SCIENTIFIC ART OF UNCOVERING THE TRUTH BY BRIDGING JUSTICE AND SCIENCE-SHINE THE TRUTH

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"In reality, those rare few cases with good forensic evidence are the ones that make it to court".- Pat Brown.

Abstract:-Forensic science, untapped history, occupies a unique niche between law enforcement and the courts. Interpret the nature of evidence is analyzed through investigation in the reconstruction of the context of one way street criminal evidence. Fingerprint and DNA analysis(bloodstain patterns, firearms, ballistics, and toxicology) to the "ologies"-anthropology, entomology, and pathology, wildlife forensic compile in forensic science. The universal symbol of forensic science, "microscope" which is strongly modified to explore the depth of crime, reasons of criminal motivation and legal address to investigative questions study is the aim of criminal justice. Both ultraviolet (visible light),Ramman and infrared (IR) lights which help to promote absorption light of higher energy label and atomic bond of molecule are important sources of beam of light in forensic criminology. During autopsies study diseases, the interpretation taphonomic of information and trauma by the forensic odontologists and anthropologists know biological profile of skeleton which leads to identify of victim. Forensic entomologist is identified insects associate death and time of death and crime intersect (drugs, poisons, and location of stolen goods like paint, glass, hair, fiber, soil, impression). Biological evident through DNA fingerprint or 10 million profiling DNA (Combined DNA Indexing System) which is visualized by radio labeling or chemilunescence identify by restriction fragment length polymorphism (RFLP).The major effect of stimulants, depressant, narcotics, hallucinogen are represent by Illicit drugs (cocaine, heroin etc), alcohol are separate of stationary and mobile phase of molecule by both electrophoresis and chromatography by toxicologist to find cause of death.

Keywords:-bloodstain patterns, firearms, ballistics, CODIS, radio labeling, RFLP, hallucinogen.

Introduction:- Beside both fingerprints and DNA analyses, Hyperspectral imaging (HSI) offers significant potential for the detection, visualization, identification, and age estimation of forensic traces, mechanical, electrical, and chemical engineering, and fire science, at the identification of crime victims or criminals encounter frequently. Criminal investigation is an ancient science that may have roots as far back as c. 1700 BCE in the writings of the Code of Hammurabi. In the

code, it is suggested that both the accuser and the accused had the right to present evidence they collected [1]. Analytical chemistry and biochemistry sample detection, mass determination, and structural analysis are acting a key role by Mass spectroscopy (MS). Potentiometric and potentiostatic under the Forensic Electrochemistry builds upon electroanalytical chemistry by focusing upon the detection of chemical species that are linked to crime scenes. Using firearms, the data collection regarding gunshot residue (GSR) during such forensic investigations is used to estimate firing distances, identify bullet holes, and, most pertinently, to determine whether a suspect has fired a gun or not, plays of homicides and violence has increased the role of forensic in criminal investigations. GSR plays to detect inorganic and organic components of barium, lead, and antimony are used of chemometric (combine of square waves of voltammetry (SWV), scanning electron microscopy (SEM), & energy dispersion X-ray(EDX).) treatment of analytical data. Cyborgs application implements the bridge of technology and the human brain. The criminal justice system based on Forensic chemical/biochemical analysis tool that are based subarea of forensic analysis, forensic serology (combine of immunoassays and DNA/RNA analysis), which identify on the type of sample, age, origin, or sex from biological fluids found at a crime scene. A mixture of endogenous and exogenous DNA analysis and PCR inhibitor from durable tissues of bone identify of individuals in crime scenes. To detect DNA polymorphisms using molecular genetics techniques has the major pathways involved in the correction of DNA damage include base excision repair (BER), nucleotide excision repair (NER), single strand break repair (SSBR), mismatch repair (MMR), direct reversal with the photoreactivation activity of photolyases, by recombination and rejoining pathways, or through tolerance with translesion synthesis (TLS). Forensic trace elements are examined by under Fourier transform infrared (FTIR) spectroscopy, UV/visible microspectrophotometry (MSP), pyrolysis gas chromatography/mass spectroscopy (PGC), Raman spectroscopy, X-ray diffraction (XRD), and scanning electron microscopy (SEM) instruments. Biometric indicators spoofing which focus on attacks on automated biometric recognition systems using by live scan technology , feasible in an operational scenario which develop anti-spoofing or liveness detection.

Origin of criminology:- Criminology (from Latin *crimen*, "accusation", and Ancient Greek -*logia*, from *logos* meaning: "word, reason") is the interdisciplinary study of crime and deviant behavior . More than 200 years ago, the root of criminology trace back from criminal justice and penal system. Cesare Beccaries, the National Criminal Justice Reference Service**,** wrote “On Crime and Punishments,” which published in 1764, have called for fitting the punishment to the severity of the crime. After moderate and developing in 20th century, criminology involved seeking to understand crime’s causes by studying sociological, psychological, and economic conditions. The view of J. Rank in “New Criminology” impacts on the base of conflicts between social and economic classes leading to social upheaval. The eyes of criminologist a multidisciplinary approach to criminology motive by greed, anger, jealousy, pride, emotion, want to control, revenge, power, materialistic gain, etc. The potential causes for criminal activity depend on parental relation, hereditary and brain activity, hormones, education, peer influence, drugs and alcohol, easy opportunity.

Fig:1-Criminal Justice.

Fig:2- Criminology VS Criminalistics

Criminology and the legal perspective:- Criminologist focus on the causes of an illegal action society punish through the Government's legal system, prevention and correction of crime. From J.Rank report that criminologist doesn't violate existing law include economic exploitation, racial discrimination, and unsafe or unhealthy work environments. Criminology theory primarily depends on sociological and psychological. The Classical, Positivist and Chicago schools are three predominate theories are bases on Bentham's Utilitarianism theory, applies scientific theory of criminology and social disorganization.

Criminology and Criminal justice:- Criminal justice develop by criminologists which is the application of enforcing of laws and investigating crimes to punish and rehabilitation of criminals. Criminology and Criminal justice are working together to against the crime. The goal of the Criminologists to addressing crime, victimization and relate governmental agendas and generate information.

In general difference between Detective and FBI (Federal Bureau of Investigation) Agent. [Sources: Pay Scale, U.S Bureau of Labor Statistics.]

Detective	FBI
Collect and analyze evidence in criminal investigations.	Investigate terrorism, organized crime, and other major crimes.
Interview suspects and witnesses.	Work with officials in local, state, and federal agencies.
Analyze archival records.	Analyze criminal data and maintain it in databases.

In general difference between Criminologist and Forensic Scientist.[Sources: Pay Scale, U.S Bureau of Labor Statistics.]

Criminologist	Forensic Scientist
Conduct research on crimes and criminals.	Collect analyze physical evidence of crimes.
Identify causes of and solutions to crime.	Work at crime sites and criminal labs.
Predict crimes and suggest preventive measures.	Testify as an expert withness.

Different kinds of weapons and/or tools in crime:- Most common weapons for homicides are Ballistics, Projectiles, Sling, Bow, Catapult, Rocket, Fingerprint recovery, Serial number recovery, Magnetic particle inspection, Chemical restoration, Examination of cartridges, Handguns, Rifles, Shotguns, Firearms, Knives, Body parts including fists or feet, etc and some nitroaromatic explosives toxic substances such as 2,4,6-trinitrotoluene (TNT) and 2,4,6, N-tetranitro-N-methyl aniline (tetryl), nitrate esters, such as ethylene glycol dinitrate (EGDN), glycerol trinitrate (nitroglycerin, NG), and pentaerythritol tetranitrate (PETN), and nitramine

explosives, such as 1,3,5- trinitro-1,3,5-triazacyclohexane, (RDX) and 1,3,5,7-tetranitro-1,3,5,7-tetrazacyclooctane (HMX), as well as mixtures containing one or more of these explosives. Additional explosives include triacetone triperoxide (TATP) and ammonium nitrate (AN), NH_4NO_3 [2] . All explosives are toxic in nature.

Ballistics:-Ballistic means **"to throw"**. Ballistics is the field of mechanics concerned with the launching, flight behavior and impact effects of projectiles, especially ranged weapon munitions such as bullets, unguided bombs, rockets or the like; the science or art of designing and accelerating projectiles so as to achieve a desired performance [3]. A ballistic body is a free-moving body with momentum which can be subject to forces such as the forces exerted by pressurized gases from a gun barrel or a propelling nozzle, normal force by rifling, and gravity and air drag during flight [3]. During the relative brief initial phase of powered flight and the trajectory is subsequently governed by the laws of classical mechanics are guided by ballistic missile only.

In ancient time, near about 64,000 years ago, in Sibudu Cave, at present day South Africa, stones and spears, and the thrown stick were used as a ballistic projectile. In China around 1000 AD, the first devices identified as guns appeared and within the 12th century, the technology was spreading through the rest of Asia, and after that Europe by the 13th century [4].

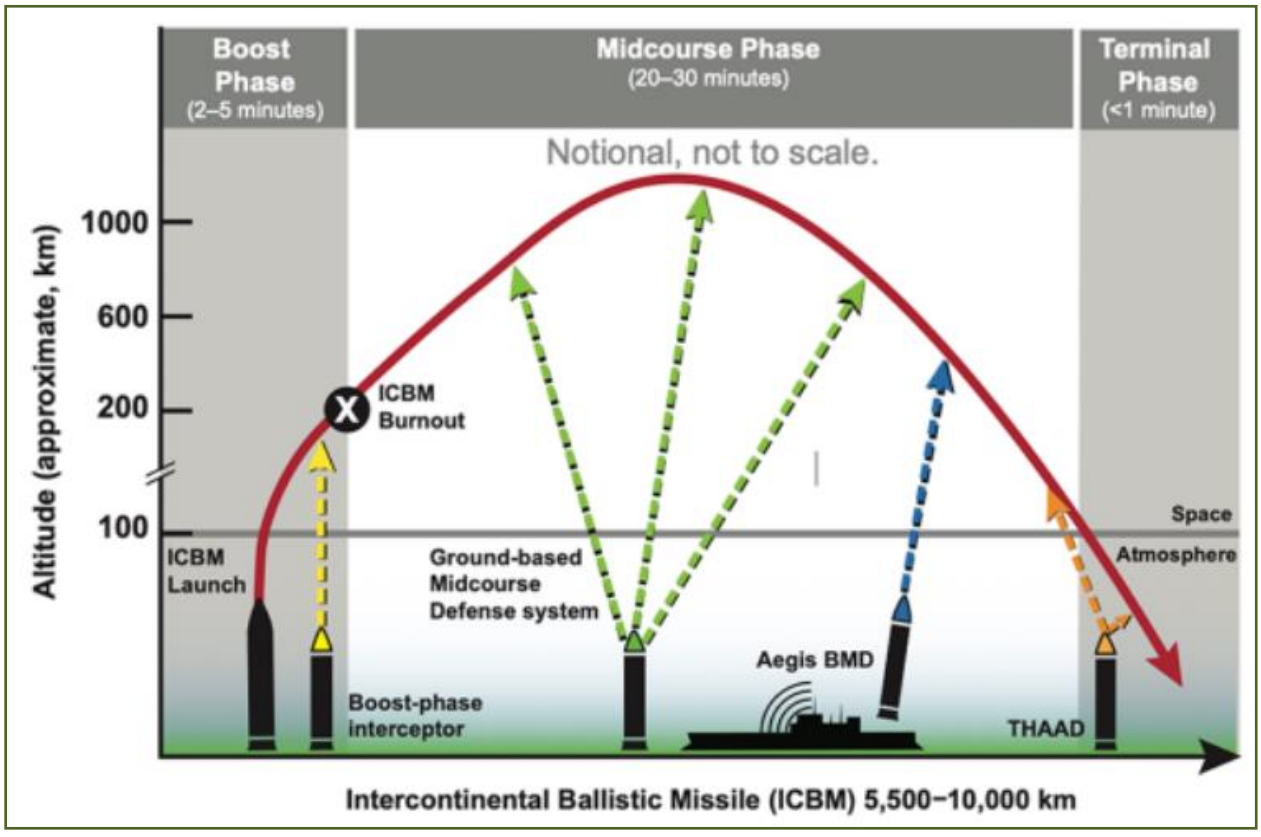
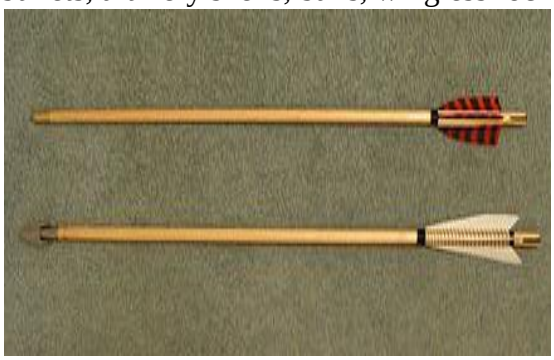


Fig:3 –U-M Physics Researcher Co-Chairs Ballistic Missile Defense Report.

Ballistics was throwing on solid equipment which acts in scientific and mathematic basis discovered by Sir Isaac Newton, which was published of famous book “Phikosophiae Naturalis Mathematica” on 1687. It is fully depend on laws of motion and gravity.

Projectiles:- Any object that is launched into space by applying force, whether the space is empty or not, is considered a projectile. Although any object traveling through space (such as a baseball thrown) qualifies as a projectile, the phrase is most frequently used to describe a ranged weapon. Projectile trajectory is examined using mathematical equations of motion. e.g. arrows, bullets, artillery shells, balls, wingless rockets etc [5].



(i)

(ii)

(iii)

(iv)

(v)

Fig:4- Projectiles- (i) Arrows,(ii)Balls, (iii)Wingless rockets, (iv)Artillery shells,(v)Bullets.

Fig:5-Types of Projectile Launcher.

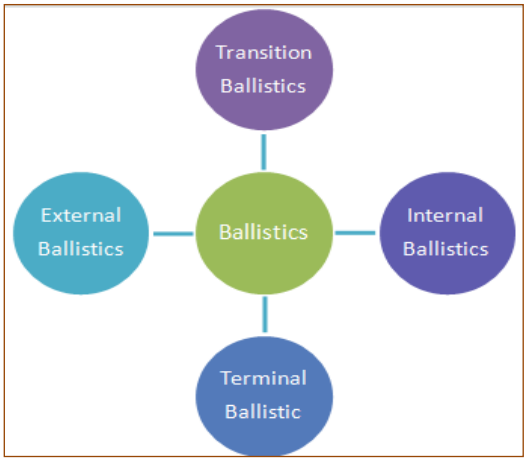


Fig:-6-Categories of Ballistics.

Projectiles Launcher:

Throwing:- One of the projectile launchers by hand is throwing. When comparing projectile throwing speeds between athletes and chimps, athletes can reach speeds of up to 90 mph, whereas chimpanzees can only reach speeds of 20 mph [6]. The capacity of human shoulder

muscles and tendons to retain flexibility until it is required to move an item may be reflected in this ability. [6].

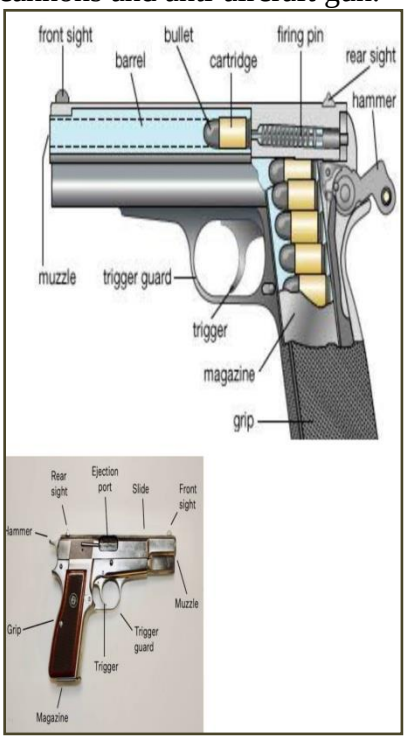
Sling:- A projectile weapon sling is throwing stone with help of a blunt small cradle or pouch which is in the middle of two length of cord where stone, clay or lead "sling bullet" which is placed by the middle finger or thumb finger. The sling swung in the arc and frees the projectile to fly to the target.

Bow and Arrow:- A flexible piece of material called a bow is used to launch arrows, which are aerodynamic projectiles. The two ends of the stick are connected by a string, and when the string is pulled back, the ends of the stick flex. The potential energy of the flexed stick is converted into the arrow's velocity when the string is released. The practice of shooting arrows with bows is known as archery [7].

Catapult:- Without the use of explosives, a projectile can be launched a long distance with the use of a catapult, which was very useful for numerous ancient and medieval siege engines. Because it was one of the most effective weapons in warfare, the catapult has been in use since antiquity[3]. The word "catapult" means ' kata'="against" and 'pallō'= "to toss, to hurl".

Gun:-A gun is a normally tubular weapon or other device designed to discharge projectiles or other material. This firearm projection varies according to design but is usually affected by the action of gas pressure. A weapon engineer or an armourer who applies the scientific principles of ballistics to design cartridges is often called a ballistician [8].

There are three categories of firearms. These are (i)Handguns – includes pistols, revolvers and derringers,(ii) Long Guns – includes rifles and shotguns, and (iii) Mounted Guns – includes cannons and anti-aircraft gun.



Part/component	Description	Example
Bolt	The bolt is a mechanical part of a firearm (mostly semi-automatic pistols) that blocks the rear chamber while firing but moves aside to allow another cartridge to be inserted.	
Breech	The essential part of the firearm that holds the firing mechanism where the cartridge is inserted.	
Breech block	The movable part of the firing system that seals the moment of firing, preventing gases from escape. Most modern small firearms use a bolt.	
Chamber	The portion of the barrel or barrel extension which supports the cartridge case while it is in firing position.	
Clip	A device which contains several cartridges that is fed into the magazine of a firearm.	
Cylinder	The cylinder is a cylindrical, rotating part of a revolver that contains multiple cartridge chambers.	
Magazine	A magazine is the ammunition storage and feeding device of a firearm within or attached to a repeating firearm. Magazines can be removable or integral to the firearm.	
Slide	A majority of semi-automatic pistols have a slide which generally houses the firing pin and the extractor, and serves as the bolt. It is spring-loaded to chamber a fresh cartridge provided that the magazine is not empty.	
Trigger	The trigger is the mechanism that actuates the firing sequence of the firearm.	

Fig;7-(i)Up=Pistol; Down=Rifle. (ii)Parts of Firearm. (iii)Different types of Guns.

When experts examine guns, they look for important clues like the special number on the gun and fingerprints that might be on it.

Rocket:- A rocket is any missile, spaceship, airplane, or other type of vehicle that uses a rocket engine to provide propulsion. Propellers carried by the rocket before use are used to make all of the rocket engine exhaust [9]. Rocket engines propel light and powerful rockets forward by simply hurling their exhaust backwards at a high rate of speed. At least since the 13th century in China, rockets have been used for both military and civilian purposes. Although rocket are used for fireworks, weaponry, launch vehicles, satellite, human spaceflight but rocket engineer needs to make sure being safe and avoiding any dangers when they take the time to plan, try things out, build things carefully, and use them accurately.



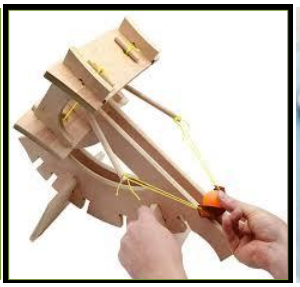


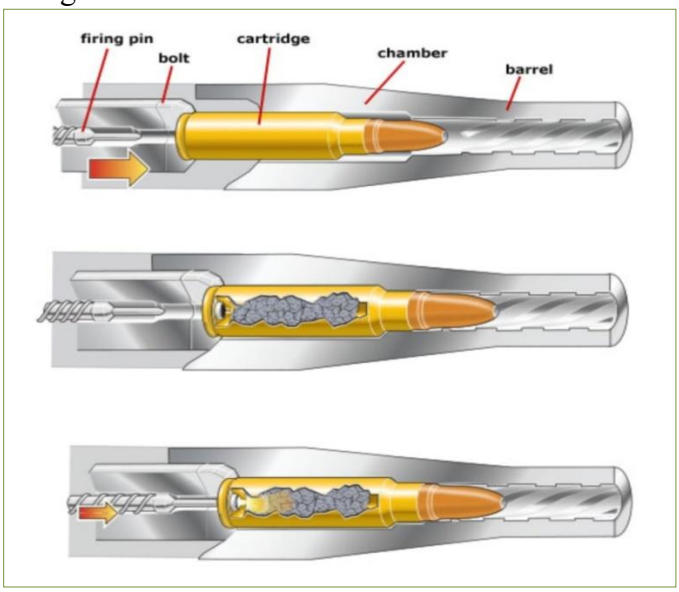

Fig:-8 (i) Throwing (ii) Sling (iii) Catapult (iv)Gun

Subfields of Ballistics:-

There are several distinct times in the journey of the Ballistics is further classified into four subfields. These are:- (a) Internal Ballistics, (b) Transitional Ballistics, (c) External Ballistics, (d)Terminal Ballistics.

(a)Internal Ballistics:- Internal ballistics (also interior ballistics =the moment the firing pin hits the primer till the time the bullet exits from the barrel), Internal ballistics is a type of science that looks at how things are shot out of guns. It focuses on what happens from when the gunpowder is lit to when the bullet leaves the gun [11] .e.g. small-bore rifles and pistols, to high-tech artillery.

Mechanism of Firing Process:- The trigger is squeezed, releasing the firing pin, which moves forward with great force. The firing pin strikes the primer, causing it to explode. The spark from the primer ignites the gunpowder rapidly expands in the cartridge. The expanding gas forces the bullet out of the cartridge and down the barrel with great speed. The rifling in the barrel causes the bullet to spin as it travels out of the barrel. The bullet's speed and escaping gases produce a "bang".



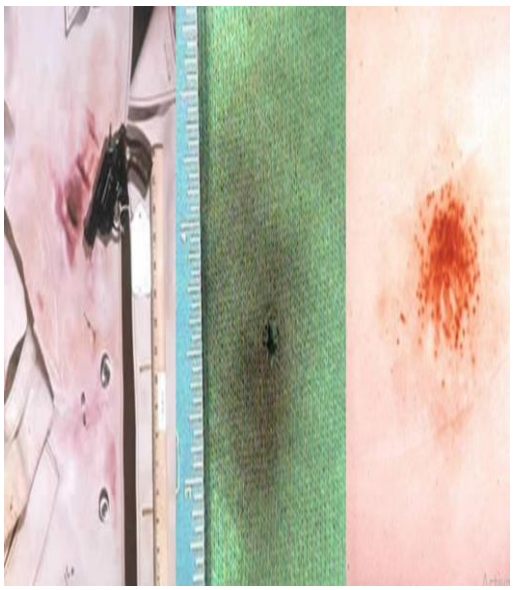


Fig:9- (i) Mechanism of firing process. (ii)Residue on clothing.

The National Integrated Ballistics Information Network (NIBIN), The Data Base of Firearm Information is formed with combine of the FBI and the ATF&E are two systems on 1999. NIBIN system has over 800,000 computerized images.

The distance between firearms and target depends on the distribution of powder patterns or the spread of a shot pattern (shotgun) which is reciprocal of distance and residue of gunpowder. Victim's cloth is chemically tested for gunshot residue to confirm of determine the distance by the 'Griess Test' or using Barium and Antimny components. Ganshot residue (GSR) is the strong evidence of victim stay for approximately 2 hours by washing or wiping the hands on the thumb web and the back of the firing hand. Collection and preservation of firearms evidence keep safely for forensic experiment.

(b)Transitional Ballistics:- Transitional ballistics, also referred to as intermediate ballistics[12], is the study of a projectile's behavior from the time it leaves the muzzle until the pressure behind the projectile is equalized [13]. As such, it falls between internal ballistics and external ballistics..

(c)External Ballistics:- The study of external ballistics focuses on the flight behavior of unpowered projectiles. It is a firearm that deals with the bullet's unpowered free-flight phase after it leaves the gun's barrel but before it strikes the target.

(d)Terminal Ballistics:- Terminal ballistics is the behavior and the effects of a projectile when it's hits its target. It works extremely high velocity impacts.

Application:-

Forensic ballistic- Forensic ballistics is the investigation of bullets and gunshot impacts to obtain information in a court or other setting involving the legal system. Separate from ballistics data, firearm and tool mark exams (also known as "ballistic fingerprinting") entail examining ammunition, tool, and firearm marks to determine whether a certain weapon or tool was used to commit a crime [14].

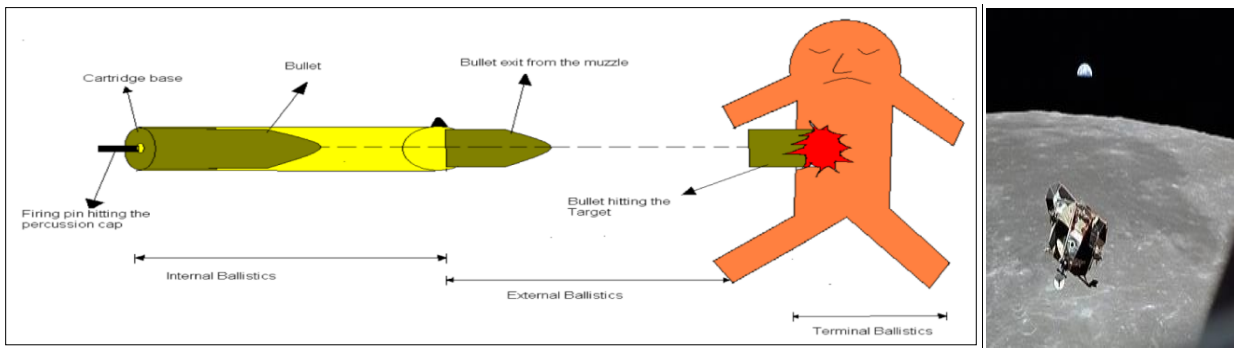


Fig:-10 (i) Forensic Ballistic (ii)Astrodynamics

Astrodynamics:- The practical issues pertaining to the motion of rockets and other spacecraft are addressed by astrodynamics, which applies celestial mechanics and ballistics to these issues. Newton's equations of motion and his law of universal gravitation are typically used to determine the motion of these items. It is a fundamental field in the design and management of space missions.

Fingerprint recovery:-Cyanoacrylate commonly name superglue is used to recover fingerprint from the surface of firearms which is placed spirally designed fume hood without touch any think. Until liquid superglue turns gaseous state, the circulating fumes adhere to the oils left behind by the fingerprint, turning to the print white which can be enhanced with finger print powder to contrast of the white print against the weapon's finish.

After recover evidence because of the textured grip and general shape of weapons, fingerprints on firearms surfaces are difficult to trace. It also processes the Striate databases, e.g. Integrated Automated Fingerprint Identification System(IAFIS). By the southern blotting DNA is analyzed and reache to victim.

Serial number recovery or restoration: A serial number restoration (=find out to hide the identity of the numbered item) involves both use of the physical (electrolytic, ultrasonic cavitation etching, magnetic particle, and heat treatment) and chemical scientific techniques used for the retrieval, recovery, and/or revisualization of the manufacturer's identifier, in cases where the serial number has been obliterated in Forensic science. Restoring a serial number can provide law enforcement agencies with information about a firearm or other item and may offer a lead in an investigation. At **the magnetic particle inspection** time UV light may be used to facilitate the display of any recovered serial number if fluorescent particles are added to the ferrous solution. [15]. Chemical restoration is only effective when the serial number has only been lightly obscured in depth. The examiner chooses acid that can range from an acidic ferric chloride solution for a non-magnetic, non-aluminum substance to Fry's Reagent for a magnetic metal, which is a combination of hydrochloric acid, cupric chloride, and distilled water. which will be used to slowly bring the number back to the surface.

Examination of cartridges: The examination of the cartridge relies on the unique tool marks left by the various parts of the weapon including the firing pin and the ejector in semi and fully automatic firearms. These markings can be compared and matched to known exemplars fired from the same weapon using the same parts. Collect the finger print from Cartridges are treated to cyanoacrylate fuming, analyzed, and photographed for any usable prints that can be uploaded to fingerprint databases like IAFIS for comparison with known exemplars. [16].

Fig: 11- (i) (ii)

(i) Illustration of microstamping. In the insert, a close-up of the cartridge's serial number is displayed. (ii) Remington rifle rifling pattern with a right-handed (clockwise) twist. **Qualities of a class and an individual:** The make and model of the weapon is different into class characteristic and it classified into three, (a) the lands and grooves of barrel which are bumps and valley created when rifling is created, (b) the caliber of the bullet, and (iii) the rifling twist. All three can be tied directly and used in bullet. The twist refers to the rotation of the barrel's rifling, which can be either clockwise (for right-handed shooters) or counterclockwise (for left-handed shooters). Examiners must take a known sample using the confiscated weapon in order to compare specific striations. Known bullet exemplars are produced by shooting the weapon into a water tank for slower-moving bullets, such as those from pistols or revolvers. [17].

Chemical Warfare and Nerve Agents:- The most potent toxic synthetic organophosphorus compounds are used as a nerve agent gas. At ambient temperatures, nerve agents are liquids that readily penetrate the skin and enter the bloodstream; thus, dermal contact is an important route of exposure [18]. Inhalation is another exposure way of highly toxic nerve agent vapors and aerosol droplets which may appear within seconds to hours or days depending on the level and route of exposure. Acetylcholinesterase, an enzyme that is responsible for the breakdown of acetylcholine (Ach) in the synapses that govern muscular tissues, is activated when a nerve agent affects the neurological system, causing a cholinergic crisis.

In World War I, chemical weapons were mostly utilized to weaken, harm, and kill firmly established defenders, against whom the indiscriminate and typically static nature of gas clouds would be most effective. [18] .Tear gas, mustard gas, lethal agent like phosgene and chlorine etc. are using in chemical warfare widely.

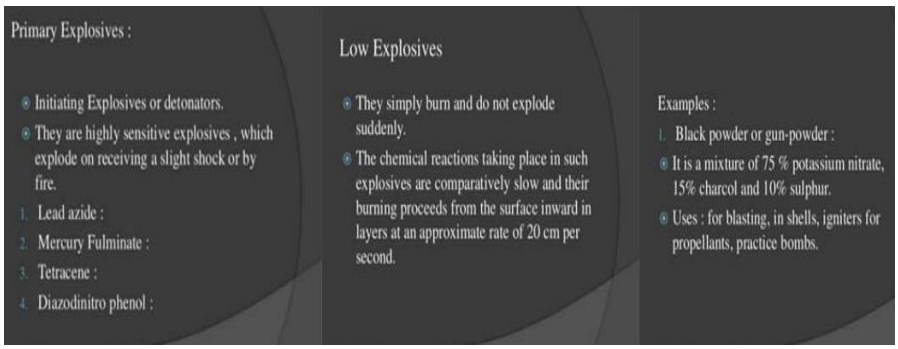


Fig:-12(i) Primary Explosive. (ii) Tear Gas.

After releasing of explosive material has great potential energy, which produces light, heat, sound, and pressure. In some circumstances or forms, such as confinement, dispersed airborne clouds, or rapid release, certain substances—such as dust, powders, gases, or volatile organic liquids—may be just combustible or flammable instead of explosive. [19].

Primary explosive-In blasting caps and percussion caps, primary explosives are frequently utilized to transmit a physical shock signal [20]. To start a larger explosive charge that is typically safer to handle, only a little amount, typically milligrams, is required. [21]. Example: Acetone peroxide, Alkali metal ozonide, Ammonium permanganate, Ammonium chlorate, Azidotetrazolates, Azoclathrates, Benzoyl peroxide, Benzvalene, 3,5-Bis(trinitromethyl)tetrazole, Chlorine oxides, Copper(I) acetylide, Copper(II) azide, Cumene hydroperoxide, **Halogen azides:** Fluorine azide, Chlorine azide, Bromine azide, Iodine azide, Hexamethylene triperoxide diamine Hydrazoic acid, Hypofluorous acid, Lead azide, lead styphnate, Lead picrate, Manganese heptoxide, **Oxides of xenon:** Xenon dioxide, Xenon oxytetrafluoride, Xenon tetroxide, etc.

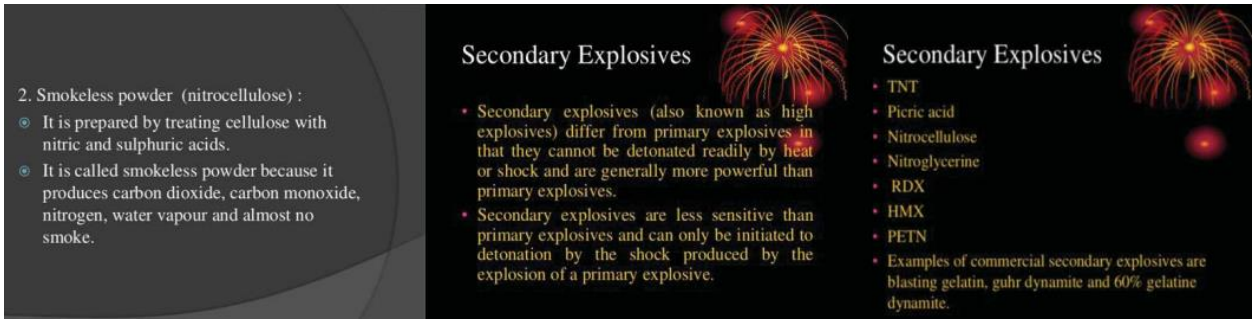


Fig: 13- Secondary Explosives.

Secondary Explosives:- In comparison with primary explosive, secondary explosive is less sensitive. It is typically started by a lesser amount of a main explosive and employed in greater quantities in an explosive train [22]. TNT and RDX, which stands for "Research Department eXplosive" or "Royal Demolition eXplosive," are examples of secondary explosives.

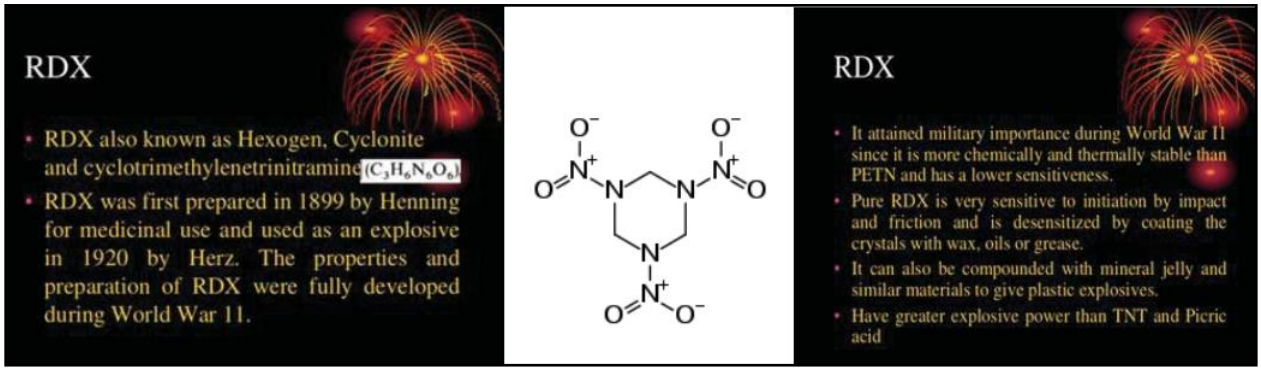
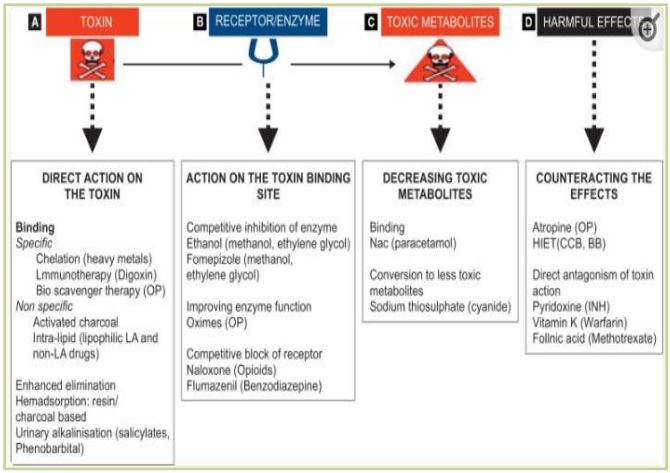


Fig: 14- RDX (Secondary Explosive).

Tertiary Explosives:- Tertiary explosives are blasting agents, intermediate secondary explosive boosters that are less sensitive, frequently utilized for safety, and have typically cheaper material and handling costs. For instance, ANFO (/aenfo/ AN-foh) (or AN/FO, for ammonium nitrate/fuel oil) is a common bulk industrial explosive used to decrease the risk of landslides. [23].

Cyanide gas. A gas chamber is an apparatus that uses gas to asphyxiate or poison people or animals. It's made up of a sealed space into which the gas is introduced. Hydrogen cyanide is the toxin most frequently employed, while carbon dioxide and carbon monoxide have also been utilized. Tear gas, also known as a lachrymator agent or lachrymator (from the Latin lacrima meaning “tear”), currently and formerly used as tear gas include pepper spray (OC gas), PAVA spray (nonivamide), CS gas, CR gas, CN gas (phenacyl chloride), bromoacetone, xylyl bromide, and Mace (a branded mixture) [24]. Lethal gases, Mustard gas, G-series nerve agent gases [GA (tabun), GB (sarin), and GF (cyclosarin)], etc are toxic gases for human health.



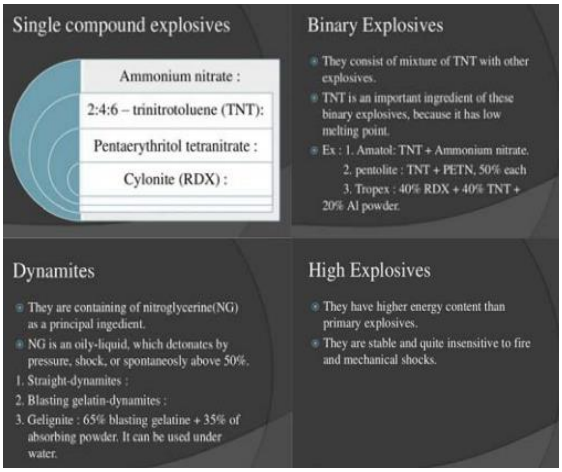


Fig: 15-(i) Mechanism of Antidotes. (ii) Tertiary Explosives

Antidotes:-An antidote is a drug, chelating substance, or a chemical that counteracts (neutralizes) the effects of another drug or poison, toxic in nature. Antidotes mediate its effect either by preventing the absorption of the toxin, by binding and neutralizaing the poison, antagonizing its end-organ effect, or by inhibition of conversion of the toxin to more toxic metabolites [25]. The duration of antidotal therapy depends on the type of toxin consumed, the estimated dose that the individual has been exposed to, route of exposure, clinical features of toxicity, half-life, and pharmacokinetics as well as the risk vs benefit for the use of the antidote [25]. Example-activated charcoal, acetylcysteine, naloxone, sodium bicarbonate, atropine, flumazenil, therapeutic antibodies and various vitamins etc.

Narcotics:- These are substances which lessen or eliminate pain to induce sleep and depress vital functions including blood pressure, pulse rate and breathing rate and produce psychological dependence [26]. Opium narcotics extract from poppies (Morphine, Heroin, Codeine etc.) is produces 'high' drowsiness and Hallucinogens (psychedelics, dissociatives and deliriants).

Fig:16- Drug addiction.

Hair analysis:-Hair analysis can be used for the determination of drug use months after drug consumption, hair analysis data can often act as important and even decisive evidence in the courtroom [27]. Hair analysis has been receiving increased attention during years and, currently, it has become the third most fundamental biological matrix used for drug testing in forensic toxicology, after blood and urine [27].

Investigative Techniques:-Complete criminal investigations include searching, interviews, interrogations, evidence collection and preservation, and various methods of investigation [1].

Fig: 16 - Investigation at crime place.

Investigation priority bias problems and proposed solutions are done by seeking of indicators of suspicion, Motive to commit the crime, Opportunity to commit the crime, and establish the relationships between the victim and any potential offenders.

Toxicology:- A forensic toxicologist needs to take the investigation's context into account, especially any physical symptoms noted, as well as any evidence gathered at the scene of the crime that could focus the search, like pill bottles, powders, trace residue, and any available substances [28]. The forensic toxicologist must ascertain which toxic substances are present, in what amounts, and the likely impact of those chemicals on the person given this knowledge and samples to work with [28]. Post-mortem toxicology, human performance toxicology, and forensic drug testing (FDT) are all essential components of forensic toxicology.

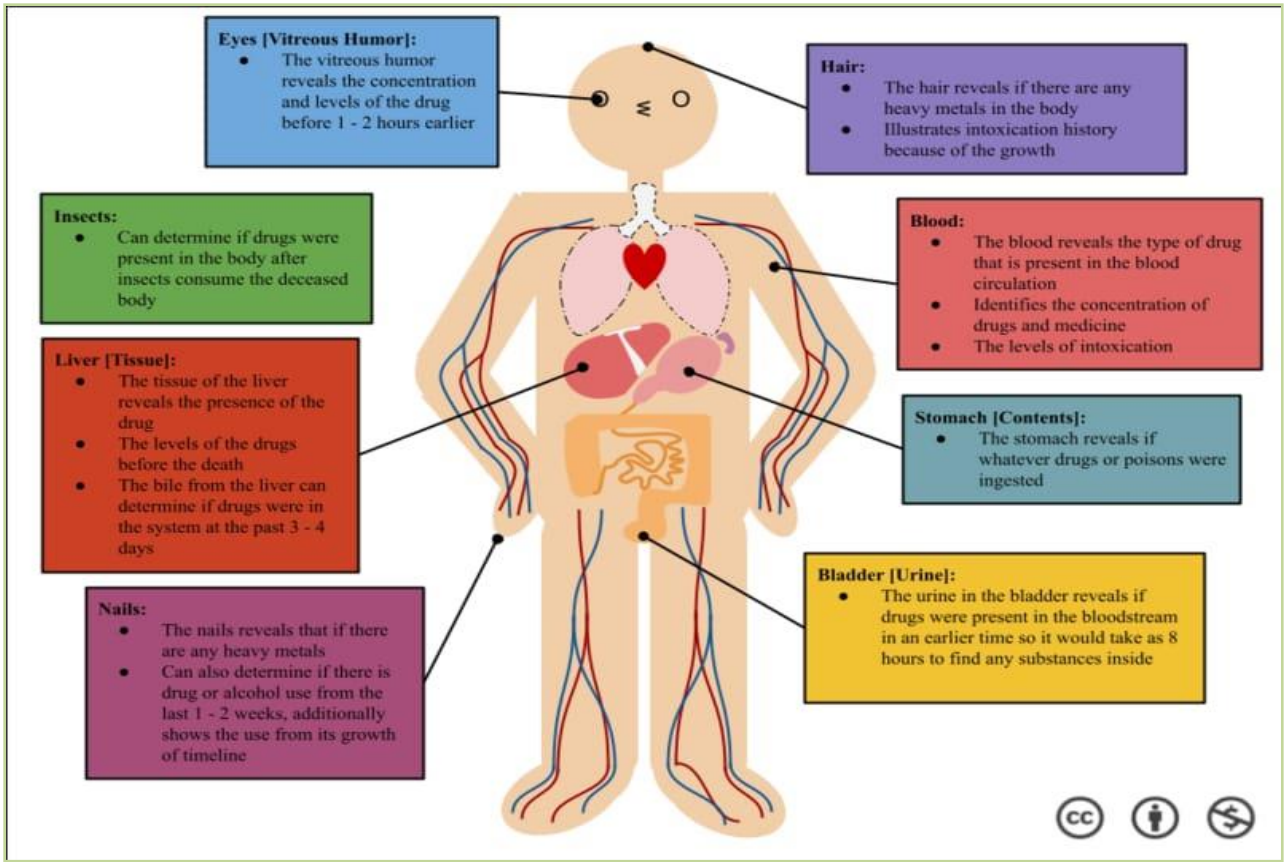


Fig:-17 – Drug location of the body.

Conclusion:- Essential design of biomedical implantable systems for telemetry and closed loop control of design approaches and noticeable milestones, with emphasis on implantable telemetry electronics. The science and technology of electronics and materials advances and human desires expand with medical needs; new challenges for novel implantable systems will evolve on future technological trends.

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