FORENSIC SCIENCE PROJECT

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Abstract: The aim of this project is to study the aftermath of the Logh Lomond murder involving a woman who was shot in the head and his husband, who survived, but was wounded inside the car. In order to investigate the causes of the crime, certain procedures had to be executed. Alongside this, the results of these procedures were considered, as well as their limitations and the conclusion of each part. After receiving specific information about the crime, it was determined that several individuals were suspects of being the possible murderer, including Alexandra Burth, John Branks, Stephen Blue and finally Gordon Ward. During this study, a discussion about the final conclusion will be presented. Furthermore, specific references regarding the different procedures have been added, such as blood or drug tests. When including further work, creating a company which helped the police   end with crime involving drugs was thought, hiring expert scientists from all over the world. Finally, the visit to the Central Scientific Police Base in Erandio has been taken into consideration. This visit enabled the people working on this project to take the next step in the forensic science field. After collecting all the information obtained, the result is this piece of work full of details and specific data related to the crime scene.

1. INTRODUCTION:

Mr. Gordon Ward and Ms. Anne Burth were driving to an unknown place in a road near Logh Lomond, when an invividual carrying a pistol shot Ms. Burth in the head and wounded Mr. Ward with one shot in the left arm. In order to start investigating the causes of the murder, we had to study the background.

Mr. and Ms. Ward were very influential people and had bad relationships with numerous persons. Probably, that was the cause of the crime. For example, Alexandra Burth, Anne`s sister, who envied her because of her power and wealth. Also, the famous politician Stephen Blue had a difficult relationship with the Wards. Finally, former criminals Bill Thomsom and John Branks would be corelated after the murder, as John Branks was Anne´s cousin.

Having studied the background in depth, the testing procedure was executed.

2. UNDERTAKEN PROCEDURES:

2.1. SOIL ANALYSIS:

It is based on a study of different soils extracted from the case, relating their characteristics. In this analysis the use of different techniques helped the team measure the precipitacion and the opacity of each soil.

2.2. FINGERPRINT IDENTIFICATION:

It is used in order to observe and relate suspicious fingerprints. In this case, different fingerprints were studied, matching the 12 points each fingerprint has to have in order to relate it to an individual.

2.2. BLOOD TEST:

A substance is identified through the use of luminol in order to find whether it is actually blood. It was known that if luminol reacted, the substance would be blood.

2.4. PLASTIC ANALYSIS:

The objective is to know the different materials that were in the case through a density and volume analysis.

2.5. DRUG TEST:

They are test and error tests in which certain substances are mixed with the possible drugs. The result would be determined by the colour of the different substances which reacted.

2.6. HAIR AND FIBRE ANALYSIS:

Possible hairs or fibers of the case are studied so subsequently different suspects are identified.

3. ANALYSIS AND RESULTS:

3.1. SOIL ANALYSIS

Before we started analysing the evidences we wrote down the features that were considered important. We also compared all those characteristics with the crime evidence, for example: the color, the thickness and also the size of the rocks.Finally, we put the evidences in a test tube with 30ml of water so we could identify the different densities and opacities.

Density (kg/m^3)

	Crime evidence	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Density	24	45	25	38	23	67
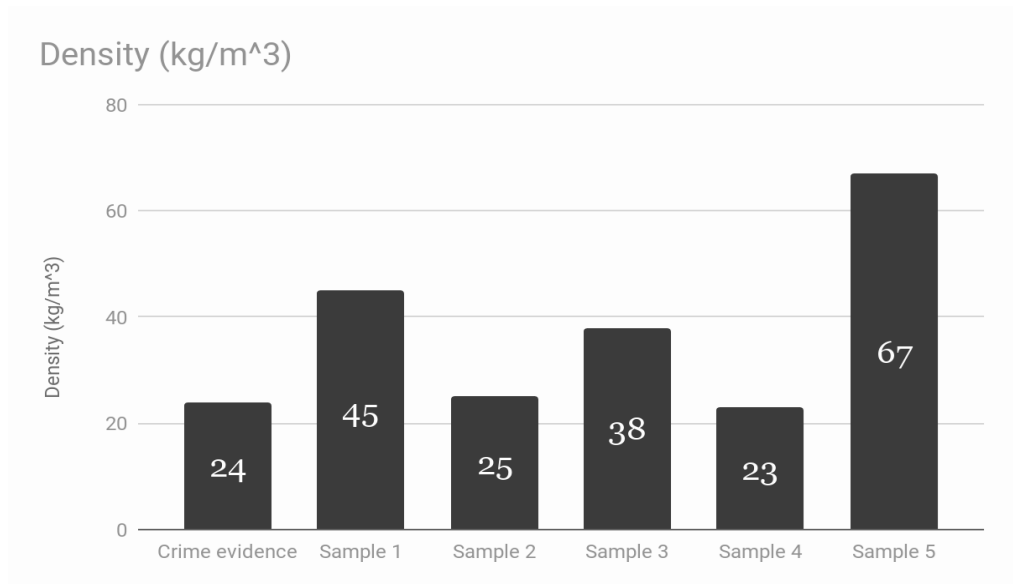
Figure 1. *Results of the density tests*

Table 1. *Summary of results of the density tests*

	Crime evidence	1	2
Precipitation	2.60s	13.64s	2.64s
Opacity	10.05s	6min	9.24s

RESULTS:
We could conclude that the second evidence was exactly the same as the one we were given.

3.2 FINGERPRINT IDENTIFICATION

To identificate a fingerprint is not a easy work to do. The procedure consisted basically in introducing some tiny iodine balls in a sheet of paper which was suspected of having real

prints. We used this method in order to be sure whether there was some important information there or not.We left those small balls with the paper for a few weeks and we could distinguish some interesting fingerprints. We remembered the 12 key points to know if two prints are the same. It is relevant to outline that we also could perceive some fingerprints in the front part of the bullet shell . Unluckily, we could not extract valuable clues because the revealed print was too small to see those 12 common points.

RESULTS:
We did manage to appreciate that the found fingerprints are very similar to the ones of the right index of Gordon Ward.

3.3. BLOOD TEST

To do it, we mixed that substance with luminol, a curious liquid that reacts with blood. As predicted, luminol reacted with the other liquid and at first we did not see the light reaction that would have made if it had been blood, but after a few minutes we realised that we had to go to a dark place in order to see it, and we did.

We could see how that mixture of the possible blood and luminol expelled light.

RESULTS:
Finally it was encountered that the found substance was blood from someone who was related with the crime.

3.4. PLASTIC ANALYSIS

For this analysis we only needed a test cube and a weight scale, since it was a good idea to study the weight, volume and the density from the different evidences.Once we knew their features, we compared them with the crime evidence so we could find with plastic was the one we were looking for.
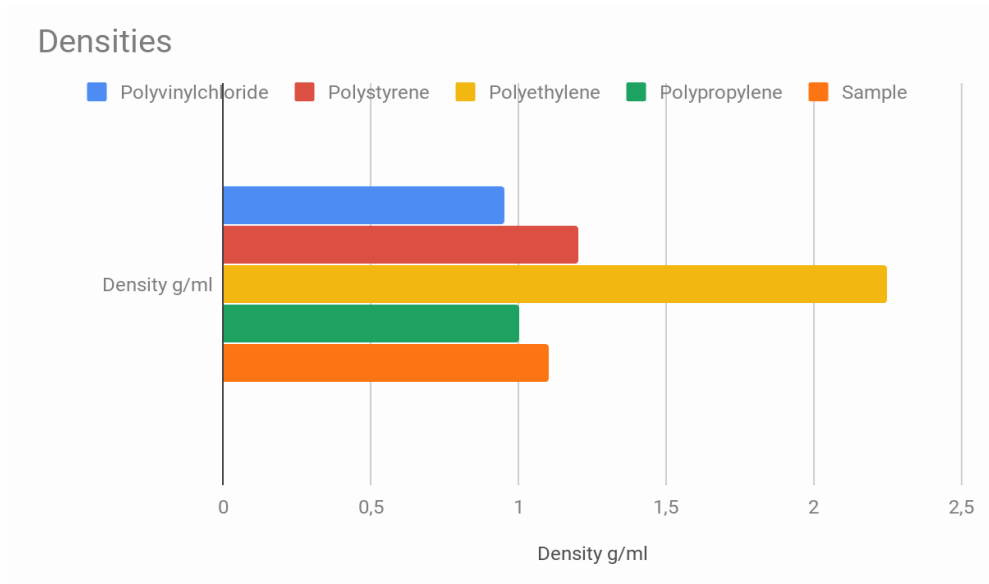
Figure 2. *Results of the plastic tests*

RESULTS:
We found some evidence that coincides with the features of the sample we extracted from the crime scene.

3.5. DRUG TEST

In order to do the test, the first thing we did was to find the 5 most probable elements of being the sample.

Then, different kinds of reactive were mixed with different reactives and with the sample.

Finally, we observe by a color code the compound that looks more like to the test that we have found, taking into account possible minimum errors.

Table 2. *Results of the drug tests*

CRIME EVIDENCE	REACTIVE 1 COLOUR:GREEN	REACTIVE 2 COLOUR:PINK	REACTIVE 3 COLOUR:RED
ASPIRINE	GREEN	PINK	RED
CLORFERINAMINE	YELLOW	YELLOW	BLUE
DIFENHIDRAMINE	GREEN	YELLOW	RED
IBUPROPHENE	GREEN-YELLOW	RED-YELLOW	RED
PARACETAMOL	GREEN	TRANSPARENT	BLUE

RESULTS:
By reacting those reactants with the different elements known and later with the sample, we could see which element coincided with what we were looking for.

3.6. HAIR AND FIBRE ANALYSIS

This analysis basically consisted in 3 different studies:

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This analisis basically consisted in 3 different studies:
1. First, we had to take all the fibers and hairs from the garment.
2. Then we had to separate the fibers and the hairs with a microscope.
3. Once analyzed, we had to identificate whether they were hairs or fibres through different methods.

RESULTS:

We could see that inside the sweatshirt from which we extracted all the elements, which were hairs and which were fibers, and we try to give them an age.

4.DISCUSSION:

--In terms of the soil analysis, the 5th evidence made us doubt due to the fact that it had a similar precipitation. Nevertheless, we ruled out it thanks to the flotability, which had nothing to do with the crime evidence.
-- We discussed that due to the asked divorce by Gordon Ward to her wife we thought that he might be a suspect. But the evidences are not valuable because it could have been normal for Gordon to have been there because they were man and wife.
-- We tried to discusse that the blood could have been from anyone, so we discussed it reaching no conclusion.
--Speaking about it, we began to doubt our findings as there was a slight variation in the weight of the matching samples. We managed to dispel the doubts by admitting a relative error.
--In the drug test, there was no need for discussion in this area as the samples were conclusive and left no doubt.
-- In the hair and fibres, we had doubts when it came to differentiating between hairs and fibers, since in the microscope it was difficult to see if they were transparent or not

5. CONCLUSIONS:

-In terms of soil analysis, after many discussions about it, we finally conclude that the second evidence had the same colour and many other features.
--Talking about fingerprint identification, we conclude saying that Gordon´s Ward evidences are clear and trustworthy but we cannot incriminate him in the crime because was totally normal for him to have been there.
--It was also determined that we did find blood in the crime scene but we cannot get valuable information because we could not know to whom does that blood belong.
--When speaking about plastic analysis concluded that the sample could come from Stephen Blue's plastic bracelet after a possible struggle, but we are not 100% sure.
--Finally in the drug test it was concluded that the sample was not a drug, it was only aspirin, by comparing the colors. So Bill Thomson may not be guilty after all.
-- Among the hairs and fibers, there were both Gordon's hairs and Anne's hairs. Also, there were some fibres coming from clothes inside the car
As a general conclusion, although we did manage to clear out some clues, we do not have enough conclusive evidences to incriminate anyone in the crime. With the current information we are not capable of coming up with solid theory about what might have happened that day, by the Logh.

6. LIMITATIONS:

-- During or soil analysis, we had not the best tools for this test. For example, the cube was small and the land we were given was not enough to do a further study.

-- The fingerprint test was specifically hard because we were not provided with professional material to analyse them, so we were exposed to making a mistake
-- As previously said, we did not have means to know whose blood was the found evidence, so we lost time and effort.
-- There was no external agent that made the task of analysing more difficult.
-- In the Drug Test, the sample quantity was rather small,which made it very difficult for us to disperse and distinguish the reactions.
-- We did not have the proper microscopes since some could not be regulated or the glass was dirty, where we had to analyze the hairs and fibers.

7. ACKNOWLEDGEMENTS:

In order to create this project, we had to inform ourselves about different aspects. Our teachers´ help proved useful. However, without of doubt we could make a difference thanks to the visit to the Central Scientific Police Base in Erandio, Bilbao.

We had to bear a lot of different ways of obtaining information in mind, such as chemistry, instrumental traces and ballistics, as well as graphistics, forensic anthropology, hair and fibres and the chromatography laboratory. We were based on numerous facts like these.

Other notable fields that we saw during our visit were aspects such as sigma, audio (phone calls, conversations through the telephone) and finally genetic engineering.
First and foremost, the rapid advance of technology in this field impressed us: it was created in 1990, and from then to now a great deal of things have been discovered.

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