts of data including drawings and photographs .

With many methods being discovered and intercepted, the Office of Censorship took extreme actions such as banning flower deliveries which contained delivery dates, crossword puzzles and even report cards as they can all contain secret messages. Censors even went as far as rewording letters and replacing stamps on envelopes.

With every discovery of a message hidden using an existing application, a new steganographic application is being devised. There are even new twists to old methods. Drawings have often been used to conceal or reveal information. It is simple to encode a message by varying lines, colours or other elements in pictures. Computers take such a method to new dimensions as we will see later.