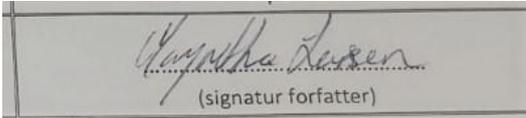




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MASTEROPPGAVE

Studieprogram: Master i historie og historie didaktikk	Vårsemesteret, 2021 Åpen
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Veileder: Peder Roberts	
Tittel på masteroppgaven: Søket etter Loch Ness Monsteret, over og under overflaten: Bruken av teknologi for å bevise «Nessie». Engelsk tittel: The Search for the Loch Ness Monster, Above and Below the surface: Using Technology to Prove the Existence of "Nessie".	
Emneord: Technology, Loch Ness, Camera development, Sonar development, environmental history, war technology, Trust.	Antall sider: 108 + vedlegg/annet: 0 Stavanger, 19-07/21 dato/år

Foreword

The year of writing this master thesis have been long and hard, but also enlightening. After this thesis paper have been turned in there are a few special people who should be given an extra thank you. I never imagined coming this far with my education and my support have helped me during this master and the student life.

Firstly, I want to thank my professor and supervisor Peder Chellew Roberts for valuable help during this year. Thanks to him we managed to adapt to the limits this year created and ended with a result. Thank you for all the help in finding source material, guidance and motivation. I deeply appreciate it.

A second and important thanks must be given to my mum, Elin, who helped me during this journey of my degree. This would never have been possible without the encouragement, believing in me and pushing me to never give up.

Lastly, I want to thank my closest friend Lim Ying Yee and my girlfriend Catherine Dela Peña. You both have been there, around the clock, through exams and this writing journey, reading through all those weird texts. Helping and being supportive at any time of the day, and often nights, even if we are on different sides of the world.

Thank you all, so very much.

Stavern, June 2021.

Margrethe Larsen

Abstract

This thesis will be focused on the search for the Loch Ness monster and how technology and trust work to discover proof. The centre of this relays on the trust relating to technology and the trust to people, regarding both the use of technology, the technology itself and what qualifies as proof.

To discuss and analyse my thesis, the method will be using sources critically, looking at rhetoric, what the sources and people involved writing these sources highlighted as well as what was only slightly mentioned. By analysing the sources what they directly and indirectly portray, it will show how technology is important for the search, the trust placed on the technological quality and quantity. And how the validation of trust changes with developing technology from witness statements and written proof to technological proof, believed to show only the objective searched for, which is taken as the truth and validated proof.

My collected analysis will show how the evidence that would verify the existence changes from relying on witness sightings of the creature, writing the statements, to using advanced technology developed initially for and by the military and being operated by trained experts. The change from people reporting sightings to serve as verification, to evidence based on technology which is perceived unbiased. This will also show how the perception that quantity and quality of the equipment is related to the believe of validated proof.

Sammendrag

Denne masteroppgaven vil omhandle søket etter Loch Ness-monsteret og hvordan teknologi og tillit opererer sammen for å finne validert bevis. Sentralt for denne avhandlingen er tilliten knyttet til teknologi og tilliten til mennesker, både når det gjelder bruk av teknologi, selve teknologien og hva som kvalifiserer som bevis.

For å diskutere og analysere avhandlingen min, vil metoden bruke kilder kritisk, se på retorikk, hva kildene og menneskene som var involvert i å skrive disse kildene fremhevet, så vel som det som bare ble nevnt uten utdypelse. Ved å analysere kildene hva de direkte og indirekte skildrer, vil det vise hvordan teknologi er viktig for søket, tilliten til den teknologiske kvaliteten og kvantiteten. Hvordan validering av tillit endres med utvikling av teknologi fra vitneforklaringer og skriftlig bevis til teknologisk bevis, som var antatt å vise bare objektet som ble søkt etter, dette ble oppfattet som sannheten og validert bevis.

Min samlede analyse vil vise hvordan validering som ville verifisere eksistensen endrer seg fra å stole på vitnesbyrd om skapningen og skrive ned vitnenes fortelling, til å bruke avansert teknologi utviklet opprinnelig for og av militæret og opereres av utdannede eksperter.

Forandringen fra vitner som rapporterer observasjoner som bekreftelse, til bevis basert på teknologi som oppleves upartisk. Dette vil også vise hvordan oppfatningen om at kvantitet og kvalitet på utstyret er relatert til troen på validert bevis.



Figur 1, "surgeon photo"

The search for the Loch Ness Monster, above and below surface:

Using technology to prove the existence of "Nessie".

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1. INTRODUCTION

1.1. THEME AND HYPOTHESIS

The theme for this master will be on the Loch Ness and the search there with the development done by the U.S Navy and the Royal Navy in the development of sonar. How military

technology ended up in use at the Loch Ness to try to confirm the existence of a creature. My research question is “How technology initially developed for military purposes used at the search for the monster in the Loch Ness. Why did the technology change during the search from 1930-1975 and what can this tell about the relation between trust in technology, evolution of technology and how is this related to the Loch Ness?”

With this hypothesis the thesis will discuss the change of how evidence of the Loch Ness creature was obtained. Evidence of existence based on technology, which was related to the trust to the technological equipment.

1.2. DISPOSITION

The paper will be constructed in five sections to show how the technology and belief is connected for finding proof and how proof is validated through the search of the Loch Ness monster and the belief in the technology. The dividing of the timeline is to show how a certain perspective of trust and technology is perceived through the years. Before the 1930's there is witness statements and written records which is taken as proof that there is a phenomenon worth investigating. From 1930 to 1960 there was a change in using cameras, however the witness statements and written records were still used. A change comes with Dinsdale in using technology and is included in the 1930 to 1960, the use of ciné-camera, filming the monster and at the same time working with photos, camera and witness statements. The next two periods are defined because of the Loch Ness Investigation Bureau, where they bring in new technology during the 1960 and after 1970 it changes to focus on the technology and the trust developed in the operations of this technology.

The first chapter Introduction will include the research question, sources, method and a short background on the Loch Ness monster to give context to the following chapters. My source material will change during the different chapters and is chosen to show technology, trust and what type of proof is considered valid. The primary sources will be used and narrowed to analyse this for each section which is organised to different search years. The sources will be picked to show the technology and what relates directly to the operations organised by the Loch Ness Investigation Bureau or to the key persons regarding it. Other literature used are selected for their contributions to either the technological aspects of the findings and readings done at the Loch Ness or to give alternative solutions. After narrowing the sources and discussing them, I will narrow the timeline to highlight the activities around the Loch Ness

and give a brief background on the Loch Ness monster. Chapter one will end with tying my theme to environmental history and defining the term technology and what that term will refer to during this thesis.

The second chapter will show how technology was developed starting off with a brief history of how the permanent photos was discovered and the technology behind it. The timeline for this will be narrowed to end approximately the year 1900. The next section will focus on how Harold Edgerton, an engineer from M.I.T, developed strobe-light. Edgerton also modified cameras and then adapted them for military use. Lastly Edgerton modified his cameras again to use them for underwater photography using sonar to scan the bottom of the sea. This section starts in the interwar time around 1930 and ends in the early 1950's. This second section shows, how the line between military and -independent developed technology is closely related and more difficult to differentiate. Lastly the introduction of sonar, why the sonar was developed and how the sonar works. This will show the diversity and limits of sonar. The timeframe will be from 1914 and ends around 1950. The reason for my choice of timeline is to show the changes in technology that was developed at the beginning of the 1900's. The development done by the military and by extension the government gives validity to the technology developed.

Chapter three will be divided into three sections, first with a short introduction to the past before 1930, going briefly into the first mentions of the Loch Ness creature. Then move on to the 1930, first section ends with the year 1960. The section will show how the witness statements come forward in newspapers and the problems with this new popularity. This led to the release of multiple books and articles regarding the Loch Ness creature and unorganised privately initiated expeditions. The year 1960 is included because of Dinsdale's expedition and what he discovered, which changes the use of cameras and the way to execute expeditions to Loch Ness. The next section 1961 to 1970 will be more extensive with the Loch Ness Investigation Bureau being established. The Loch Ness Investigation Bureau brought in both new and different technology. The section 1970 to the 1980's shows how the technology had advanced and will be based on the source material available. This will be in majority the yearly reports from the Loch Ness Investigation Bureau. The Bureau stops its field operations after 1975, so the last section 1970 will include the first years to 1975 to tie up the investigations. It will also discuss the latest "proof" acquired at the Loch with the articles released in the 1980's, which brings new perspectives on the previous findings.

1.3. NARROWING AND SOURCES

1.3.1. Primary sources

The primary sources I have worked with are a variety of the literature available especially archive materials from the M.I.T. Chapter 3 uses mostly primary sources for the first period. Before 1960, the primary source used are newspaper articles and the book by Saint Adamnan *life of Saint Columba*. The next sections from 1960 to 1980 consist mostly of the primary sources in the form of letters or reports from the Loch Ness Investigation Bureau. These are reports, letters and some news articles. This collection is found in the *Harold Edgerton Papers*, at the MIT Archives. The reports used give a yearly ending report of the operations conducted at the Loch Ness from the LNIB, the plans for the next season operations with recommendations and evaluation of what techniques and equipment showed results. Letters to members or LNIB, often discussed the technology acquired or its use. In some cases letters give a more extensive report on what the findings showed, than news articles discussing it. The source material has limits in what is covered in the timeline, especially in conducting the experiments at the Loch Ness. The reports do not give all the information which make them incomplete. Other limits are what is mentioned in the report exaggerating the positive findings and gives little attention to the lack of findings or pictures. The source material does not reflect any tests or experiments eliminating other possibilities than a creature. There is no reports or letters specifically mentioning other possibilities, however a degree of denial or perhaps belief comes stronger across. This is because of the reports states no finding because of faulty equipment, the need to train personnel for using equipment and mentioning human error. This limits the sources to only show results from one side and not explore other opportunities. The archive material is Harold Edgerton's papers at MIT and tells Edgerton's story and involvement in the Loch Ness investigations. However, the documents also tell a story of using technology, the trust put on the technology used and how this was used together searching for the Loch Ness monster.

Newspaper articles from papers in the U.S and the U.K, both made by journalists observing from outside, but some news sources contains interviews with participants affiliated with the LNIB. The news articles have been collected using google newspaper archive. Narrowed to news relating to Loch Ness and time limit set to before 1990. The articles picked have been chosen to relevance to Loch Ness and the search or includes information about the technology and results during or after the field operations. Some of the articles have also been chosen on how the media portrays the Loch Ness and the idea that a creature is living there. The last

primary source which has been used a lot is Tim Dinsdale's book *Loch Ness Monster* written, published and republished during the search years in 1960 and 1970. I have chosen this book by Dinsdale since he was present at the Loch for many years and became the leader of the Loch Ness Investigation Bureau. This puts him in a central role for the decisions being made regarding the execution of expeditions and the equipment, including the technology used.

The primary sources from the M.I.T will be regarded as genuine sources with the letter showing the dialogue between members. Dinsdale's book is valuable as a source to follow an approximate timeline and is used to fill in events happening where the archive material is not elaborated upon on. The last primary source which has been used is the book by the United State government *United States. Bureau of Naval Personnel Principles of Naval Ordnance and Gunnery* from 1971. This book shows the technical uses of sonar, how it was developed and the most common problems and wrong readings because of misuse. This source show how the use of sonar and other underwater equipment should be handled by trained personnel to understand the readings. The use of sonar during the right conditions and managing it properly is shown in this book to give good results, which is valuable for the understanding of the archive material regarding the sonar searches and underwater research.

1.4. SECONDARY SOURCES — LITERATURE

Secondary sources have been chosen to show the background of the technology used and how it works. *Seeing the unseen* edited by Roger R. Bruce shows thoroughly how Harold Edgerton developed his cameras and strobe-light. It also show how Edgerton adapted his cameras to make them work with the environment, especially for the underwater photographs. The article *Sonar research and naval warfare 1914-1954* by Willem D. Hackman shows how the sonar became important during the first world war for the naval warfare. The history of sonar in the article show the use of sonar and hydrophones. The use changed how warfare was done for the first and the second world war and the new submarines of the second world war led to further development of the sonar. The *Seeing the Unseen* and *The sonar search* article shows the use of the technology, how they can be used and work in different environments. The source used for the development of the permanent photographs by Peres. Michael R, *The Focal Encyclopedia of Photography: Digital Imaging, Theory and Applications, History, and Science*, goes detailed into the science behind the photographs. It shows how the development went from prints that did not last, faded if exposed to light, and ending up as permanent

photos. The type of permanent photos and film became more accessible for the public until finally ending up as standard film in cameras around 1885. Secondary sources used at chapter three is Binns book *The Loch Ness Mystery Solved*, which goes into details about what happened around the LNIB, the active participants and shows different possibilities for what was experienced at the Loch Ness. This regards explanations to the photos and for the V wakes witnesses saw in the water, and other sightings. Questioning the findings and offering a different explanation and perspective on the search.

1.5. METHOD AND NARROWING

I have chosen to narrow the timeline to end at approximately 1975. This is because of the archive material regarding technology and the use of different technology at the Loch Ness ends around 1975. My method will be critically analysing the sources and use this to tie together two stories. One story is the use of technology at the Loch Ness while the other is about the search for the Loch Ness monster, tied together with belief in both technology and in the existence of the monster. The Loch Ness Investigation Bureau (referred to as LNIB) stops arranging the seasonal operations when they lose the base at Achnahannet and after 1980 it is a new type of investigation at the Loch Ness. This new investigation was done by different groups using different equipment and will not be a factor in this thesis but is the reason for why my thesis stops at 1975. My method is to work thru the sources in a linear timeline because of the technological aspect, it will show how the development between the use of technology and the search for the Loch Ness monster develops. The questions around what technology to use and the trust related to science and technology are also developed thru time. The last part about the trust in technology becomes apparent during the years 1960 and early 1970, and the linear timeline shows how the use and who uses this equipment becomes important.

Technology as a definition can relate to five broad terms. The dictionary explains technology in five points, I will focus on the first; Technology is the branch of knowledge dealing with the creation and use of technical means and their interrelation with life, society and the environment. Drawing to subjects as industrial arts, engineering applied science and pure science.¹ Applied science is to use already known scientific knowledge to a practical problem or use already existing technology. Which is what was done at the Loch Ness. When I discuss

¹ <https://www.dictionary.com/browse/technology>

the different technology and equipment used during the search, technology will be referring to the equipment used and trusted. This will be underwater listening and searching devices, sonar, hydrophones, and the photographic equipment. These two main categories will be an important factor showing what technology is trusted to provide the adequate proof. Other technology used will be shown as a way to stack technology, but the focus will be on the technological equipment which was used often and trusted. Other scientific research methods as writing down statements, and interviews will be regarded as data collection. Environmental research was given little space during the search, but is regarded important to show the environment in and around Loch Ness, for the argument of ignoring factors explaining a phenomenon.

1.6. A BRIEF BACKGROUND ON THE LOCH NESS MONSTER.

The Loch Ness monster have been mentioned in various sources from around year 600. This describes a wild sea serpent or sea monster which inhabits the Loch Ness in Scotland. Around 1930 sightings started to be reported of a creature swimming in the Loch. The myth of the Loch Ness monster was then brought back to life. During 1933 it was multiple claimed sightings of the creature, with as many different descriptions as sightings. Because of the media attention, multiple private field expeditions were done at the Loch Ness. Especially after 1934 when the “Surgeons photo” was taken and released to the public. This led to the use of cameras to try capture a photograph of the Monster and prove the witness statements. The Loch Ness monster become known fast, both as a unexplained phenomenon but also as a myth.

2. TECHNOLOGY, CAMERA AND SONAR BACKGROUND, HOW DOES IT WORK AND WHY DO WE HAVE IT.

2.1. INTRODUCTION

Technology, a term which can contain much and at the same time little. David Edgerton argues in his book how Technology builds on previous technology, meaning it is a transfer of

techniques.² Edgerton discusses how war have an influence on the technology, both moving slow between war time, and faster during war. He brings in examples like the Radar as military developed technology, but also focuses on civilian technology, bringing in the different cultures and developments in the different countries in different time periods. My definition of technology will be shorter than Edgerton's. The technology I want to focus on is the technology which will have the most attention during the Loch Ness search. Technology will therefor be both military made and civilian made. Civilian made refers to outside of the military or in affiliation with war.

The military technology will include the use of sonar, hydrophones and other underwater listening and detection technology. This technology was developed by and for the military and the sources for the development of sonar I will use the United States. Bureau of Naval Personnel, *Principles of Naval Ordnance and Gunnery*. This personnel book shows how the sonar works and the technicalities of using it. For the background on the sonar and its development I have used Willem Hackmann's article *Sonar Research and Naval Warfare 1914-1954: A Case Study of a Twentieth-Century Establishment Science Historical Studies* "Sonar Research and Naval Warfare 1914-1954: A Case Study of a Twentieth-Century Establishment Science Historical Studies. The development of the strobe-light and Harold Edgerton's underwater camera falls in both categories. Edgerton developed the strobe-light and had began taking pictures of objects in speed using this flash, but during the war he was adapting his technology to fit the militaries need. This might have had an impact when Edgerton went on to develop his underwater camera. For Edgerton's part in technology I have chosen to use Roger R Bruce *Seeing the Unseen*, as well as use the MIT websites for a more thorough understanding of Edgerton's technology.

The development of permanent photographs seems to fall under the category of civilian developed technology. The use of photos would become one of the most trusted technology at the Loch Ness and I wanted to give a background for how this was developed. I have chosen to use Michael Peres *The Focal Encyclopedia of Photography : Digital Imaging, Theory and Applications, History, and Science*, which shows the science behind developing and inventing the permanent photographs.

² David Edgerton, *The Shock Of The Old: Technology and Global History since 1900*, (Profile books, 2011), 227 https://play.google.com/store/books/details/David_Edgerton_The_Shock_Of_The_Old?id=IdVGikvzIH0C

2.2. THE DEVELOPMENT OF PERMANENT PHOTOGRAPHS.

Photography was developed during the 1800's building on the previous knowledge. The word photography comes from the Greek word is *photos* and *graphos*, together meaning light drawing. Photography means in some form a image made by light and chemicals, light serves in this form as energy. A photography is by the definition a way to create durable images by using light. this can be done by an image sensor or chemically using sensitive materials. These sensitive materials was the most common in the 1800's. First time used in 1802 by Thomas Wedgwood and the scientist Sir Humphrey Davy, the results was published in the *Journal of the Royal institute*. The procedure they used was to coat light leather and paper with silver nitrate making the processed leather or paper the sensitive material. covering it with painted glass and exposed them to light which darkened the silver. But the images did not last, and they did not have a solution to this issue. the first permanent photograph was made by Joseph Nicephore Niépce, he began his experiments by using paper sensitized with silver chlorine. This technique was not satisfactory, so Niépce moved on to use different light sensitive materials. Niépce covered different materials in asphalt dissolved with lavender oil which hardens, when this had dried, he covered it and exposed it to light. The areas unexposed was then removed and dissolved while the hardened areas remained as a negative image. Niépce placed waxed engravings on these sensitive plates and removed the excess and the plate would be used as an etching plate for printing in a press after being treated with acid. Niépce called these plates for heliographs taking inspiration from the Greek words *Helios* and *Graphos* which means "sun drawing". In 1826 Niépce used a heliograph with a thin asphalt coating on top of polished pewter. Niépce exposed this in a camera.³ This is the only surviving heliograph, and the picture he captured is known as "View from the window at Le Gras". The estimated time to expose just the horizon and the largest differences in architecture of buildings was around two days. what makes this image so special is that it works as a positive and negative image depending on how it is illuminated and is permanent.⁴ The same year. 1826, Niépce started a partnership with Louis Jaeques Mandé Daguerre. Daguerre was the inventor of Diorama in Paris and wanted to pursue how to secure images using camera and light. In 1835 Daguerre was still searching to find a way to make images that would be permanent with Niépce son Isadore after Niépse's death in 1833. Then in 1835 Daguerre

³ Michael R. Peres, *The Focal Encyclopedia of Photography : Digital Imaging, Theory and Applications, History, and Science*, (Massachusetts: Taylor & Francis Group, Burlington, 2007), 27.

⁴ Peres, *The Focal Encyclopedia*, 28.

discovered a new process using silver plates fumed with iodine and exposing the plate to mercury fumes. This process took only minutes in contrast to previous attempts which had taken hours. The image could then be stabilized by giving it a bath of sodium chloride. This image development is called Daguerreotype and is both positive and negative depending on the angle and lighting it is viewed. This technique became the standard for cameras and photo development until the photography started being developed on paper.⁵ Photogenic drawing was a new term referring to stabilizing both positive and negative images on paper.

Photography on paper was experimented on by William Henry Fox Talbot, a English scholar of hieroglyphics'. His experiments started in 1834 and Talbot discovered how percentages of silver nitrate to sodium chloride affected the sensitivity. This led him to understand how he could make the unexposed areas of the images less sensitive and how to make images stabilised and without being exposed to strong light could be preserved for years. This also meant that Talbot could make a positive image by printing in the sun on a second piece of sensitised paper. By 1839 Talbot could produce photogenic drawings with colours and focus, while still being relatively sensitive. The images could not be shown in sunlight without visibly changing. A permanent positive process on paper was invented in 1839 by Hippolyte Bayard. Bayard's process was to light bleaching the exposed silver chloride paper with a potassium iodide solution, then fixed permanently with hypo.⁶ That was different from Talbot who chose not to use hypo to fix his images, which might have been because of hypo being such an expensive chemical that Talbot chose to use a different compound.⁷ Forty years after Talbot and Daguerre made their discovery and with forty years of developing, changing and researching multipole possibilities Eastman Dry Plate Company introduced the paper roll film and sheets of celluloid-based film in the mid 1880's. The paper was marketed as American film and this film would be in a special container which would be fitted to any type of camera. These papers were based on gelatine which would be softened using hot water and after used as a gelatine glass negative,⁸ or the film could be removed from the glass by applying gelatine and then collodion, to then be removed from the plate with a knife. This type of film was the film in the first Kodak released in 1888.⁹

⁵ Peres, *The Focal Encyclopedia*, 28.

⁶ Peres, *The Focal Encyclopedia*, 29.

⁷ Peres, *The Focal Encyclopedia*, 28.

⁸ Peres, *The Focal Encyclopedia*, 34.

⁹ Peres, *The Focal Encyclopedia*, 35.

The development of the photograph making it permanent and to be able to capture a moment in time forever is a very different way than before. A painting and text can not compare to a photograph which does give a still photo of a moment. A photography would not be able to change what is captured on film, unless it is manipulated in some way by using light, contrast or manipulating the photograph itself. However, a photograph can not give a context. An unmodified picture will only show what is captured thru the lens at that moment. This idea that the photograph shows the truth, might be one of the reasons the trust and validation of existence of the creature have to come from a photograph or film. While cameras was still being modified and becoming more advanced another forty years passed and Harold Edgerton are experimenting using cameras and flashes together with strobe lights.

2.3. EDGERTON FROM STROBE-LIGHT PHOTOGRAPHY TO UNDERWATER PHOTOS AND SONAR CAMERA.

2.3.1. Strobe-light camera

In 1933 while sightings started to appear in the media about the monster,¹⁰ at the MIT there was made advances in the photography and science around the use of flash and strobe light. Harold Edgerton an engineer at MIT was working on developing the flash to a strobe light, slowing time. The Stroboscope made by Edgerton consists of 3 basic parts, this is needed to have the stroboscopic release one flash of light. The stroboscopes setup is basic, what is needed is Power-supply, conductor and a tube with gas. The way it works is the power supply, either an adapter or a battery, sends electricity to a conductor storing up energy. Then the conductor “dumps” the saved energy into a tube. This tube is filled with gas, when the molecule in the gas reacts with the electricity it makes the molecules vibrate. This vibration or reaction is then causing a flash.¹¹ This is interesting in how this would affect the speed of the flash going off. Creating many strong flashes go off in a row creates a different way to not only illuminate an object, but to capture and study moving objects in a new way. Edgerton was also in the early nineteen-thirties working a lot with cameras, The Kodak camera was tested a lot and he combined this with using the strobe light and an open shutter. As a normal

¹⁰ Ronald Binns, *The Loch Ness Mystery Solved* (Somerset: Open Book Publishing Ltd, 1983), 9-19

¹¹ Roger R Bruce, Editor, *Seeing the Unseen: Dr. Harold Edgerton and the Wonders of Strobe Alley* (Rochester: The MIT Press, 1994, 24.

motion picture camera, it is usually taking 24 frames per second. If this is synchronised with the electronic stroboscope and a modified high speed motion picture camera, this can take a picture synchronized with the flash. This means each flash will be frame of film exposed, the number of flashes then determine how many pictures taken. Edgerton had by this modification the ability to expose 6-15000 frames per second. Normally projected film speed was 24 frames per second by this modification the possibility opened to study high-speed events in slow motion.¹²

Harold Edgerton was an engineer and always eager to develop his skills and modify, invent and find solutions and answers. this shows in his work with bats. Edgerton reached out to Harvard's biology department in the search for someone with bats to photograph. Edgerton was referred to Donald Griffin, a biology student specializing in bats. When Griffin came to the MIT with the bats, he was met by Edgerton's set up, cameras and light at one end of the room, with amplifiers and stroboscopes.¹³ When Griffin released the bats they were flying around, scared and it was impossible for Edgerton to get a photo of them. They tried to make the area smaller but still it was impossible. The next day, Edgerton had made changes to the camera. Instead of Edgerton trying to take a picture of the bats, the bats took pictures of themselves. Edgerton had combined a beam of light and a photoelectric cell who acted like a relay. When the bat flew past it and interrupted the light, the strong flash would go off and the film would be exposed.¹⁴ This experience by capturing photographs of animals and other creatures in high speed, without forcing the animals but to adapt to the circumstances, shows how Edgerton's creativity and interest in technology was valuable later on when following the search for the Loch Ness monster.

During the second world war a third of the staff faculty at the MIT was on government leave assisting in the war in new environments, Harold Edgerton was one of them. Edgerton was an electrical engineer but had become best known for his photos using high-speed photography and the use of flashes. His ability to catch images of fast objects made him interesting for a new project for the military; adapting the flash photography of objects to be used to take aerial surveillance photographs, at night. The method for taking photos at night had to be better than the system developed by Colonel Goddard during the first world war. They had used a magnesium flash bomb system, releasing canisters weighing about 50 lb that were self-

¹² Bruce, *Seeing the Unseen*, 29.

¹³ Bruce, *Seeing the Unseen*, 33.

¹⁴ Bruce, *Seeing the Unseen*, 34.

detonating from airplanes. The canisters are filled with flash powder and were shown on the sky like a single-burst firework. Issues with the system was the canisters itself and the flash powder was extremely sensitive and could easily be ignited. The self-detonation was relaying on the pre-set time in the fuses and the plane carrying them had to maintain a predetermined altitude for the flashes to illuminate the ground.¹⁵ The request to Edgerton was for hi, and his team to produce an aerial electronic flash, large enough to light up about a square mile. But the flash had to be small enough to be carried by a plane.¹⁶ Edgerton and his team used a year to develop this and could successfully take pictures of the campus at 2.000 feet altitude. The flash was connected to a B-18 plane and the camera was on the plane flying side by side the B-18. The project met some issues and in 1943 the team still had to work out how to increase the altitude of the flash. The military had to have the planes at an altitude at 3.500ft for them to be safe from enemy attack. This raised two problems, the flash already built was to small. They had to build a bigger lamp to be able to take a picture from that height, and this led to the next problem, weight. B-18 was to small to be able to fly with such heavy equipment, so the only solution was to start the changes to the camera equipment and wait for the new plane that was secretly developed, B-24. B-24 was a larger plane and was the only plane large enough to carry the weight of the new equipment at 3.500ft.

When the B-24 was finally finished, and the new equipment was done the testing showed new issues. The equipment kept failing and Edgerton had to travel back and forth trying to fix the issues as they showed up. B-24 caught fire during a refuel and this plan also had to be scrapped. The decision was then made to have the equipment changed to fit a smaller plane, the A-20. This plane was smaller, faster and easier to manoeuvre, making it harder for the enemy to shoot down. Edgerton was sent to Italy for this project and over eighty photo missions were done over the Monte Cassino. This success led to Edgerton being sent to England and equip the 155th night photo squadron with the flash equipment so they would be able to take pictures of Normandie before sending in the Allied forces.¹⁷ Edgerton have after taking the pictures of the bats and working with the military kept working on the strobe-light, modifying cameras and working with different sizes. Making these cameras work and be tested successfully above surface before developing the underwater cameras.

¹⁵ Bruce, *Seeing the Unseen*, 38.

¹⁶ Bruce, *Seeing the Unseen*, 40.

¹⁷ Bruce, *Seeing the Unseen*, 42.

2.3.2. Underwater photography

After working with the Atomic Energy Commission (AEC), developing the Rapatronic shutter, taking pictures at 1/1000.000 second, to take photos of nuclear explosions. Edgerton moved on to taking photos under water.¹⁸ In 1953 Edgerton agreed to start working with Jacques Cousteau, he was co-inventor of the “aqualung” with Emile Gagnan. The “aqualung” was the first under water breathing equipment. The cylinder of compressed air was attached to a regulator and as the diver descended it automatically gave mire air pressure to the breathing tubes. Cousteau had many successful dives, but noticed a known phenomenon called “deep scattering Layer” (DSL) or referred to as “false bottoms” also picked up on sonar from ships showing sudden shallowness.¹⁹ This was dense layers of ocean matter which rose at night and sank during the day, correlating to the sunlight. This happen further down than the divers could go, so the option was to study it from the inside of a bathyscaph and take photos of the DSL. The question of how to do this led to Cousteau visiting Edgerton. Edgerton after this meeting agreed to start building an underwater electronic flash camera, and lower that into the ocean by a cable. Edgerton designed a camera to withstand the pressure at 3000ft and could contain 800 exposed film at fifteen seconds intervals. The equipment was two steel tubes, one was there to protect the camera the other was holding the flash lamp, electrical components and battery. The two tubes were in a V shape. This was done so the angle would make the flash illuminate the water about six feet from the focused lens. The flash and the camera were connected and synchronized by cables.²⁰ After some changes to the camera after the wood he had used as wedges in the camera had been destroyed by the pressure, they managed to take 13.000 pictures of the DSL during the summer in 1954. They discovered that the DSL contained mostly living organism. But they also saw on the sonar of the ship that the DSL thinned out as the camera passed and got thicker again once it was thru. They started speculating if it was the flash or the motor of the camera that was driving fish away. Edgerton returned to Cambridge where he and his co-developer MacRoberts started to redesign the whole camera, changing the flash to beam sidewise over the lens instead of the flash cylinder to confront the camera.²¹

¹⁸ Bruce, *Seeing the Unseen*, 48.

¹⁹ Bruce, *Seeing the Unseen*, 60.

²⁰ Bruce, *Seeing the Unseen*, 60.

²¹ Bruce, *Seeing the Unseen*, 61.

The pictures were still blurred and with the flash lasting 3/1000 of a second, Edgerton calculated that the objects in the DSL and the larger fishes were moving at three to ten feet per second. And the bigger fish still moved away from the camera as it was lowered, staying out of the lens reach. Cousteau had the idea to drag the camera on a sled after the boat, which seems to have been more successful. But they still used the former method of lowering the camera by cable and started to develop that method further. The former method they had used to lower the camera by the cable gave no indication of how close they were to the bottom of the sea until the camera hit it and the cable slackened. The camera was then pulled up muddy and filled with sand after its encounter. Edgerton turned to sonar to fix this issue.²²

The sonar was first used for the military in the naval warfare during the first world war, to counter the use of submarines. Edgerton would now use this on his camera. He connected a transducer to send a ping and the switch was connected 8 feet under the sonar unit. The plan was when this hit the bottom, it would fall and shut off the transducer. This would tell the crew that the camera was 8 feet above the sea bottom. This worked somewhat under the right conditions, but the sea bottom is not straight, and it was difficult to hold the camera in the right position for clear photos to be taken.

Edgerton redesigned the whole sonar system for the camera, changing out the switch which did not work in uneven terrain. The new system had the ship to read two signals. One was the reflected ping from the sea bottom sent from the sonar to the sea bottom, and the other was the direct ping from same sonar connected on the camera. This took a bit more time to read but made it easier to adjust the camera for changes in the terrain.²³ Edgerton's camera and use of camera had changed a lot from the first pictures of slowing time, to now being able to take pictures of the underwater trenches and phenomenon's using the strobe light and different shutters. Already the first photos Edgerton took became popular and was printed in magazines, the new technology giving people the possibility to see what previously could not be witnessed made his photos into art and science.

The development and modifications that was discovered by Edgerton and how he modifies to situations was important for the development of the underwater camera and the use of it. This would be particularly important later at the Loch Ness where most of these discoveries and modifications was in use alone or together with other technology like the sonars. These

²² Bruce, *Seeing the Unseen*, 62.

²³ Bruce, *Seeing the Unseen*, 63.

cameras would become very important both in 1972 and in 1975 when pictures of the creature was published. Those photos were taken underwater, combining Edgerton's experience possibly. The Sonar who triggers the camera might have come from the idea of using the flash to trigger the camera the same way previously done with bats. In 1972 and 75 this was done with underwater cameras and with the help of sonar.

2.4. WARFARE TECHNOLOGY, SONAR AS A RESPONSE TO SUBMARINE WARFARE.

Sonar was developed as a respond to the new way of warfare discovered after the first world war, the underwater warfare and the new threat, the submarines of world war one.²⁴ The goal was to have a device which could be installed on ships with the purpose of warning ships of torpedoes and aid submarines in attacking ships.²⁵ After world war one, Germany was not allowed to possess submarines until 1935, so to defend their ships against the use of sonar they focused on hydrophones.²⁶ Hydrophones works as an underwater microphone making it possible to listen and then interpret the sounds.²⁷ Hydrophones was being developed already in the 1880s. In 1889 it was reported a underwater warning bell and hydrophone system and a similar system was also reported a year after. By 1902 underwater sound was marketed as a navigational help.²⁸ These hydrophones were operated electrically or by wave action and equipped under various dangerous obstructions. The signal could be picked up 15 km away by the hydrophones mounted in the bows of the ship.²⁹ Because of the passive way a hydrophone is working it was not effective as a aid against torpedoes. Both the U.S and the British started to develop other means and made a prototype of a transducers. The first prototypes could pick up Echoes 400 meters away.³⁰ The Royal Navy and the U.S Navy both decided to research and develop further into the mechanically rotated echo-ranging sonar. Because of its ability to make ships detect and hunt submarines.³¹ During the first world war the submarines was traced with varied results but the few confirmed hits using hydrophones was enough to make both the Royal Navy and the U.S Navy confirm that the prototype asdics (Sonar prototype)

²⁴ Hackmann, Willem D. "Sonar Research and Naval Warfare 1914-1954: A Case Study of a Twentieth-Century Establishment Science Historical Studies" in the *Physical and Biological Sciences*, 1986, Vol. 16, No. 1 (1986): 83

²⁵ Hackmann, "Sonar Research and Naval Warfare," 86.

²⁶ Hackmann, "Sonar Research and Naval Warfare," 86.

²⁷ Hackmann, "Sonar Research and Naval Warfare," 90.

²⁸ Hackmann, "Sonar Research and Naval Warfare," 90.

²⁹ Hackmann, "Sonar Research and Naval Warfare," 91.

³⁰ Hackmann, "Sonar Research and Naval Warfare," 98.

³¹ Hackmann, "Sonar Research and Naval Warfare," 86.

was working and that active echo-ranging was performing better than passive listening.³² During the 1940 the British Navy in form of their fleet exercises understood that there was room for improvement on their sonar and change in design. This gave their submarines hunters a greater advantage by changing the dome which housed the transducer and adding a chemical range recorder which meant that they could now plot the submarines movement.³³ This became more important as the second world war started when the submarines from both the allies side and the German side of the war had evolved since the first world war. The submarines of the second war had now the ability to dive deeper, moved faster in the depths where the previous locators could not reach. The Allies improved their Navies and improved the sonar to be able to detect these new weapons. The Royal Navy developed the “Q” attachment.³⁴ This was a narrow deep-beam set, which made it possible for the hunting vessel to maintain the deep range sonar contact. The asdic was the first with this deep diving ability, the tilted transducer and depth recorder connected. While this was developed more projects were started like the split-beam, scanning and the FM sonar, they were finished during the late 1940’s and 1950’s.³⁵ The Sonar (asdics) was valuable to detect submarines and was used as a guid to hunt down the U-boats from a ship. But the sonar did not work to detect submarines at surface and the range was limited to 1.2km. it was still considered valuable for its ability to help finish off a submarine after detection.³⁶ Around 1941 the U.S and British researchers took two slightly different paths. The U.S focused their sonar research to detect and hunt U-boats while the British tried to develop sonar to destroy U-boats. By 1942 the U.S and British again worked together to develop the sonar after many years of secrecy.³⁷ The ability of the U.S to quickly get inventions into production and the British’s ideas made the developments in sonar research develop quickly during the 1940’s when the U.S and British worked and shared their discoveries with each other.³⁸ Sonar have had many purposes and have been used in different variants since the discovery of listening for sound under water to also include active sonar sending sound and receiving the echo. The frequency the sonar works on are usually referred to as infra sonic (very low), to ultra-sonic (very high) The sonar is also known as the study of underwater sound, underwater acoustics or hydro acoustics. The sonar was developed as a response to the new threat that was the underwater warfare after World

³² Hackmann, “Sonar Research and Naval Warfare,” 99.

³³ Hackmann, “Sonar Research and Naval Warfare,” 100.

³⁴ Hackmann, “Sonar Research and Naval Warfare,” 102.

³⁵ Hackmann, “Sonar Research and Naval Warfare,” 103.

³⁶ Hackmann, “Sonar Research and Naval Warfare,” 107.

³⁷ Hackmann, “Sonar Research and Naval Warfare,” 106.

³⁸ Hackmann, “Sonar Research and Naval Warfare,” 104.

War one, because of the growing threat they used the simpler hydrophone in during the first world war.³⁹ So how the sonar actually work. This can be explained short as a unit sending out a ping or signal and listening to the echo returning, almost like a radar, working only under water. However, because of the different types of sonar and the importance of the development of the sonar to be used as a vital underwater tool it is useful to know how the sonar works on a deeper level. The radar and sonar were developed almost at the same time, during the world wars, the sonar have been thru a lot of different stages and development. The sonar uses the echo to locate and find underwater objects, initially the submarines. The sonar refers to the “active” sonar. meaning it send out the “ping” and then the transmitter receives the echo,⁴⁰ transform the received echo to a decibel that the operator can hear.⁴¹ The main difference between the active sonar and the passive is that passive sonar only listens for echoes, while the active send out the “ping” then receives echo. With the active sonar, there is also the option of scanning sonar.⁴² The sonar when sending out the “ping” works in a beam, sending the signal and receiving the echo in this range.⁴³ The beam is not straight forward or around but works in a cone shape, getting wider as the sound travels. The scanning sonar is more complicated than the standard sonar with more equipment needed. It would require as a sonar the sonar the transmitter- receiver, transfer switch and the transducer, adding in amplifier units, switches and at last a data converter. This makes it possible not to only hear the echo from the sonar but to also have a display visual, made possible by the cathode ray tube.⁴⁴

2.5. SUMMARY

It took less than 100 years to develop permanent photography. By developing the photography, a camera and the use of a camera becomes less of an specialised, scientific field. By the end of 1800’s the camera can be more accessible for the common public. The development of the camera and photographs together made it possible for Edgerton 40 years

³⁹ Hackmann, “Sonar Research and Naval Warfare,” 89.

⁴⁰ United States. Bureau of Naval Personnel, *Principles of Naval Ordnance and Gunnery*, 1971, 22.

⁴¹ United States. *Principles of Naval*, 23.

⁴² United States. *Principles of Naval*, 423.

⁴³ United States. *Principles of Naval* , 422.

⁴⁴ United States. *Principles of Naval*, 423.

later to experiment with cameras and light, leading to the use of flash and strobe light. The strobe light makes it possible to “slow time” taking picture of fast-moving objects, like Edgerton discovered with the bats. By adapting this use of flash during the second world war have undoubtedly had major a major impact and the flash have been developed further than what it was in the 1940’s.

The sonar being made as warfare technology to fight of submarines and to be developed further when the U-boats got more advanced, with deeper dives and became faster under water, shows how the military alliances and the exchange of technology and ideas have worked between the U.K and U.S. When the U-boats got more advanced, the sonar got more precise, it could scan deeper and there is development in using the sonar not only to listen for the echoes, but for visual aid. Other developments to the sonar and how it was constructed, meant that this sonar could track better and faster than the previous sonar or as the British called it Asdics. The last sonar seems to have been an adaption of both ideas from both countries, which the main goal was to hunt and destroy U-boats. The development of sonar was used by Edgerton when he was trying to photograph the DSL, using the sonar and transducer to indicate the bottom of the sea, protecting the camera. Modifying first the camera to have a switch turning of the transducer, which did not work in the uneven terrain. To a different system, where the boat read two signals. One from the camera and one was the echo from the sea bottom. This invention and idea build on the influence of military technology used independently in other creations. However, the sonar was developed slowly in the years between the wars and was a higher priority during war time. Edgerton might have learned about sonar while working for the military during the second world war or heard of it after. Regardless, the underwater camera fitted with a sonar to take pictures off the bottom of the sea is a creation drawing on both military and individual technology, creativity and development. This combination would be used later at the Loch Ness with the collaboration between U.S scientists and engineering with the British, and how the field operations were promoted, and equipment being borrowed and modified to use at Loch Ness in the search.

3. THE SEARCH FOR THE LOCH NESS MONSTER

In these chapters I have decided to part them in three sections. Because of the source material and how the search evolved. The sectioning before 1961 witness statements reported to the media is the most available source material and it shows a change in how the newspapers report on the phenomenon. From being head titles, to being the end of a joke, not taken seriously. The news articles and secondary source material, including Binns, and primary sources which is Dinsdale's book, especially for his own expedition. This first section will show how witness statements are taken as a legitimate reason to do research at the Loch Ness, however the witness statements are not sufficient proof and cameras are in use to confirm existence. Dinsdale's expedition is included in this section because new technology is in use after the year 1960. Dinsdale's expedition could have been included in the 1961-1970 section, but because his use of camera and his expedition being the start of a shift in how and what technology is used it is the end of a period before another starts.

The next chapter 1961 to 1970 are the years where the Loch Ness Investigation Bureau is established and the most active. The science in form of analysing film is more present, there are expeditions, and the newspapers changes from being sceptical to have more scientific interest in it. Sources here are mostly private letters or reports from the LNIB between members of LNIB or other participants. Most of these letters and reports are describing findings, equipment being used or plans for the next field operation at the Loch Ness. The archive material shows how technology and the planning around using the technology. Letters between members and the yearly reports show how the trust in technology is more prominent in this section, but the witness statements are still valued in the early 1960's.

From the 1970 it is a change in the use of technology, it becomes more refined and developed. The tests that were performed are now taken to the Loch Ness and it is more excitement around the searches. More people are getting involved and the search is broadcasted internationally. By 1975 there is less activity, and I will finish chapter 3 with the possible explanations that have been observed but not paid attention to as well as the doubt to the searches and findings. This will show how the technology and hunting for proof turns into stacking technology and more equipment isn't necessarily better.

3.1. THE SEARCH FOR THE LOCH NESS MONSTER BEFORE 1961: WITNESS STATEMENTS AND CAMERAS.

The loch ness and its creature have been talked about as a legend for many years. And mentioning of a creature living in the loch ness and river ness have been around for a long time. Saint Adamnan wrote in *life of Saint Columba* in the year 565 the monster shall have been seen and the monster in River Ness killed a man.⁴⁵ The story goes on telling how the blessed man, Saint Columba, encountered the monster after he met the group burying their friend. He commanded one of his men to go into the river and swim to the other side, retrieving a coble that was on the shore on the other side.⁴⁶ While the man was swimming the monster surfaced again, disturbed by the swimmer, and rushed towards the swimming man. The “blessed man” made the sign of the cross in the air towards the river, calling the holy name, then called out to the monster; go thou no further, nor touch the man; go back at once. The beast who moments earlier had charged the man with open mouth and loud roars, turned quickly around apparently terrified of the holy man and fled.⁴⁷

The monster was since then mentioned rarely in written sources. Mentions of it occurs in 1520, 1771 and in 1885 according to a letter Binns show to being sent to *The scotsman* 20. October 1933.⁴⁸ In 1933 the mystery around Loch ness and the Loch Ness monster had started and multiple reports had made its way to the media after multiple people claimed to have seen the creature. In 1933 the *Inverness courier* picked up on the story of the sightings in the Loch Ness. Multiple witness statements came in during 1933 and 1934, some of the witnesses claimed to have seen the monster years prior, and multiple newspapers started to print these stories. One of the witness stories was from a married couple. The *Inverness courier* told the story of a local married couple witnessed the monster out in the loch, they stood there watching how the monster broke the water, rolled around before disappearing again. Creating “... waves that where big enough to have been caused by a passing steamer”.⁴⁹ The article mentions this is not the first of recent sightings, a few years earlier, in 1930, some local fishers had an experience while out rowing in Loch ness. This witness account was met with scepticism, and nothing more came out of it until more people seeing the monster came forward. The article mentioning the husband and wife emphasise the

⁴⁵ https://archive.org/stream/lifeofsaintcolum00adam/lifeofsaintcolum00adam_djvu.txt

This might not be the Loch Ness monster, but location is in the same river going from Loch ness to inverness and the sea. The source is partly, from the boston library, digitalised in 2010 and the file is damaged. this is written by Saint Adamnan, year 679-704, translated from latin.

⁴⁶ Coble, a type of fishing boat.

⁴⁷ LIFE OF SAINT COLUMBA 137

⁴⁸ Binns, *Loch Ness Mystery*, 51.

⁴⁹ *Inverness courier*, 2.May 1933

couple's credibility. The husband, a businessman living close to Inverness and his wife who is a university graduate, seems like an attempt to make this story more credible than the sighting and reports from simple fishermen.

After the article about the couple's encounter with the creature, stories became more frequent, and more articles were written about the creature living in Loch Ness. The media started to get more interested in this mystery and the editor of *The Scotsman* sent Philip Stalker to investigate at the Loch Ness. Stalker was a Scottish journalist and left for Loch Ness in October 1933, Stalker spent two days at the Loch.⁵⁰ Returning from the Loch, Stalker wrote several articles for *the Scotsman*, taking inspiration from his encounter with Alex Campbell and Commander Meiklem, Alex Campbell's neighbour who claimed to see it the same day as two other witnesses in the area of Fort Angus.

Stalker also used material from the *Courier* regarding the sightings, however those were anonymously written by Campbell. Alex Campbell was the Water bailiff at the Loch Ness, who also worked some form of freelance on the side as a correspondent for *Inverness Courier* and *Northern Chronicle*⁵¹. Campbell was friends with the Mackay's, they were the married couple claiming to see the monster out in the Loch.⁵² Stalker was also leaning towards the idea that the *Northern Chronicle* made in August 1933, that the creature might be a Plesiosaurus and said as much on the BBC radio.⁵³ Getting the attention of Lieutenant-Commander Rupert T. Gould. Gould had a background in the navy and after leaving in 1915 Gould became a naval assistant in the Hydrographic Department of the Admiralty staying with this until 1927. Gould published his book *The Marine Chronometer* in 1923 which was the book most people knew him for at first.⁵⁴ The general public came to know him through the books he posted and as a broadcaster. Gould had an interest in unexplained events and followed the reports around the "monster".⁵⁵ Gould travelled himself to Loch Ness and talked to the witnesses and Stalker. Gould's report and thoughts were written in to the Press Association and was printed in *The Scotsman*. The Press Association did not believe it the monster was news anymore, right before a picture was taken of the monster.⁵⁶ The *Mail* hired two monster hunters in December 1933 and they quickly discovered foot prints on the

⁵⁰ Binns, *Loch Ness Mystery*, 24.

⁵¹ Binns, *Loch Ness Mystery*, 11.

⁵² Binns, *Loch Ness Mystery*, 21.

⁵³ Binns, *Loch Ness Mystery*, 25.

⁵⁴ *The observatory*, Vol.68 1948 p. 233

⁵⁵ *The observatory*, Vol.68 1948 p. 234

⁵⁶ Binns, *Loch Ness Mystery*, 27.

shore. This made the media start to repost the previous stories about the monster and sightings on land, while experts at the British museum analysed the prints. In January, the conclusion was clear from the experts. The print was made with a stuffed left hippo foot.⁵⁷ The blame on who was responsible for this hoax was short lived if the monster hunters where the ones who approached the mail or if the mail reached out to them. In any case. This made the monster seem like a joke, and the respectability surrounding it was gone.⁵⁸ Until April 1934. the monster 01.04.1934 *the Daily mail* publishes the “surgeons’ photo” showing body, neck and head of the monster. The picture was taken as the most solid proof you could get but judging by the quality it is not much to be seen. The photo was distributed, and the picture was then analysed and speculated about. The picture seemed to be real, based on the size of the creature compared to the water rings, however experts did not make comments regarding if it was real or not. The experts at the British Museum might have decided to make some distance between themselves and the monster. After the hippo hoax done so recent and a picture released on April 1st might have been a red flag. The technology seems to start making an entrance and replace the trust in the subjective observations done by witnesses. Moving towards something more reliable. However, the lack of the experts making a public statement regarding it and the take it have to be real since its photographed, seems to be a mixed signal regarding lack of trust of the experts but developing trust in a thing, not a person. The public and media do not seem to regard the silence of the experts as anything significant and it did not stop the speculations in the media. There were still people claiming to see the monster and the first private expedition was done in July, financed, and overwatched by Sir Edward Mountain. Mountain had read Gould’s book *The Loch Ness Monster and Others* and was inspired by the idea that Gould puts forward at the end of the book. All it takes is a good picture to prove the existence. Mountain was an entrepreneur and was the chairman of the Eagle Star Insurance Company and decided to finance his own expedition to investigate and maybe the one to obtain the wanted picture.⁵⁹

Sir Edward Mountain’s expedition started 13. July 1934. Mountain funded this expedition privately and was the person overlooking it. Mountain’s strategy was placing 20 men around the Loch with cameras for surveillance. the problem with Mountain’s strategy was employing the men, who was earning a good pay to be there. The motivation for the crew might not be capturing the creature on film, but to have a paid vacation, occasionally stating sightings of

⁵⁷ Binns, *Loch Ness Mystery*, 28.

⁵⁸ Binns, *Loch Ness Mystery*, 29.

⁵⁹ Binns, *Loch Ness Mystery*, 36.

monster and take pictures which warranted a bonus for each photo taken.⁶⁰ This resulted in 21 pictures taken the first 14 days and for Captain James Fraser, hired to keep the crew under observation⁶¹, to step in. the next weeks no photos where obtained.⁶² Mountain was still happy with the result of the expedition and wrote to *the Field* claiming that the photos obtained proves that there is something in the lake. Mountain used two photographs taken at the Loch, Binns points out that those are clearly taken to play a practical joke on Mountain and the photos, according to Binns are clearly boat wakes.⁶³ Captain Fraser did stay behind at the Loch after the search ended to keep watching and managed to catch the creature on film. Fraser managed to get 10ft of film using the Kodak Cinecamera, 6" telephoto lens with a range of ¾ mile. This was then sent to the Linnean Society. The Linnean Society was and is devoted to natural history, with their collection of resources and expertise in the scientific and cultural research they were the experts needed to comment on the film.⁶⁴ The opinions around the creature varied from seal to whale, they commented on the estimated size and Gould, invited for the viewing thought it might be an Otter. The experts did not confirm an exotic creature or a prehistoric plesiosaurus and after this it gets relatively quiet. While there was obtained film and photos, the technology used based on the expert comments Binns bring up, says something about the quality of the equipment. The range from an Otter and a whale are two quite different opinions and to make a decision on what the creature is with that quality of proof, might have been a reach. The scientific execution of this whole expedition also gives doubts to the photos and motivation. The crew where unemployed men that were promised bonuses for pictures obtained, Mountain overlooked the whole thing from Beaufort Castle, apparently not participating actively.⁶⁵ Mountain's motivation for this seems flawed as well. By not participating and with his article stating that he had obtained the new evidence,⁶⁶ gives the impression of wanting to obtain the credit for solving the mystery. Not to get the proof for a scientific reason or move technology further. With the proof being definite, more research could have been done to look closer at the environment in the Loch Ness and its creature, which does not seem to be the motivation. The technology used seems still to be most witness statements with the photographs and films as a supporting factor. Making sure that there is something to prove that what is said is correct. This small change, especially after Gould

⁶⁰ Binns, *Loch Ness Mystery*, 38.

⁶¹ Binns, *Loch Ness Mystery*, 37.

⁶² Binns, *Loch Ness Mystery*, 38.

⁶³ Binns, *Loch Ness Mystery*, 38.

⁶⁴ <https://www.linnean.org/the-society>

⁶⁵ Binns, *Loch Ness Mystery*, 37.

⁶⁶ Binns, *Loch Ness Mystery*, 38.

finishes the book claiming a good picture is all it takes, might have been the reason for why Sir Mountain equipped so many men with cameras and had them watch the Loch. Cameras are easily operated by most people, and often the outcome is good. This might be the reason that camera is a way to proof what is happening at the Loch. The motivation around being at the Loch seems especially with Sir Mountains expedition to be economical and perhaps the fame to be the one capturing the monster. Mountains expedition is not alone in having motivations to it, during the 1930's there seem to be two motivations for why sightings and people went to the Loch, searching for the monster. One motivation is to obtain pictures or other proof for the fame in discovering the monster, while the other is to investigate and confirm the existence. The means to do either seems to now be relying on the use of camera and to get solid proof. The thought of manipulating photographs does not seem to be as big of concern as manipulating other proof, or witness statements. This might be because the photograph takes photo of what is in the shutter, and nothing more. Witness statements are more difficult to prove and there is always the possibility of people lying or being influenced by others or the media.

It became quiet after this, there is a dismissive take on the existence of the monster, the Scottish anthropological and folklore refers to it as "the case of the loch ness monster". It can seem like the film contained from the search put together by Sir Edward Mountain and the dismissiveness of the film put an end to the way the press reported and ended their articles. Binns points this out, that the articles of every new information or alleged proof ends on a positive tone, finally the mystery can be solved. Evidence of existence is captured on film or camera. Only for the experts later to counter the statements pointing out poor quality, changes in V wakes consisting with boats and so on. The hoaxes regarding the hippo foot, and the slight inconsistency from the witnesses on the appearance of the monster have probably also made articles on the account seem like it is all a long hoax. In 1938 the Loch ness monster is mentioned again, this time in *The Glasgow Herald*, the mentioning seems more like a hidden advertisement. Raising the question what about if the monster gets captured, what about the tourism? Then going into the fantastic scenery there is in Scotland and near Loch Ness that an attraction like the monster is not necessary and the prices are good for overnight stay.⁶⁷ By now it was clear that the desire to prove the existence of the monster was shifting from people making claims it existed to rely on technology. Cameras are starting to make their way as a necessity for monster hunting at the Loch Ness. However, the experts surrounding technology

⁶⁷ The Glasgow Herald, June 6th. 1938, *Loch Ness and its "monster"*.

and science seems not present yet. The technology is operated by amateurs, without a formal training in the technology they use. This might be because of the notion that everyone can use a camera.

In 1945 when the Loch Ness monster is mentioned it is portrayed as a joke. *Ottawa Citizen* mention the Loch Ness monster May 31st. 1945 that the monster had been seen again, but reports said its only 40 feet. They speculate that this estimate might have something to do with the Scotch being cut. Making the phenomenon a joke and entertainment in the newspapers.⁶⁸ A photo 1951 a local, Lochlan Stuart took a picture of three humps⁶⁹ that had swum past his house one early morning. Even if the media treated the Loch Ness monster with humour it was still being reported in weird sightings in the Loch Ness.⁷⁰ *The Virgin Islands daily news* have an article *One bell means Lloyd's pays off*. The article is mainly about the business Lloyds, that is an insurance company started by Lloyd in 1688/89. It shows its history in how it operates, members, and finishes off with how low, or lack of requirements they take to insurance something. One landlord wants insurance if murder in his building, someone got a policy for children having to many free cakes on Mickey Mouses birthday and then the Loch Ness monster. A man wants a policy of 20.000£ for the capturing of the monster alive, then transported to an exhibition hall in London. This is then mentioned with all the other ridicules claims the newspaper pointed out.⁷¹ The quiet is broken in 1957 when Constance Whyte publishes *More Than a Legend: The Story of the Loch Ness Monster*. Whyte addressed the reason for changes in witnesses' statements and descriptions and make the argument that there might be different monsters. The most interesting regarding Whyte's reasoning around the occurrence of sightings is her take on the road. Whyte brings up as a point that there where no road at the Loch before 1933.⁷² This would explain why there was so many sightings of a monster once one could travel along the North shore and overlook the Loch. The problem with theory about the road being built, is the fact that there was a road. Documented already 1906 in a guide book recommending the North road.⁷³ Whyte's book was inspiring for many and was breaking the silence about the Loch, bringing it back to life. In 1959, 3rd of August, Maurice Burton releases an article in the Sunday express where he

⁶⁸ Ottawa citizen, May 31.1945 *Once over lightly*

⁶⁹Binns, *Loch Ness Mystery*, 53 (image 5, shows photograph taken by Lachlan Stuart, July 1951 of three humps in the Loch Ness.)

⁷⁰ Binns, *Loch Ness Mystery*, 2.

⁷¹ The Virgin Islands daily News, November 9th, 1957, *One bell means Lloyd's pays off*

⁷² Binns, *Loch Ness Mystery*, 43

⁷³ Binns, *Loch Ness Mystery*, 63.

argues if the monster can be a plesiosaur, his main argument for this is if some of them have survived. the Loch ness would be a suitable habitat. Burton was a zoologist and had been fascinated by the Loch Ness monster and had followed the story of the creature as so many others for a long time. He had earlier favoured the giant eel theory, but after reading Whyte's book, changed his mind.⁷⁴ Burton reasoned that the sightings must have been because of the decomposing vegetation from the environment around Loch Ness and this would be pushed to the surface because of the gas created by humid acids. This would explain many of the sightings, and this theory would be sufficient, if the temperature in the Loch Ness favoured this. Which it does not, the temperature in Loch Ness is stable most of the year, which leads to vegetation falling into the river will in most cases sink to the bottom and decompose to sand without making any gas.

Dinsdale changes the search for Loch ness in many way and it all started with an article. Tim Dinsdale discovered the talk about the Loch Ness Monster while reading an article in everybody's magazine 21st of February 1959. He was intrigued by it and started reading the article several times not sure to believe if the creature was living in Loch Ness or if it was a creature of imagination of the people giving their testimony. He found his curiosity poked and wanted to know more, and decided he needed to try to find the truth in all this. Dinsdale started his own small investigation at home analysing witness statements and articles and books written about the phenomenon and Dinsdale managed to draw two vital flaws from the previous attempts and use of the information obtained. Firstly, was the verbal evidence. Dinsdale recognises the difficulties using verbal statements as a reliable source, however Dinsdale points out that no one had tried to secure or obtain these statements. Even if he did recognise the flaws of the practice, Dinsdale did point out that the statements had so many details in common that they had to obtain some common truth. Secondly Dinsdale points to time.⁷⁵ The times had changed and with closer to thirty years from the beginning of the first expedition, time had a vital role. Since no one had recorded in any way other than the interviews, there was no formal collection of the statements and for every year past this becomes an issue. Recollecting something accurate is difficult and to use it as any proof are not reliable without some added reference material.

16th of April 1960 Tim Dinsdale started his travel to the Inverness and the Loch Ness. With him he brought three cameras; a tripod mounted 16-millimetre Bolox cine with 135 millimetre

⁷⁴ Binns, *Loch Ness Mystery*, 44.

⁷⁵ Tim Dinsdale, *Loch Ness Monster*, (London: Routledge and K. Paul, 1976), 7.

telephoto lens loaded with black and white film a 8MM Kodak cinema, and a good German 35 millimetre both loaded with colour film the Kodak centre and the German was only for standby purposes and was only to be used if Dinsdale ran out of the larger film or had time to spare. Dinsdale's approach are different from previous expeditions. The two things Dinsdale had in common with the previous ones was the desire to catch the Monster on film and location. Dinsdale did this trip alone, accompanied only by his Cameras. The log shows a detailed system, areas are given numbers and it seems fairly thorough to follow what Dinsdale did. The logging follows a more scientific path than previous and Dinsdale seems set on the idea that he will obtain the evidence in a scientific way, using all technology he have available. This was one of the things that stood out to him when reviewing previous operations. The way proof was obtained, and reading how others have not been able to capture the photo that seems to be the one thing missing to prove existence might be the reason for why Dinsdale made the decision for bringing cameras. Dinsdale seems to trust the witnesses and their recollection, but is also relaying on the cameras to obtained the proof, camera seems to be the means to validate the witness statements and elevate them to proof.

Dinsdale's logs are thorough showing from the first day of the log at Monay 18th. of April starting early morning at 4.30. and ending at 9 in the evening. Thru the logs Dinsdale carefully writes down where he is located and what he has done at the location. Mostly its watching and talking to previous witnesses who came forward during the nineteen thirties and forward. The first 3-4 days are uneventful, Dinsdale spends hist time in the area around the Loch. It is not until day four Dinsdale records his first encounter with something in the Loch. On day four Dinsdale logs his incident at 8.10 pm, at Foyers. Dinsdale claims to see the monster in the river close to the river mouth. Dinsdale had already set up the camera in case he saw something and shortly after he got aware of a sudden violent disturbance in the water. It was centred around two long shadows rising and falling in the water. Dinsdale focused the camera on the occurrence and exposed twenty feet of film. Dinsdale then decide to try to get closer to the occurrence and wants to make his way down to the mouth of the river. Dinsdale brings his camera, but when he arrives its gone. The camera Dinsdale used was the Kodak camera he had brought with a tripod he had set up to overlook the Loch while he kept watch. Because of this event Dinsdale extended the expedition from five to six days in hope of capturing the creature on film or getting a definite photo. On the sixth day Dinsdale went out early at dawn as for the other days. After making his rounds finishing early Dinsdale decides to mount his camera inside the car going back. Pointing it towards the Loch. Half way down

starting to film, just as Dinsdale sees an object two-thirds over the Loch. Dinsdale comments on the object standing more out of the water than what Dinsdale expected a fishing boat to do. Dinsdale described the object as mixture of red and brown when the sun hit it. Dinsdale claims he saw it perfectly clear with binoculars.⁷⁶ The object was laying in the water, and oval shape, Dinsdale filmed the creature as it started to swim across the Loch away from him, shifting course and swimming in a zig zag pattern. Almost at the other side of the Loch it turn sharply and swims towards Dinsdale and making the V wake, the most attributed sign of the creature in the witness statements. Dinsdale claims seeing the froth from the rhythmic strokes from 1800 feet, with the naked eye. Dinsdale realising only 15ft of film is left stops filming making the decision to get down to the water edge west of the lower Foyers. Unfortunately for Dinsdale, by the time it took to reach the water edge, the creature was gone once again..⁷⁷ Dinsdale logged this event at 9:00 am to 9:04 am. Dinsdale logged in; filming monster for approximately 4 minutes at 1300 yards increasing to 1800 yards. Dinsdale apparently reached his new destination at 9:07 am trying to decrease the distance between him and the monster, the log shows he was watching from that shore until 10 am. From 10:00 am till 12:00 am he filmed supporting sequences of a boat.⁷⁸ The reasoning for filming the boat was because without a comparison to the film he took off the monster, it would be of little scientific value. The boat would be a vital role in comparison for the monster to be measured. This in terms of size speed and the wake. The need for the comparison made them launch a boat with a 5-horsepower motor to drive the same route that the monster itself had taken a few hours earlier they then tried to replicate the visual scene.⁷⁹

Dinsdale reached out to Kodak limited which had the expertise to arrange for the film to be processed and copied. Mr. Coppin the work manager witnessed the breaking of the seals and recorded the film identification numbers, both original and copy films. Then he shared with Dinsdale the first project viewing. The tape shows the few first frames Dinsdale had taken of different boats and steamers moving over the water and in different parts of the water of the Loch, this was deliberately filmed exposing scaling markers in the water. This went on for a few minutes before arriving at the first disturbance that Dinsdale filmed the 4th day. Unfortunately, it soon became apparent they were just watching the ocean swell of waves around a hidden shoal caused by wind. The second sequence from the following day of the

⁷⁶ Dinsdale, *Loch Ness Monster*, 78.

⁷⁷ Dinsdale, *Loch Ness Monster*, 81.

⁷⁸ Dinsdale, *Loch Ness Monster*, 76.

⁷⁹ Dinsdale, *Loch Ness Monster*, 83.

same area when the loch had calmer waves, proved that beyond a doubt. Dinsdale realised watching the tape, that the conditions of the fading light and because of the fatigue, he had been fooled by his own mind and eyes.⁸⁰

The film came around to his second sighting of the monster and this film was proven somewhat a disappointment. When he was watching it at the site and with binocular's he could see so many details, colour nuances, this did not show off as detailed on film. It lacked the colour, contrast and perspective that had been so apparent when he was at the loch. Dinsdale describe what he saw on the screen it "a shabby little black and white image that traced its way across the screen wrecked in shape and movement was indeed poor imitation of what I had witnessed".⁸¹ Tim Dinsdale still went back to the loch in July 1960 and in March 1961, spending 10 days driving around the loch trying to access the more inaccessible places. He makes a comment in his book, that he had too much equipment. This equipment includes a giant 36" lens mounted on a tripod that was fixed a 16-millimetre camera and the 300-millimetre lens and various other cameras, that are not specified. Dinsdale decided that in the future he would only operate the minimum and best photo equipment. It seems like Dinsdale is in some ways blaming the equipment for not picking up the nuances he witnessed himself at the Loch. By bringing less equipment is in regards to the inaccessible places he wants to keep lookout from. But the better equipment is probably a response to the results from his first expedition. The cameras not having the ability or the finesse to capture what Dinsdale claims to see so clearly. This does also suggest that Dinsdale either thinks the equipment can be used by anyone if the equipment is good enough. Another possibility is that he recognises that the camera must be better to compensate for the lack of training. Perhaps its neither, and the expectance to the equipment did not follow thru shown in the end result.

Dinsdale was not the only one making expeditions in 1960. Burton made his own trip to Loch Ness after releasing a new article in 1960 arguing that the creature could be a large turtle or a shell less terrapin, which would be close to a plesiosaur Burton decided to put together his first expedition to the Loch Ness bringing with him a small crew of five men. The expedition last for 8 days without a sighting of the monster.⁸² By this time Burton seems to have change his mind and concludes that the evidence found previously are biologic matter, rotting grass and branches in the Loch, mistaken for a monster. This conclusion builds on what he says is

⁸⁰ Dinsdale, *Loch Ness Monster*, 86.

⁸¹ Dinsdale, *Loch Ness Monster*, 86.

⁸² Binns, *Loch Ness Mystery*, 44.

gas from the Loch moving the matter around. This theory is quickly disregarded due to the evidence he builds it on, there is no gas in Loch Ness, matter sink and becomes sand at the bottom of the Loch because of the humid acids.⁸³ The evidence Burton had for proving that there was no monster was there for debunked.

3.1.1. Summary

Burton as an expert in zoology educated in the field, had an interest and thought of many different theories of what it could have been. But after he had gone to the Loch he did change his mind. As a Zoologist he would be considered as an expert in his field to some extent and supports the argument that the experts around the phenomenon, do change their mind after inspecting the Loch. Could this be because their expertise proves that there is nothing in the Loch or are they reaching the wrong conclusion because of other factors? Burton himself based his opinion on the environment and the science regarding decomposing vegetation however that cannot be the case because of the temperature in Loch Ness and its lack of humid acid gasses being created. Burton was also equipped with a camera during his expedition. This leads to the thought that the definitive proof would have to be captured on film, and technology would support the argument of the existence of an alleged creature.

Dinsdale was using a 135mm telephoto lens while filming the object at the river mouth and the oval shaped object moving in the Loch. This gives us three different lenses for different use. The 70-200mm lenses, 100-400mm lenses and lastly 135mm prime lenses. The 135mm is the most unlikely with a shallow depth and are more suitable for a portrait. The 70-200 lenses are able to zoom in some distance. But are designed to have a sharper subject with blurred background. Suitable for action shot of a single subject or object. The 100-400mm lenses also have zoom and push the limit more than the 70-200 when it comes to range. This is the preferred lens of wildlife photographers.⁸⁴ Dinsdale does comment to only use 300mm lenses when he goes back after 1960. this brings the question if he used a different lens previously or does Dinsdale confirm using the 100-400mm lens at 300mm. However, Dinsdale is not a photographer and with the information only given as a 135mm, its questionable about the lens and therefor the film taken in itself. Dinsdale did admit in his

⁸³ Binns, *Loch Ness Mystery*, 45.

⁸⁴ <https://www.masterclass.com/articles/photography-101-what-is-a-telephoto-lens#what-are-the-different-types-of-telephoto-lenses>

own book to be fatigued taking the film and was fooled himself by the first occurrence on the fourth day. Dinsdale's use of technology, going out on expedition and logging everything is a new approach and by the use of the camera there was definitely proof that he had managed to film something moving in the lake. Continuing going back to the Loch Ness with his goal to always have better equipment shows that technology and the use of especially camera is important for the definite confirmation of the creature. This use of technology as a means of confirmation does suggest that the trust in technology is greater than the trust in people at the beginning of 1960. The technology is favoured, and the sighting of the creature becomes only a reason to continue looking and to bring in more technology. Dinsdale mentions early that there is still no findings or photos that would hold up as proof, which leads to Dinsdale makes the effort to obtain this evidence bringing camera and talk to the witnesses that claimed to see the creature. Dinsdale does, however, not mentioning recording or in any way secure the testimonies from these witnesses in a way that is sent to or listened to by others. It is mentioned he talks to them but does not record and store these stories.

It does become clear by how Dinsdale formulates the question about lacking proof that the requirement has changed from what the requirement was in the 1930's until the beginning of 1950's, and the books previously released based themselves on star witnesses or stories. There must have been a shift in the idea of proof and the use of technology as more trustworthy than the eyewitnesses. Using the new road as a reason for the creature to start coming to the surface because it might be sensitive to sound. The road was new, but it had been a road there previously. However, the idea that the creature might be sensitive to sound is a factor that would influence how and what technology would be used for the years following 1960. This shift in acquiring proof might be the reason for Dinsdale's plan to return with less equipment, but the equipment he does bring will be better than what he used in 1960. This might not only be because of Dinsdale's plan of being in the more inaccessible areas but might be because of the film he took of the creature. The colours that did not show as radiant and clear as when he looked at it, and apparently the camera could not pick up as much detail as Dinsdale wanted, for the short clip to qualify as adequate proof. In the 1930's the idea that a photo was the proof needed have changed. It is not enough with just a photo, the "surgeon photo" was not enough evidence back then either. The quality was not good enough, and Dinsdale's film was not good enough. The use of technology changes from not only using it and obtaining a photo, but the photo needs to be of a certain quality before being considered. Why this changes and especially with Dinsdale is how he uses the cameras and the plan moving forward. Dinsdale

recognises there is an issue in obtaining valid proof. A photo is good, but not adequate. Dinsdale focuses on getting a sharp image, a better film in the future, and the means for this is better and more advanced technology than already brought in.

3.2. THE SEARCH FOR THE LOCH NESS MONSTER 1961 TO 1970: CAMERA, SONAR AND “EVERYTHING ELSE”.

In May 1961 he went back to the loch again and on this occasion, instead of being cold he got a sunburn, and he states it was now clear that almost any type of weather could be met at a loch at any time of the year.⁸⁵

Later in the summer of 1961 Dinsdale met David James, he was a member of parliament. David James helped to start up the Loch Ness investigation Bureau and became one of its directors, with Peter Scott who was an ornithologist and conservationist.⁸⁶ This company was supposed to be a non-profit organisation with the main objective to gather support, collecting evidence and help to sponsor the fieldwork. David James viewed this a hobby project, that would be exciting if there was something to the myth of Loch Ness. Dinsdale went back to the loch in spring and autumn of 1962, two different expeditions but there was still no sighting of the monster. The difference this time from the previous expedition he had made, was the upgrade in his equipment. Dinsdale had changed from amateur equipment and now used professional cine equipment with variable focus lens and sound recordings. This change in practice means less strain on eyes and neck during the use of the camera as Dinsdale could look directly at the monitor. The ability to zoom in and out without the camera losing focus would also make the quality of the picture better and give higher odds for a clear photo if the monster showed up. This means that using the amateur equipment would not be as efficient or good as using better technology and more advanced technology shown by using different cameras having more technology in them. Using this might have been the idea that better technology, using professional gear, gives more trust in the technology than using amateur equipment.

⁸⁵ Dinsdale, *Loch Ness Monster*, 117.

⁸⁶ Binns, *Loch Ness Mystery*, 2.

In June 1962 Colonel Hasler brought his yacht “Jester” through the Caledonian canal, he also brought with him 56 volunteers.⁸⁷ Hasler was well known from the second world war after planning and leading “Operation Frankton” in Burdeaux, France.⁸⁸ Hasler was used to being on the water in yachts as a trans-Atlantic yachtsman and as a Royal marine. For two months he and his sixty-volunteering crew watched the lake and listened with hydrophones for underwater noises. In July 1962 Cambridge students joined an expedition, they mounted shore cameras, they also did extensive work with fish-finding sonars. This was to test their new sonar and was the first sonar search conducted in Loch Ness. This expedition was led by Mark Westwood and Peter Baker.⁸⁹ The *Observer* newspaper had an article on Hasler, June 3rd and August 19. Following with an article in August on Barker and Westwood expedition and findings. Both expeditions claim to have had possible sightings of humps, back, neck and some positive results using hydrophone. Picking up noises and echo-tracing. The noises and echoes proved to be an unexplained phenomenon, but it still was nothing conclusive as proof. Same year a few months later in October of ’62 David James brought with him 26 volunteers using search light from the army. This new technology brought in was to aid the cameras and to make it possible to conduct search at night, placing them around watchpoints where volunteers would be keeping watch with cameras. Because it is mentioned those lights were from the military and their plan is to use them at the Loch, we can perhaps assume these lights are a lot stronger than the regular flashlights that might have been easier to acquire. The visual sightings they hoped for by using them could also have been because of the thought that visual sightings validate more search effort. It has already been mentioned funding, and confirmation, even if only visual and not technological might be enough to sustain the funding coming in to use on more technology. This did not get a positive result, but Dinsdale mentions that the monster showed itself during the daytime and that was captured with a cine camera using 35mm black and white film. The shadow, assumed to be the monster was seen moving opposite of the stream and Dinsdale states it was chasing a steam of salmon. Which could not be confirmed by other sources. The film was submitted to four scientists and their explanation was an unidentified creature and would need careful scientific examination and identification”.⁹⁰ The technology had now moved to contain film, which gives more information than just a photo, and seems to be more desired as proof than a photo. However,

⁸⁷ Dinsdale, *Loch Ness Monster*, 119.

⁸⁸ Binns, *Loch Ness Mystery*, 128.

⁸⁹ Dinsdale, *Loch Ness Monster*, 120.

⁹⁰ Dinsdale, *Loch Ness Monster*, 120.

the use of photos is still a good option. This might be because of the quality of the photos, the time it took to take a photo, which usually came back showing what they believed was “humps”. A film would show a longer sequence of the creature, how it moved and with professional equipment, might show more of the details that had been described by witnesses that have not come across on photos or previously on film. The search during night and to light up the lake starting to use army equipment might have been because it is the only available technology that is large and powerful enough to do that they intended. Reaching out to experts to analyse the movie is not elaborated much further other than scientists. Previously the experts were the ones at the Linnean society, however with the use of film, is the scientists used to examine the film experts in that field? The technology is now starting to develop away from using the witness testimony and the definitive proof they search for seems to have come to a picture or a film, showing the creature clearly without room for doubts. The technology used, the films and photos developed still have to be examined and get an approval from some experts, but it does seem like the thought of good equipment is enough to exclude the professionals from operating this and to make the judgement on what is produced. The best technology would capture an image or film of the monster in such a high quality that it would be sufficient as proof only in itself?

1963 started off with a new expedition, again by volunteers, going to the loch. This time it was supported by funding from the ATV, probably to have some leverage for the information first if anything was discovered and to possibly be mentioned if there was a discovery. With the funding LNIB manned the two-week expedition. The expedition was to be watching the loch in daylight using 35-millimetre cameras. By this time Tim Dinsdale was still going to the Loch Ness and doing his own small expedition, but in 1963 and 1964 he was working from what he called “a lonely height on the southern shore of the Loch”. By this time, he had watched the loch Ness for more than 700 hours. Dinsdale states “he was beginning to appreciate the good fortune that he had seen the monster in less than 1/10 of that time” referring to when he discovered and managed to catch the loch ness monster on film back in 1960. The LNIB started to have more expeditions and more and more people who was interested joined the hunt for the Loch Ness Monster, some worked on their own, but most worked with the LNIB. The LNIB worked from the northern shore opposite from where Dinsdale was having his “lonely hideout” on the southern shore. The most likely reason for LNIB keeping on the northern shore is probably because of the road and the better

communications, than on the southern site with more difficult terrain to get equipment and people too.⁹¹

Ted Holiday, also known as F.W. Holiday,⁹² an author and “monster hunter”⁹³ joined the search in 1963, he got hold of a tape recorder after he was talking to two fishermen, they talked about seeing in July, the head and neck of the monster. They both stated the monster was alive and powerful, the neck was about one ft. in diameter, the head was held at a slight angle to the neck, “the head reminded him of a bulldog flat on top with a powerful lower face” he saw no eyes or tentacles, the head and neck was a black and brown colour, the head was wide and extremely ugly, the part of a hump was also visible, the neck was fringed by what looked like coarse black hair”.⁹⁴ After talking to the two fishermen Ted Holiday began to collect tape recordings of sightings and reported what he had learned to LNIB. Dinsdale had also taken witness statements but it doesn’t seem like they have been records just written down. Dinsdale thinks that this is probably the best way of recording verbal evidence, because it gets intonation, description, and emotions from what the witnesses saw and how they describe them in their own words.⁹⁵ This does suggest that the witnesses are starting to come forward again, and that witness accounts are again taken as valid evidence. This could be because of the slight shift in media covers, from being ridiculed to having proper scientific articles, regardless of outcome. The newly established LNIB probably had an impact on the new perception too. Taking a more scientific approach to the witness statements by recording them, makes the use more reliable. However, with the time passed as Dinsdale pointed out earlier, the statements in a scientific value as evidence should be handled with care. Even if there are witnesses coming forward and them being recorded does not seem to influence the idea that technology and capturing evidence by using photography should be replaced. In 1964 the LNIB had his first summer long expedition, they got help from technicians from ATV who borrowed them equipment. LNIB had access to two long range photo rigs, gear-traversing heads that carried 35-mm film in the camera with thousand feet magazine and 36-inch lens and two big F24 aircraft still-cameras on cantilever arms this was to provide stereoscopic cover they were set on the 12 second intervals timer, aimed through a telescope and triggered by a switch.⁹⁶ The use of the equipment from the ATV would have been

⁹¹ Dinsdale, *Loch Ness Monster*, 121.

⁹² Binns, *Loch Ness Mystery*, 50.

⁹³ Binns, *Loch Ness Mystery*, 127.

⁹⁴ Dinsdale, *Loch Ness Monster*, 121.

⁹⁵ Dinsdale, *Loch Ness Monster*, 122.

⁹⁶ Dinsdale, *Loch Ness Monster*, 122.

professional gear from the TV company we can assume. implementing more professional gear and involvement of the media, might be a sign of an idea that the use of professional equipment might be what is needed. trying out different approaches and using trained technicians.

Since the previous years, the expeditions had only lasted for two weeks and they still obtained evidence during that short time, they were optimistic about having an all-summer expedition. Between May and August no photograph was taken, but there were many reports of sightings from other parts of the loch, but not from where the LNIB was set up. There were two sides of the Loch that have been chosen to have cameras facing each other. Each of them on opposite sides of the water the headquarters for the LNIB was on the beach to the South the same place where the colour film in 1963 showed an object in the shallows in August they changed the watch area to Urquhart. At the end of the expedition Dinsdale volunteered to stay for the final weeks remaining of the expedition as a group commander. The first two weeks of October he kept five people in continuous work. To have the whole part of Urquhart Bay covered they had two and three cameras always overlooking the Loch. Because of the distance between them they had to stay connected by field telephone. But, regardless of their watch and better equipment the expedition acquired no pictures.⁹⁷ When David James the leader of the LNIB wrote to the newspaper *Observer* who had contributed with £1000 for the expedition, the article was titled “fine weather monster” it became published 27th. December 1964.⁹⁸ This gave a clear account of the year’s activities, sightings, and research. Also addressing the claimed sighting of a monsters or weird sightings in Loch Morar, Loch Linnhe, Glen fault, Loch Lomond and all the way over in Sibir; Lake Khaiyr. The different reports talked about sightings of 30-40 feet objects with humps, necks of a monster out of the water, and a creature was sketched standing partly on land and in water after someone claimed to see the beast in north-east Siberia.⁹⁹

The LNIB and David James organised in 1965 a new expedition. They worked for 150 days and set up new headquarters at Achnahannet, approximately 200 feet above the loch from their previous main area at Urquhart Bay. This time the castle and Sandy Bay was not used. Instead, the expedition took note of the weather and used vehicles to transport equipment and crew out to likely places they could spot the monster, when the weather was the same as the

⁹⁷ Dinsdale, *Loch Ness Monster*, 122.

⁹⁸ Dinsdale, *Loch Ness Monster*, 122.

⁹⁹ Dinsdale, *Loch Ness Monster*, 123.

records showed 95% sightings occurred.¹⁰⁰ The expedition logged 1736 hours of watching from Achnahannet, additional 500 hours put in by the mobile units. Even if the units were prepared for sightings being more likely at calm and sunny weather where the units still out searching in the horrible weather the expedition faced. By all the hours the expedition logged it was only 44 hours when the weather was calm and sunny. 30th. of July 1965 The Aberdeen Press and Journal had an article that two businessmen had watched “a very large, humped animal swimming down the river towards the sea.”¹⁰¹ They said this had absolutely amazed them. The creature was very much alive. The description was as a prehistoric animal, with three humps. The animal had been in the water, approximately at the centre of the river, the skin appeared rigid, and the neck was the size of a tractor tire. The creature was visible for about six minutes, traveling slowly down the river, the two businessmen estimated they saw about 15ft. of its body.¹⁰² 1965 shows how the different tactics based on the witness statements plays in. By analysing the weather and using it for a centred search in “nice weather” to improve their chances for a sighting and to get a picture of the creature. involving vehicles to make the travel time shorter and starting have a structure around the expeditions. The structure and organisation around the searches made the whole operation more trustworthy. with David James making yearly statements on their development in the LNIB and their expeditions. informing the public but also other institutions about the technology used, how they used it and what the results was building the trust to the technology. At the end of September 1965 Dinsdale was still trying to get a picture of the monster, optimistically a close-up photo. This was his 9th. expedition alone, and he again was at the south shore on his “lonely hideout” in the difficult accessible area.¹⁰³ The problems and the difficult terrain made Dinsdale get a small fibreglass boat, making the access to his hideout easier. But this seems to be the last time he is at his hideout. The difficulties getting there, the sudden changes of the waves almost tipping over his boat, equipment malfunctioning, and injuries and sickness seems to define his last expeditions to that south area in 1965.¹⁰⁴ Doctor Roy P. Mackal an associate professor of biochemistry at the University of Chicago visited Loch Ness, mainly to look at the evidence of a monster in the loch himself. Mackal met up with David James, James invited Mackal to join the LNIB as a director. Mackal proved to be a

¹⁰⁰ Dinsdale, *Loch Ness Monster*, 123.

¹⁰¹ Dinsdale, *Loch Ness Monster*, 123.

¹⁰² Dinsdale, *Loch Ness Monster*, 123.

¹⁰³ Dinsdale, *Loch Ness Monster*, 123.

¹⁰⁴ Dinsdale, *Loch Ness Monster*, 124.

great asset to the LNIB, managing to get funds and raise interest for the research.¹⁰⁵ The LNIB submitted in 1965 a sequence of 35MM film showing two convergent wakes. was admitted for analysis to the RAF due to this information obtained by the film David James suggested to look back to Dinsdale's film from 1960 and have that examined again. Dinsdale's film was sent for examination by the Joint air reconnaissance intelligence centre, (JARIC). At the time JARIC had the absolute best equipment and they had a reputation of accuracy.¹⁰⁶ Being the intelligence unit who analysed photos from the war making them highly skilled in their intelligence work and photo analysis before the use of the satellite images.¹⁰⁷ January 1966 the photographic interpretation report No.66/1 was admitted to the LNIB. Because of the pressure of the press and the misinformation being spread in the media, the LNIB decided to publish a full report. The report, a Crown corporate pamphlet containing 2000 words of technical analysis and conclusion, with an introduction written by David James, made the monster much more respectable than what it was 30 years earlier.¹⁰⁸ Dinsdale shows how positive this report was in his book, this report from JARIC seems to be positive for the LNIB. When Binns discusses the JARIC report it seems to have a more cautious approach than what is seen in Dinsdale's book, without any conclusive evidence. Binns give a different description than Dinsdale on this JARIC report. First he goes on how this creatures colour differs from normal description of the monster being black or grey, to Dinsdale's description being red or brownish. Binns argues that the distance JARIC concludes between Dinsdale and the creature is one mile, which means the object or creature have to have fairly bright colours to be seen in that distance. This would not show on the film, because of the black and white film and not colour,¹⁰⁹ but Dinsdale describes this himself in his book.¹¹⁰ Binns think this is a motorboat Dinsdale have seen, and does think the JARIC report favours his theory. The report points out how the object appears to submerge, as Dinsdale claimed the monster did, but this can be explained by light, angle, reflectivity etc.¹¹¹ There is one quite fascinating occurrence during Dinsdale's film that Binns also points out. The creature who is supposed to be sensitive to sound, does not seem to have any reaction to the car driving by so close to the creature that it should have reacted. And this goes for the car, Dinsdale saw the creature from other side of the Loch, the driver of this car does not slow

¹⁰⁵ Dinsdale, *Loch Ness Monster*, 124.

¹⁰⁶ Dinsdale, *Loch Ness Monster*, 124.

¹⁰⁷ <https://ncap.org.uk/JARIC>

¹⁰⁸ Dinsdale, *Loch Ness Monster*, 125.

¹⁰⁹ Binns, *Loch Ness Mystery*, 120.

¹¹⁰ Dinsdale, *Loch Ness Monster*, 78.

¹¹¹ Binns, *Loch Ness Mystery*, 120.

down or seem to drive differently.¹¹² The car would have visual down at the Loch. Binns suggest that what was on the Loch was something ordinary which would not have a car notice it, like a motorboat.¹¹³ It is very interesting how the JARIC report is very different in Dinsdale's book. And it seems like the LNIB does not correct the assumption that JARIC agreed with Dinsdale. Does this mean that they think its need to withhold information to make the technology look better, or are they just taking what they think is right from the report and ignoring the rest?

With the movie Dinsdale took back in 1960 now resurfacing thru the media and how it is portrayed to draw more tourism to Loch Ness, it seems as the use of cameras and film are competing with the former issues surrounding the phenomenon. The hoaxes seem not forgotten about, but one could maybe suspect that by JARIC being the analysers and experts commenting on the film, it does give more credibility that the film is real. There is still no evidence that JARIC have the expertise in underwater phenomenon as sea-serpents and the film was not analysed by any specialists in underwater sea life. Which leaves the film to show something in the water, larger than the usual size captured on genuine film. This is still not adequate proof of existence but does show the faith in the use of film and cameras. In 1966 the LNIB started another full-length expedition, this time it lasted from May to October. New equipment was used, a new infrared film to pierce thru the mist. Last time they were close to catch the monster the film showed little other than the mist and could not be used. Now they changed the film used to work around this issue. Still, the expedition ended with no new film or photograph taken.¹¹⁴ The use and development of the infrared light and use of it was initially developed during the first world war to counter the difficult weather and other issues surrounding visibility and taking aerial photography. The Bureau of Standards then offered the new and improved plates to the military. Not only cause they had superior vision, speed and colour sensitivity range compared to previous plates, but also since they were better at penetrating haze and smoke.¹¹⁵ The experiments started already in 1917 to develop a new kind of plate due to the blocked access for materials from Germany during the first world war for the British and American military.¹¹⁶ In 1930 the technology was taken further from just

¹¹² Binns, *Loch Ness Mystery*, 121.

¹¹³ Binns, *Loch Ness Mystery*, 121.

¹¹⁴ Dinsdale, *Loch Ness Monster*, 126.

¹¹⁵ *Annual report of the Director Bureau of Standards: for the fiscal year ended June 30. 1919.* Miscellaneous publication, No. 40, page. 117

¹¹⁶ *Annual report of the Director Bureau of Standards: for the fiscal year ended June 30. 1919.* Miscellaneous publication, No. 40, page. 116

having the ability to take photos with infrared light, and Kodak started to work on how they could apply this to film and having it working and available. The Research Laboratory of the Eastman Kodak Company, mainly, worked on improving the technology being used, and made discoveries relating to the dye.¹¹⁷ This would then improve the use of the infrared lights.¹¹⁸ The Infrared film used at the Loch Ness in 1966 can we then assume should be able to be used during most of the difficult weather when sight was obstructed by mist or other disturbances to the lens. However there does not seem to have been any new information or proof obtained. The idea of using the infrared film might have come to them during the expedition in 1965, when weather was bad and, as stated previously, mist had ruined their opportunity before. Infrared film seems to be another fix to a problem they have encountered, but should perhaps been aware off, with many expeditions to the Loch both in private regie and by the LNIB. Dinsdale mentions already back in 1961 the weather is bad, and changes rapidly. The infrared film gives the advantage of taking pictures in other conditions than normal film can. Making the difficult weather not a significant issue anymore.

April 29th. 1967 the *Reading Eagle* post the interview article ““Monster” watch scheduled” its states that science is giving the monster one more chance to show itself, in front of cameras, if it does not the search and hunt is over. The undertone of the trend of scepticism comes thru early as it states right after this *The Loch Ness Investigation Bureau will be ready to accept that the hundreds of “sightings” of the monster are some kind of recurrent hallucination and turn the matter over to psychologists.*”¹¹⁹ Which seems to be the right thing to do judging by the way it is written. The search for that year’s expedition is to start on May 13th and they are bringing new equipment for this year’s search. A crossbow that was forbidden already in 1139, by the Lateran Council of Europe. The crossbow was ruled as a “too murderous of weapon” to be used by the Christians. David James, head of the LNIB explains the plans they have for this crossbow. As mentioned in many of the witness statements collected by Dinsdale the Monster seems to be vary of noise and disappear when loud noises occur as a large car or boat of some sort. The idea with the crossbow is that it’s quiet, a silence weapon. And the intent is not to damage or kill the monster, but to get a sample of the skin, or perhaps get a tracker implanted into the monster to track it. The tip of the arrow will be modified to suit this. If they are lucky and get a sample, this will then be sent for analysis. this is a new approach regarding collecting proof and using existing technology. Firstly, David James

¹¹⁷ Merrill, P.W. *Photography of the near infra-red region of stellar spectra*, Astrophysical journal vol.79 p. 183

¹¹⁸ Merrill, P.W. *Photography of the near infra-red region of stellar spectra*, Astrophysical journal vol.79 p. 184

¹¹⁹ *Reading Eagle*, “Monster” watch scheduled, 29. April 1967,

seems to believe they are close to the monster, at least close enough to manage to hit it with the crossbow. This comes with two ideas, either to clip it and get a sample, which might be helpful to determine what the creature is or establish if it is a known creature or not. the second to attach a tracker. The tracker would probably be a form of active sonar. Keeping the receiver on land or in a boat with personnel while the transmitter might be modified to be attached to the arrow or get attached on the creature somehow. There seems to be few other options that would work in an underwater environment at the same time be easy to operate. Secondly the use of existing technology. The crossbow being illegal to use since the crusade ages. is now modified to be equipped with either a tracker or something to take a sample off the creature. in itself the crossbow is as James points out a silence weapon, however the use of a crossbow does require the person who is to use it to hit the target. This is however the first time LNIB are using old technology and heavily modifying it from a weapon to a tool. David James does not believe the Scottish members of the House of Commons would oppose this, even if they have demanded the protection for the Loch Ness monster, securing it for hunters. David James also report that they are changing the years watch. They will now do 24-hour watches, and the expedition is to last from mid-May, or May 13th. That was mentioned earlier in the article, til mid- September. They are planning on two observation stations along the Loch and have three mobile cameras in addition to a boat. This boat will be using an electrical driven motor, making it silent. The funding for this year's expedition has been given by The Highland and Islands Development board, government sponsored, they have granted 1000£ to the LNIB this year, as well as some others that is not specified. There has also been a new sighting supported by a colour film of what he saw. A shopkeeper close to inverness, Renzo Serafini filmed what the article describes as two car tires in the Loch. David James also comments on this film that you can see something on the film, and there is a wake from something moving with speed. The film is sent in copies to the Royal Airforce photographic experts, and to the University of Chicago where Roy Mackal works, one of the directors of the LNIB.¹²⁰

This article gives a short explanation of what the plans for the summer expedition is, but the aspects that stands out is this year's focus on silence. The idea that the "Monster" might be sensitive to sound, comes thru in the choice of the silenced weapon, the electric boat with a silenced motor. The witness statements do seem to be the underlying cause to all of this. The perception that the creature is sound sensitive. The creature flees if there was loud noises

¹²⁰ *Reading Eagle*, "Monster" watch scheduled, 29. April 1967

which explains why they might think the new approach will be more successful by having quiet transportation on the Loch. This is a shift from relying on just a camera or a film. This year's expedition seems to want to come close physically to the creature, not to prove that it exists but to study it. These changes are new to this year's expedition. Also, the focus on the Scottish, how David James carefully points out that they do not want to harm the Loch Ness Monster, just have a small sample of skin. He also points out that the Scottish house of commons wants to have the "Monster" protected from hunters, specifically. It can be a sign of that the LNIB and their Volunteers do not view themselves as hunters of the monster, but there is no mention of someone hunting it. Except for the expeditions and other volunteers wanting to secure evidence that it exists. The colour film taken showing something in the Loch is given little space and are just a short mention at the end of the article. The dismissiveness of it being car tires and the comment of passing the sightings to psychologists, might be a sign that the trend from previous papers are not over. But the science is given more and more space, which might mean that the newspapers and medias are taking halfway both sides. Not wanting to have their paper being the one reporting a hoax as it was real, at the same time do not want to miss out on the Loch Ness Monster coverage if it exists.

The expedition in 1967 by the LNIB managed to get their long range cinè rigs to capture a clear picture of certified millimetre black and white film showing a V wake developing and moving over the surface of the loch. The efforts of Professor Roy Mackal in the US the leader of the LNIB managed to get the bureau a large grant from the Field enterprises education Corporation of Chicago. This new funding meant that the expedition for 1968 could invest in more equipment and more extensive research. The main expedition managed to get a long-range film sequence, but none of them were adequately clear to show anything of significance.¹²¹ Yet, this meant that the LNIB would keep doing their research, they had managed to capture something on film.

The Department of Electronic and Electrical engineering of the University of Birmingham was at the Loch Ness August 1968 performing a technical trial, led by professor Tucker and Hugh Braithwaite.¹²² The *New Scientist* published the technicalities and the results of the test in their December edition of 1968. The Birmingham team tested out a new type of sonar equipment in the Loch Ness, to see if they could get any results with the new sonar. The team

¹²¹ Dinsdale, *Loch Ness Monster*, 127.

¹²² Dinsdale, *Loch Ness Monster*, 128.

was trying to obtain ciné photos of the cathode ray display of the sonar.¹²³ The intervals was going at 10 seconds exposing 16-mm film¹²⁴ over a two-week period, using the different variations of the sonar. When examining the film, only one series have an occurrence that stood out and caused interest. The series lasted for about 13 min and the *New scientist* article describes this 13 min film and the technology of the sonar.¹²⁵

This sonar had an acoustic emission frequency at 50kHz, it was developed at Birmingham university and was called the “digital sonar”. The “digital sonar” used a new signal processing that was entirely functioning digitally. The digital sonar had a high resolution within the range of one meter, but because of the placement of the cathode display it worsened in practice. The angular accuracy in the plane, which is usually in the trials the vertical plane, is better than two degrees. And the beamwidth at approximately 12 degree; the horizontal observation sector. The test was performed in Urquhart Bay and the sonar was fitted on Temple Pier, the placement gave the sonar lookout straight across the Loch, about 3 kilometres wide. Temple Pier is on the shelf of the Loch floor and it steps down to about 200m. The illustration in the *New scientist* shows how the sonar looks out over the Loch, from this shelf.

A stationary target was recorded about 1.2 km in midwater, and this is consistent in the sonar records. The figure.2 in the article shows the “B-Scan” basis for the display. This shows the rectangular coordinates of range and the depression angle. There are some stationary irregularities at the bottom, comes out clearly along the low edge of the display. The midwater target is 75m below surface and about 50m extent along the range axis. The irregularity could be a large, waterlogged tree caught in the target with other debris. Another explanation they present is the possibility that it is a face of a rock, energised by the horizontal diffraction pattern of the sonar transmitter, then picked up on the horizontal beam of the receiver. The Birmingham team was not sure if such a rock existed but was not equipped to physically examine the target.¹²⁶ In total the sonar picking up three objects, or a group of objects where recorded on the digital sonar.¹²⁷ The sequence photos, that are most interesting was taken 28th

¹²³ Harold Edgerton Papers, MIT Archives, box 75 folder 3, *New Scientist*, *Sonar picks up stirrings in the Loch Ness*, December 19th. 1968

¹²⁴ Dinsdale, *Loch Ness Monster*, 128.

¹²⁵ Harold Edgerton Papers, MIT Archives, box 75 folder 3, *New Scientist*, *Sonar picks up stirrings in the Loch Ness*, December 19th. 1968

¹²⁶ Harold Edgerton Papers, MIT Archives, box 75 folder 3, *New Scientist*, *Sonar picks up stirrings in the Loch Ness*, December 19th. 1968

¹²⁷ Dinsdale, *Loch Ness Monster*, 128.

of August, around 16.30.¹²⁸ The results was sent to LNIB and was in their annual report. For the article in the *New Scientist* 1968 the objects had been named A, B and C.¹²⁹

object A: a large object rising from the bottom at a velocity of about 100 feet per minute the velocity components along the axis of the sonar it reached about 6.5 knots maximum then almost disappearing out of the beam sector then it again descended to the bottom and ascended again at about a 120 feet per minute.

object B: this could possibly have been a Shoal of fish swimming at a constant depth.

object C: object C appears only in frame 16 to 18 but as a horizontal velocity component along the range axis of the order of 7.5 m. pr. second or 15 knots while diving at 2.4 metres pr. second or 450 feet per minute. The object appears to have the length of several metres.

The report then states that the object A and B have been compromised of animals and it might be fish. The conclusion of the present data is quite inadequate to decide the matter and they encourage a greater deal of further investigation with more refined equipment. They commented that this is not presently available, and they claim that it is needed before definitive conclusions are drawn. The report does not prove or disapprove the existence of the monster, but they do point out the need for better equipment.¹³⁰ The article in the new scientist shows more the technology used and how it was used. The digital sonar was a new and had some issues. By the mounting of the cathode ray display in the position on the top of the sonar compromises the quality in the new sonar, that should have improved quality due to the digital display. The other change is the angle in one plane which have approved accuracy, that is better than two. The acoustic emission is 50 Hkz which is a Low Frequency and makes the new sonar a digital frequency sonar.¹³¹ The sonar sends and receives, judging by the readings mentioned in the article. Something picked up the sound and sent it back that might have been a rock, this means that the sonar used was an active sonar, sending out a ping and waiting for the receiving ping back. If it was a rock as mentioned, it should probably have been picked up consistently. The other possibility that the article and reports are mentioning is the drifting wood and debris, that could have been caught in the stationary target. That could also explain why the ping comes back with a reading. The new sonar shows that there is still

¹²⁸ Harold Edgerton Papers, MIT Archives, box 75 folder 3, *New Scientist*, *Sonar picks up stirrings in the Loch Ness*, December 19th. 1968

¹²⁹ Dinsdale, *Loch Ness Monster*, 128.

¹³⁰ Dinsdale, *Loch Ness Monster*, 129.

¹³¹ Harold Edgerton Papers, MIT Archives, box 75 folder 3, *New Scientist*, *Sonar picks up stirrings in the Loch Ness*, December 19th. 1968

developments doing done with the sonar. The tests done at Loch Ness and the results of something in the Loch probably establishes the belief that newer and more advanced technology was better than the previous. Even if there was some issues with the mounting of the cathead, there would be good enough results to continue the search and further develop and acquire new and better equipment to the search.

November 1968, Harold Edgerton have been in contact with Robert Love. Love was a Sonar expert hired in by the LNI to do a scan of the Loch.¹³² Edgerton seemed to have mentioned his wide beam sonar to Love. But, for the expedition Love have chosen to use the Honeywell sonar instead. Love is more familiar with the details and usage of this. The Letter to Edgerton shows how the Cambridge university is starting to question their own search. They used sonar but are starting to wonder about the frequency. If it was driving the creature in front of it, out of range to be picked up. They had used a Low frequency unit and is in the 100KC – 300KC. If this creature use echo location like seals it is possible it is very sensitive to noises or are closer to the porpoises which have an energy below 30KC. Also, the walls and shores in the Loch Ness gives a return to the wide-beam, which is confusing. This happens because of the narrowness in the Loch. Love are more optimistic about mid water search since the openness gives back less echoes from bottom and are more promising for a identification. The zoologists are mostly interested in the tracking since that can be a valuable source for behavioural data. This becomes important if they are to try to identify the creature. Bob Loves mentions briefly contact with Bill Currie and the possibility of a fusion of Edgerton's and the Honeywell sonar and mount them on the same boat.¹³³ The wide beam sonar is probably the sonar Edgerton developed while working with Cousteau and the research of the DSL. This has probably been worked on after the first tries in the sea, and the wide-beam side sonar could be useful here. Edgerton seems to be involved in some form and have made got in contact with the LNIB and with his equipment and desire to keep researching moves the LNIB closer to the shift they do in 1970. To combine the two sonars imply that the previous sonar searches have been successful enough to continue the use of sonar. This shows how the LNIB tries to modify the sonars and keep adding equipment. Now it seems the shift is going from the amateurs using the equipment, to experts operating them. The sonar have room for error if not operated correctly and relays on trained personnel to use it. This might be one of the reasons that the experts are becoming more important in the years coming than before.

¹³² Binns, *Loch Ness Mystery*, 153.

¹³³ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to Dr. Harold Edgerton from Robert Love, 5th. November 1968.

The equipment and technology that was being trusted have become more advanced than amateurs can operate. This shows how the trust is not only on the equipment and the technology used, but in the people operating them to provide the evidence needed.

The wide-beam side looking sonar is different than a normal sonar. First off the sonar does work as it says, by scanning on the sides. The sonar then scan from side to front stacking the acoustics in layers, read by the pings coming back. The side sonar scan is very useful to map the sea bottom fairly detailed, and the closer to the bottom it is the better it works. The use can differ, it can be towed, dragged by another boat or driven under water depending on the sonar. The side sonar works usually in the 100kHz but can reach the 1MHz, ranging from 500m to a 10-20 meter. The coverage from the cross-tracking is done by having a high frequency and long range, meaning the maximum of the systems. This is then used to determine range resolution. Showing the absorption of acoustic. The cross-track is then the range resolution thwt is given from the pulse or the bandwidth of the coded pulses. The along track-track coverage is determined by the pulse repetition interval and the along-track resolution is given by the sonar antenna end the range. The side-scan sonar does have limits and the settings does compromise the uses over another. The traditional side sonar have limits regarding the spatial resolution along-track. At a far range the range resolution is worse than at close range, this is because of the array is measured in wavelengths this can them be improved by decreasing the wavelength or have a higher frequency this would then improve the angular- resolution. However, this compromises the practical length because of the frequency and absorption of the seawater. One could then improve the length of the array, but this requires more technology. The issues regarding this can be fixed by using SAS, Synthetic Aperture Sonar, this can then have a larger array and use consecutive pings from a moving sonar. the SAS was more developed and started to be more commonly used about the 1990's. Regardless of a traditional side-scanning sonar or a synthetic being used more frequently in the 90's, the traditional sonar will pick up the acoustic shadows of from objects on the sea bottom, if they are elevated.¹³⁴ The quality and reflection of echo will be affected by the reflectivity of the different bottom types. And the bottom of the Loch Ness is relatively flat, but are mostly consistent of silt, that is not highly reflective, though it is readable.¹³⁵

¹³⁴ Hansen, Roy Edgar *course material to INF-GEO4310, introduction to Sonar*, University of Oslo, Autumn 2012, downloaded, 07.04.2021, 22.13, p.10

¹³⁵ Hansen, Roy Edgar *course material to INF-GEO4310, introduction to Sonar*, University of Oslo, Autumn 2012, downloaded, 07.04.2021, 22.13, p. 11

The wide-scan sonar to both Honeywell and Edgerton would perhaps battle these issues of trying to find right range, at the same time having a good scan of the bottom, listening to echoes from the monster. The use of the Sonar is different technology from the use of camera especially how to use it. This must be operated by professionals who are trained in using the sonar scan. After the scan is done, there must be someone who can read and understand the record of what showed up, to interpret this. The sonar scan will not produce a clear confirmation like a photo where everyone can see what was photographed. This is different from a camera. For the photographs it would show you what you are looking at, then an expert would confirm if this were real or not. Therefore, the photo analysis is important. To get the experts to give a confirmation, but everyone can in most cases use a camera for photos or film. With the sonar there is the need for training to operate it and to interpret the scan after.

The November month 1968 have been busy with another letter this time from the LNIB to Bob Love. This time it is regarding Bob Loves planned expedition to the Loch ness for a new sonar search. David James, leader of the LNIB is incredibly positive for the new expedition and the bureau will help in any way possible for the expedition to get equipment and fix transportation for the participants. What David James is not that fund of, is the idea of capturing the monster based on positive sonar findings. He quickly points out that capturing this creature before having established the population, can be the difference between extinction and survival. James goes on to tell about the Irish lochs and how they too have a reputation for creatures. David James finishes the letter saying that capturing should be the last resort.

The way the letter is constructed, David James saying he is Scottish and knowing the culture, opposed to Bob Love who is American is interesting. James makes a point out of how the Scottish population would not be favourable to the capturing and how this might seem odd to an American, perhaps implying that the Scottish culture is richer in caring for their heritage and the local folklore. The letter is still friendly but does also mention the need for historical and research of the object to be preserved. Not to catch it and display. David James finishes with asking not to mention this again, because that will not be taken in good spirit by the locals.¹³⁶ David James have already also shown how the Scottish already are weary of the

¹³⁶ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to Robert Love from David James, November 27th. 1968.

hunters. As mentioned in the *Reading Eagle* 1967, the Scottish member of the House of commons have demanded the monster to be protected. So David James are probably right in this instance. If it does come out that the expeditions want to capture it, it would likely prove what the general consensus is about the expeditions. A request from the House of Commons can be interpreted as what the intent of the expeditions and LNIB is questioned. David James does confirm that capturing is the last resort, even if he and the Scottish are against it. but that would depend on the sonar findings it seems. perhaps if the sonar shows clearly that there is a creature in the Loch the idea of capturing and study it would be more acceptable for the Scottish. The idea of capturing the monster on camera as the ultimate proof, are now slowly being applied to the sonar. getting a positive reading would be good proof and lead to the capturing or confirmation of the existence.

In 1969 the LNIB started their work again and focused their work from only spotting from shore with cameras and on the occasional boat, but to start searching under water. They got a hold of a small one-man submarine ship from the United States. The driver Dan Taylor had technical issues when it was launched in Urquhart Bay the submarine was intended to pick up on echo responses from the yacht Rangitea. Rangitea carried a mobile sonar probe but this time they experienced technical problems that prevented them to start the dive.¹³⁷ The *Pisces* was also in the loch, this was another submarine and it logged 47 dives, totalling approximately 250 hours on the bottom of the loch. The *Pisces* was there originally for testing in the freshwater environment but proved useful discovering new information in the loch. the new depth maximum registering of 970 ft. with sonar and contact to the surface radio to 120 ft. *Pisces* was able to photograph bottom trenches and craters previously unsuspected, and it also discovered a circular crater current swirling around at 750 ft. the discovery of a wreck, creatures far below the usual fish levels at 350 ft. and the discovery it was a small white fish burrowing through the silt, and at 820 ft of four-inch white eel. Of the findings besides fish, creeks and trenches that was dumped and living in the Urquhart bay, the LNIB was most interested in an occurrence logged at 500 ft. *Pisces* was then approximately 50 feet above the bottom of the loch when it picked up a sonar target.¹³⁸ *Pisces* pursued the target, but it disappeared from the screen at the range of 400 ft. The captain reported on all of this and the results and the happening with *Pisces* was published in the 1969 report from the LNIB. The search with *Pisces* was a valuable contribution the other underwater work in 1969. This

¹³⁷ Dinsdale, *Loch Ness Monster*, 129.

¹³⁸ Dinsdale, *Loch Ness Monster*, 129.

including other vessels they used to monitoring the loch and a week-long expedition using a charter by the LNIB. The LNIB used the drifter Pavlova to make a profile of the loch with echo sounder and also scanned the bottom of the loch. Pavlova patrolled the bottom for giant eels. While sonar search was useful in mapping the loch in more detail, the patrolling for the giant eel and fishes gave useful information, but no giant eel from the myths was located.¹³⁹

In September 1969 the search was again started and was making new headlines “Hunt starts for Monster in Loch Ness”, in *The Morning record*. This was going to be the most thorough search done in the Loch since the first expeditions in the search history starting in the 1930’s. The scientists did multiple sonar sweeps to try to confirm existence. The plan was to make so much noise in the Loch that they could trap “Nessie” in a “silent cage” and trace it on a radar screen. A LNIB spokesman confirmed the multiple sweeps of the 700 feet deep Loch.¹⁴⁰

This seems to be a different approach combining the sonar search with the previous thought that “Nessie” is sensitive to sound and would have a reaction to the noise made. By scanning the whole Loch Ness would be a long task and by doing multiple sweeps the sonar should pick up something. The silent cage they are trying to trap “Nessie” in have to be a new approach of using the sonars “ping” to send the creature in a direction, then track it. The sonar seems to be used to drive the creature into one part of the Loch. This is a very different way to use a sonar and relies on “Nessie” being sensitive to the frequency the sonar uses to send out the “ping”.

David James mentions in the annual report for the LNIB in 1969, that was covering the proceedings and events as usual, that another hoax might have taken place. During the expedition it had been discovered a large bone in Loch Ness. The report goes on to mention that two short, interesting sequences of film had been caught on film by the LNIB. The short films showed V wakes. The film was shot at a considerable range, but Dinsdale also reported seeing water disturbances on five separate occasions. The scaling patent ruled out fishing boats and to speculate that subterranean tremors may have caused them. Dinsdale is against this, that the 600 feet below tremors, which would create the phenomenon, is hard to imagine. The reasoning being form, a circular pattern of ripples 6 inches high, on calm water stretching for half a mile almost, and the placement; from a point in the middle of the loch close to the surface.¹⁴¹ This search was most likely done by Love and is mentioned in report to David

¹³⁹ Dinsdale, *Loch Ness Monster*, 130.

¹⁴⁰ *The morning record* Hunt starts for Monster in Loch Ness. 15th September 1969

¹⁴¹ Dinsdale, *Loch Ness Monster*, 132.

James and in *New Scientist*. Robert Love joined LNIB in September 1969 and was a part of the expedition. Love an American electronic engineer was an expert on underwater research. His research and sonar search was however interesting. If we look at how this event is presented in Tim Dinsdale's book compared to the technical report sent to David James by Love himself. According to Tim Dinsdale, Love equipped Rangitea with the Honeywell Sonar 2 and was scanning the loch the next six weeks. He logged 150 miles with the sonar and the searches deep-sea searches. Traveling back and forth over the loch. The sonar produced several interesting contacts.¹⁴² One of the more interesting contacts was on 10th of October tracing it for *two minutes and 19 seconds*. The target had in that time moved along a looping path ahead of the boat between 210 and 450 feet down minimum 150 feet above the bottom. Like the team from the Birmingham University, Robert Love made no claims about the monsters existing or not, but his work was still valuable as an addition to previous records. Other sonars were also in use but were operated from the Temple Pier in Urquhart Bay. The Birmingham team operated one for the LNIB and the other sonar was operated by the Plessy group for the independent television and daily mail. In the two weeks of that operation from Temple Pier there was no targets being observed or unexplained happenings.¹⁴³

As a comparison we can see from the report to David James that it was a very extensive search, covering and testing the findings. The Letter is much more detailed oriented around the technology used, how it is used. Then Dinsdale in his book, who are doing a shorter recap of the sonar search, just mentioning the main event. At the end of 1969, 19th December, Robert Love sends the mentioned letter to David James. From this letter it shows David James the draft for the *New science new service* release and 3x10 print from the 16mm film recording of the sonar screen where they made the most likely contact during the 1969 season.¹⁴⁴ Love does explain that he had marked on the prints the whereabouts of sonar, monster and himself. Love then goes into the reason for this extensive letter. The Science release did not include the description as detailed as he hoped for regarding the sonar operating technique, and this might be useful knowledge for D. James in dealing with the press. The film strip that is sent to James are 72 frames of movie shot of each of the 18 frames that recoded the sonar contact. When played it shows 3 seconds of each target positions. The projection is to be done at 24 frames per second. While the scan goes on the 30 second

¹⁴² Dinsdale, *Loch Ness Monster*, 132.

¹⁴³ Dinsdale, *Loch Ness Monster*, 132.

¹⁴⁴ Harold Edgerton Papers, MIT Archives, box 75 folder 2, David James from Robert Love, *Press release of 1969 Sonar Target Contact Information*, December 1969

interval it the beam is changing position from the downward pointing 8, then 20 and up again to 8 degrees. This is done in repeat during the scans. Frame 3 done with the Low Beam, the target shows as dots barely below 400-yard range circle and shows in two successive sweeps. This is a rare encounter and Love gets very descriptive of the operator and himself when it shows on the screen.

“This is such a rare occurrence that it fairly jumps out of the screen toward an operator and at this point I became super-interested in the next Lo Beam scan”¹⁴⁵

Love is excited for the next Lo beam scan because the target was not showing up in the Hi beam scan in frame 4. Love switched the mode to the Sector scan mode when the target reappeared in three sweeps, just within 400 yards. He was convinced he had found something. Under normal conditions in Loch Ness, it was possible to pick up the bottom echoes with the side lobes if they are set to high, that usually was more insensitive. Love explains that normally he adjusts the lobes to eliminate or try to limit these echoes. But because of this encounter and he was occupied with tracking the target and not lose it, he had not had time to try to eliminate these echoes. Therefore, the display shows the target distinctly separate from the bottom echoes in range. These bottom echoes therefor work as a comparison and confirms that the sonar target was not a rock at the bottom of the Loch. The target is shown in the remaining frames in one or more sweeps but gets more difficult to track. The tracking gets difficult because of the beam width decreases with the range and as the tilt angle increases. The Honeywell team is also present during this expedition, and the Honeywell engineers are surprised that Love could keep contact with a moving target for such a long time, several minutes, as the Honeywell team usually loose contact with stationary targets when they are on 800-yard range. Love conclude that the narrow scan mode is absolutely needed for their operations and this makes it apparent. What The target shows some degree of evasive behaviour that can be shown by the changes in the target’s direction.

If there was a rock at the bottom of the loch, that could make an echo that would present as a target, but this would be stationary and consistent, the target Love encountered was not stationary. The target had moved about 80 yards within 120 yards of boat travel. The beam does not reach the bottom, so Love concludes that the possibility that the target resting at the bottom of the Loch is not a possibility. The discussion of size of the monster is also of

¹⁴⁵ Harold Edgerton Papers, MIT Archives, box 75 folder 2, David James from Robert Love, *Press release of 1969 Sonar Target Contact Information*, December 1969

question, and as Love point out, will always be a curious question asked by the public. The sonar can determine size, within limits. This can be done by doing a characteristic analysis, to do that however, you need a base or reference. Love says they can do it based on their limited physiological knowledge of the creatures that might inhabit the Loch Ness. There is also the base reference to aquatic creatures and their acoustic properties. The aquatic creature's body seems to have the same density to the water around them and does not give of a strong echo, making the them not good sonar targets. This does not include skeleton as this is denser than water. The skeletal remains also contains gas, lighter than water, but does give a strong target reflection for the sonar to pick up. The gas in the bones does have some different variables in how strong they are. The plan is now to modify cylindrical and spherical shapes and fill them with gas, since these shapes give the strongest signals as targets. This is done to imitate the target they did pick up. This will then be the base to compare the strength of the echo they picked up and will have known volumes to help determine size. The tracking target initially was taking at 480 yards range. This was then compared to a 14- inch cylindrical target, 40 inches high and at a range of 400 yards. The strength of this test was comparable to the strength of echo from the tracked target. This means that the target was probably an animate target and of comparable size due to the gas inside the cylinder. Even if there is 80 yards difference in the test target to the target found during the sweeps, the steel cylinder gives a strong reflecting echo that this probably compensate by the differential. Love do not want to speculate to much about size of "Nessie" until they do know more. But he does point out that if it does have mammalian pulmonary characteristics with a lung capacity of 5% of body volume, and then compare to the target echo strength the creature can be 30-40 feet in length. Because it would need a fairly large size to contain that air volume. But Love points out the sonar seems to have only picked up one target. If this were a steam of fish or something else, it has to be fairly large and would appear differently on the sonar screen. If there is only one creature in the Loch Ness, moving at random during the search Love performed, statistically they can determine some probability of when they should see it in the sonar screen. Love says it is in his opinion very possible that one of the targets he has now discussed in this letter to David James is a large animate object. He gives his reasons as the midwater location, movement of target.¹⁴⁶ This Letter/report as an edition to David James as Bob Love did not think the report from the *Scientist* would be extensive enough in details, probably covers most

¹⁴⁶ Harold Edgerton Papers, MIT Archives, box 75 folder 2, David James from Robert Love, *Press release of 1969 Sonar Target Contact Information*, December 1969

of it. They seem to have concluded tests as they were there with the cylinders to test the reflecting echoes and trying to establish size. The technology used is interestingly used as Bob Love refers to his screen, which leads to the digital sonar. The digital sonar from Honeywell was not the most precise to use due to the mounting of the cathode, so this might suggest that the issue have been fixed. This sonar is an active sonar working with CW as Bob Love reports. The active sonar using this frequency CW- Continuous wave is the best option for Loch Ness. As the CW is the best to use in deep water where there is not much echo or disturbance. At the same time the CW can recognise the doppler effect, making it capable to determine speed. And Love had as a mention that the target they tracked seemed to move faster than the boat. However, we do not know the boat used from the letter, if this was the Electrical driven boat mentioned by David James before. It does not seem like it's a quiet boat, because of Love's thoughts on trying to minimize the noises and disturbances. The letter show as before with sonar the need for experts in the field to operate and interpret the searches and records of it. to be able to establish what is already known objects because of behaviour on the sonar. The problem with sonar might be the use of proof. It relays on the reading and interpretation, and to prove existence you need to be able to show that the reading confirms what they conclude with. It is different from camera where everyone can see it. but as James was mentioning it would be a useful way to track and to study at distance without interfering with it first. The use of sonar also makes it clear that the untrained participants are not reliable enough and the LNIB are adding more technology to the search and are trying to adapt to the idea that the monster might be sound sensitive with the thought of trying to have less interference and noise while performing the scan. Even if they do not want to speculate in the size of the monster, they are still making some suggestions and have the idea that if it was 30-40 feet it should have been a possibility to predict its movement for when it will pass thru the sonar. They do think it has made contact, but there is another creature in the Loch which they are identifying as most likely eel. To be able to identify the transcripts like that shows the need for experts while dealing with the new technology starting to be used in the search. This section shows how the sonar was operated. Love did have someone with him during the search who operated the sonar. The errors he described or disturbances that came in that he did not exclude are also known to make readings difficult. Loves point of using those disturbances to track the creature and shows it moves and not being static might as well be a disturbance. The other disturbances could also have interfered in the way the signal is perceived to the sonar.

3.2.1. Summary

The 1960's starts off with Tim Dinsdale doing his research relying on camera and witness statements. The LNIB is started in 1961 with the help of David James, who also brings 26 volunteers to join the first two week operation at the Loch Ness. The way this was done the first year was mainly watching from shore and some activity on the water with cameras, trying to take a photo of the creature in the Loch. The next year, 1962 the search at the Loch Ness was joined by many participants among them students from Cambridge university using cameras, fish-finding sonar and hydrophones. The hydrophones might have given some positive results, picking up some sound under water. These students did the first sonar search in the Loch Ness while testing the fish-finding sonars. David James returns this time with military flashlights. The use of military borrowed equipment might be because of David James's role in parliament making it easier to borrow this equipment, however military items at work in the Loch Ness could be a sign of an acceptance to the legitimacy of searching for the Loch Ness monster. These flashlights are probably stronger than the average flashlight and they are starting to explore the Loch at night hoping to illuminate the creature if it shows, without luck. A film of the creature is sent to analysis to four scientists. Interestingly it is not mentioned who or where. Previously it was mentioned where the analysis where taking place, however that is not the case with this film. Is that because of the scientists analysing it are not specialised in the area? The film does not seem to be mentioned again. In 1963 the LNIB starts their first seasonal operations at the Loch, because of additional funding to LNIB. This year's volunteers are to keep watch during day using 35mm cameras to try to get a picture from land. It seems that the last years attempt on doing night watches have been taken out of the watch plans, probably because of the lack in results. Ted Holiday joins the search this year and is the first mentioned to bring a tape recorder to collect witness statements. In 1964 there are two significant changes, the first is the use of professional camera equipment borrowed from a TV station, those cameras were mounted, had time intervals and was triggered by a switch. By being mounted the way they were the range of these cameras should be inferior to ground personnel standing on ground with camera. The other significant change was the awareness of the weather of when the sightings happened. This was mentioned in an article where "Nessie weather" refers to sunny, not to windy weather at the Loch. This shows they are becoming more aware of the surroundings and environmental factors around the Loch.

1965 the LNIB seems well established and sets up their permanent base at Achnahannet, this year they have all summer operations at the Loch. A film had been sent to JARIC for analysis along with the recordings done by Dinsdale in 1960 for a second opinion on that film in 1965 and the report comes back early 1966. By sending this to JARIC and them analysing those movies it should strengthen the connection to the scientific and technological community about the operations at the Loch Ness, which may be the reason for why much of the report have been left out of books and other articles. 1966 more military equipment shows up at the Loch Ness, this time in form of the infrared film to use in cameras. This was initially developed and given to the military to help with the visual issues caused by the weather. The LNIB will probably use it for the same reason to eliminate another issue they have with capturing the creature on camera. Mist and bad weather have disrupted a good photograph for them before, and with this film that should not be an issue anymore. An interview early 1967 of David James shows that the idea that came about the sound from the highway being built are still relevant. The LNIB will now try a silent approach and plans to eliminate as much sounds as possible, by using electric boats and a crossbow which is a silent weapon. The use of the crossbow is to try to attach a transmitter or tracker of some sort so they can track the creature. Or if possible, to take a tissue sample to send that for further analysis. Most likely to see if it matches with some other known animal or to help identify the creature. During the 1967 operations the LNIB manages to capture twice something making a V wake in the Loch. Mackal the leader of the LNIB manages to get more funding in the U.S which opens up for the LNIB to invest more and get better equipment and to do research. Later in December 1968 the department of electrical engineering starts doing tests in the Loch Ness with their new sonar. This a larger shift in the use of technology and the search is now conducted above and below water. The digital sonar which should be able to give a cinè-photo of the cathode ray display, later reported on by *New Scientist*. One of the main issues that became apparent with their sonar was the mounting of the cathode on the sonar, which blocked the visual. 1968 also shows that Harold Edgerton is in contact with Robert Love. The letters discuss the use of sonar and the ideas about connecting and modifying Edgerton's sonar with the Honeywell sonar. Sonar and camera seem to become more important in the late stages of the 1960s and in 1969 the use of a submarine was tried and sonars searches did have results in something being tracked.

The 1960 shows how the proof of existence that they try to capture relies on the use of camera and starting to develop into the use of sonar. The years from 1961 until 68 seems to have been

used to test different equipment, some are not used or mentioned again, like the military flashlights or the infrared film. The consistent technology thru 1961 to 1970 is the use of camera. To obtain a photograph is important and is the most consistent use of technology. Sonars starts to enter the Loch Ness at the end of the 1960's doing more extensive search. Because of the positive perception of sonar, it seems like sonar and camera now is what should be trusted to bring in the needed proof.

3.3. THE SEARCH FOR THE LOCH NESS MONSTER 1970-1980: UNDERWATER PHOTOGRAPHY, SONAR SEARCHES AND "FINDING NESSIE".

The 1970 starts off with planning new equipment to be used in the upcoming season at the Loch Ness. Already 20th January there is a letter from Love to Edgerton again, with subject as 1970 Loch Ness Exploratory program. Love refers to their contact in the spring of 1969 and gives a report of the search of the search Love and the Honeywell team did in August-September. The Honeywell loaned them the Honeywell sonar II-F to do a mobile search of the Loch Ness and Love did contact something animate mid-water. Love is sending Edgerton the press release and copy of the technical report that was sent to David James, regarding the sonar search, to interpret the photos taken that was not elaborated enough in the press release. He also includes the photos taken while recording the sonar screen. Love have taken the advice from Edgerton to film the sonar data and tells Edgerton he appreciate the advice.

“without which I might have returned, much chagrined, from Loch Ness only able to report that I believe I made contact with “Nessie” on sonar.”¹⁴⁷

This shows how Love as he also admits, have started to believe there is something about Loch Ness. Love points this out himself too, that he as many others approaching the loch Ness phenomenon from a scientific perspective was sceptic to the legend. But has started to believe it has to be something about the Loch. There are still many unanswered questions but after the Birmingham sonar expedition and their findings in 1968 and their own expedition in 1969 but the “if” and “what” is something he desire to determine and answer. For the funding, this year the world book Encyclopaedia have become involved and will sponsor the exhibition in 1970, they want Love to direct the scientific program. The equipment is being evaluated and

¹⁴⁷ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to Harold Edgerton from Robert Love, 1970 *Loch Ness Exploratory Program*, January 20th. 1970

they are looking into different tools like: probes carrying biopsy darts, passive UW acoustic recording and unattended mid water photo with baited flash-camera.¹⁴⁸ The equipment seems excessive and it seems like the thought that was happening in the 1960's is being done at the beginning of 1970; more technology is better. There is also the question of analysing the findings. Granted there is experts in sonar and electrical engineers conducting searches. Its still a need for specialists to do the analysing of the biopsy darts, acoustic records and the photos being taken. Perhaps all the different technology being considered is because they are not sure what would be the best approach besides cameras and sonar, which have not given adequate proof yet.

Love does raise an important question about what if the creature or the thing living in the Loch ness have perished. One suggestion if this has happened is to recover the remains. But if it sank down the 750 ft. to the bottom it will be difficult to do. Another suggestion is to use Edgerton's sequence camera, dragged by a sled to do a photo survey of the bottom of the lake. The water in Loch ness is not turbid and Love has done a light measurement in 1969. Due to the light absorption of the colloidal peat particles being amber stained.¹⁴⁹ Love had done light measurement by taking off the selenium cell and lowering that by a cable. This showed that light absorption was 90% of sunlight thru each 10ft. the correct colour film exposure and then camera being 5ft from the lens opening gives clear and sharp photos.¹⁵⁰ The camera Edgerton showed Love was good for 3000 frames on a 400-foot roll. If they had recycling rate and the flash tube cooldown of 11 seconds, tow speed of 3 mph. they would have a frame for every 50ft or 1000 frames pr. Mile. One roll would then be good for the whole traverse being 21 miles of the Loch Ness. The bottom of the Loch ness is suited for this kind of exploration due to its flat surface because of the sedimentation and being under the silt and the rock walls of the loch. The size of the loch and what they have seen of the bottom of the loch from a 5-foot-wide frame shows about .01% bottom coverage. This means that considering of the weather, unscheduled maintenance and so on, 10 traverses could be run in 3 weeks. The survey has about 10% chance of giving one frame of photographic evidence of skeletal remains.¹⁵¹ The 10% chance seems very precise, and how Love have managed to get that number is not

¹⁴⁸ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to Harold Edgerton from Robert Love, 1970 *Loch Ness Exploratory Program*, January 20th. 1970

¹⁴⁹ Colloidal particles are particles with a small diameter, invisible to the unaided eye but larger than atoms and ordinary molecules. Colloidal is responsible for the turbidity or the colour of the water on the surface.

¹⁵⁰ The colloidal and the light measuring debunks the reason for gas being what was seen in the loch ness.

¹⁵¹ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to Harold Edgerton from Robert Love, 1970 *Loch Ness Exploratory Program*, January 20th. 1970

elaborated on. This might have been an general estimate based on normal conditions of confirmed animals and fish. Or this could be an optimistic number made by Love. Love continuous that even if the odds are low it could give results that are important for the goal of identification.¹⁵² This letter follows the letter to David James with two weeks, and the plans for the years expedition seems to be well underway. One of the questions raised by this letter is mostly about the remains that might have sunk to the bottom. The Honeywell sonar is then not a side-scan sonar which can map the bottom of the lake it seems. That might be why the Honeywell is interested in making a hybrid of the two sonars, theirs and Edgerton's. If they had used a side scan sonar and mapped the bottom as they searched, any object that was above the surface should have showed up. Another point in this source is that it shows how Edgerton apparently have followed the research for some time. And is getting more involved, giving ideas and help to execute the searches. As we can see he advised Love to film the sonar display, using one piece of technology to support and perhaps legitimize another. This might mean that the sonar is a considered an aid to track and validate the search, but the technology that is more trusted is the camera. The technology used is now starting to involve above the water, the water itself in form of sonars swipes, water samples, and the bottom of the Loch.

Robert Rines, a lawyer and president of the Academy of applied science became involved 1970. Rines was not a scientist but a lawyer and had established the Academy of applied sciences which consisted mostly of businessmen.¹⁵³ Rines reached out to David James to discuss the possibility of baiting and that the Academy wants to get involved doing experiments and research.¹⁵⁴ Robert Rines have contacted Henry Walter, president of International flavours and Fragrances Inc. and the letter from May 5th. 1970 are just named Loch Ness Project as a reply. The letter is signed The Academy of Applied Science by Robert H Rines, and are sent as CC to Harold Edgerton, Walter Juda and Martin Klein. Klein was one of his associates in the Academy.¹⁵⁵

Robert Love and the team with Honeywell are planning to do more sonar searches in the Loch Ness. New to this is the use of tape recorder when the echo is close enough. This will be done while they do a depth scan of the Loch. It has also become an issue with the sonar. They have to try and get better vertical resolution. So the year starts off with more planned sonar

¹⁵² Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to Harold Edgerton from Robert Love, 1970 *Loch Ness Exploratory Program*, January 20th. 1970

¹⁵³ Binns, *Loch Ness Mystery*, 151.

¹⁵⁴ Binns, *Loch Ness Mystery*, 151.

¹⁵⁵ Binns, *Loch Ness Mystery*, 152.

searches and an issue with the sonar. The plan of using traps seems more interesting in the use of technology than many of the other ideas. The idea is to use active and passive traps with bait pouches. Using the instamatic camera pointed at the bait, the plan is when the bait is disturbed it will set off a flash and take the photo. This is interesting because it seems they are still trusting the camera more than other technology; at the same time, the choice of camera is not professional gear. The instamatic camera is probably the Kodak instamatic, which was a small camera, easy to operate and quite easy to change film. This might be because it's easier to operate with the idea to use bait, or perhaps the faith in cameras has not changed as much as it previously seemed. The Kodak Instamatic was not newer or better camera than what they had previously used.¹⁵⁶ Edgerton and Klein have already talked to Love about having a lecture about his findings last summer. Hope to get support from these sources too. Love has gotten more information for LNIB regarding the PH in the water of Loch Ness. Studies by the Department of Agriculture and Fisheries of Scotland found that the PH in Loch Ness lies within the range of 6.5 to 6.2. no significant changes in PH from top to bottom of the Loch. Oxygen saturation also shows a small range of variation. Below 60m 93.1 to 90. It does not seem to be large biological masses or decomposition resulting from something biological. The bottom layer of the Loch is covered of mud and is being analysed for content. It looks to be primarily silica sand¹⁵⁷ with some diatomaceous saturation¹⁵⁸. Relatively free from protozooids¹⁵⁹ and have few bacteria or other microscopic life. The water is stained in itself because of the colloidal suspension of peat. This results in high coefficient light absorption, 90% per ten feet. Which has some obstructions to the use of camera. Prior chemical analyses also show extremely low magnesium, sulphate, calcium and phosphorous content. Dr. Foster comments that this is consistent with melted snow and rain. Temperature is on an average 56.5F at the surface and drops about 0.5F at the 75-foot depth. The temperature stabilizes at 42-43 degrees from the 250-foot mark to the 700- and 800-foot depth to the bottom. The season and conditions seem to have little impact on the temperature of the Loch below 100 feet. Above the 100 foot mark it is some mix of temperature in response to heat and wind conditions, but only in the 100 feet specified. Dr. Foster comments that most Lakes have some overturn in the spring, but this might not be the case of the Loch Ness. The water samples do show that it is not much that have been decomposing at the bottom other than the

¹⁵⁶ <https://digitalmuseum.no/021029515875/kamera>

¹⁵⁷ Silica is quartz broken up over time into tiny granulates.

¹⁵⁸ Diatomaceous sand is made up by fossilized remains of small aquatic organisms – diatoms. Their skeletons are made of natural substance called silica.

¹⁵⁹ Term for a group of single celled eukaryotes. Free living or parasitic.

Silica, maybe some fish, eel, nothing out of the ordinary. This is important regarding the times of the expedition have been determined by the presumption that “Nessie” likes nice weather. The expeditions have ranged at this point from Mars/April to October, but even if the weather is warmer for most of these months, that does not affect the water significantly. Loves group are now preparing to map out the bottom of the Loch Ness, using sonar and hydrophones, equipment borrowed from Honeywell. The hydrophones will be passive sonar and not send out a ping, just receive. By using the hydrophones those could pick up the echoes from “Nessie” if the active sonar drives it away because of the frequency if the creature is sensitive to sound. They are not believing they will be able to get the sample to do a biopsy this time. Love and the sonar team seems confident that the biopsy and close contact will only be a matter of time.¹⁶⁰

1970 the LNIB invited Tim Dinsdale to run the LNIB as a surface photography director. He was from then on going to work closely with Robert Love who had become the underwater research director the LNIB. The position as the head of LNIB was major. Each year LNIB had a team with over a hundred people for their expeditions and that brought their own issues regarding transport engineering and photographic difficulties. Dinsdale wanted to experiment more with the methods which seems to regard the baiting and trapping.¹⁶¹ Love had returned this season 1970, with the sponsorship from Field enterprises of Chicago, to work with the LNIB. Love spent the season busy at Loch Ness without Dinsdale who was at Loch Morar. At the end of the season Robert Love got a response on his underwater listening equipment. The sonar picked up a strange rhythmic pulsation unidentifiable. The sounds seemed to emanate from about 30 ft., but the pulsation was picked up in many different places in Urquhart Bay. The pulsation was speculating to be from a fish or creature using echo location, but there was no answer to this sudden rhythmic ping.¹⁶² Robert Love hopes that Edgerton will join the expedition later in the fall when he returns from Russia. The letter to Edgerton from Love describes the intended use for the camera they were planning on using. They want to use the EG&G sequence camera to photograph the bottom of the Loch ness hoping to find skeletal remains. They hope to discover a “burial ground drive” which many large animals have. If they were to discover this it would be of great significance. The plans mentioned in the letter to Henry Walter seems well on their way in this letter to Edgerton. Love says that the program

¹⁶⁰ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to Henry Walter from Robert Rines, *Loch Ness Project*, May 5th. 1970

¹⁶¹ Dinsdale, *Loch Ness Monster*, 133.

¹⁶² Dinsdale, *Loch Ness Monster*, 136.

has developed well with passive acoustic monitoring and recording, baited UW camera and active search sonar. The acoustic system is so sensitive that dropping a hydrophone in the sink they can hear the conversation going on in neighbouring apartments. They had tested the hydrophones in Lake Michigan. They picked up some loud noises that appeared to be natural origin. He played them for Bill Scheville at WHOI, who referred him to Arthur Hasler at the university of Wisconsin. Hasler identified the noises to the male freshwater drum *Aplodinotus Grunniens*, who make these sounds during spawning of the female, they only do the sound when the sun is shining bright. He has taken Edgerton's suggestion on using a Pinger on the bottom of the camera for determinate the proximity to the bottom of the lake. He loaned a Pinger from DuKane Corporation and modified it to have a 1 Ms. Pulse length for short range resolution. He hopes it will be possible to borrow the camera to HG&G and ask to contact Jim Colvin at Field Enterprises for shipment and return.¹⁶³ The advice Edgerton have given for the pinger to determine distance to the bottom is an issue Edgerton have already had to deal with. When he did his research with Cousteau on the DSL in 1954, they never knew how close the bottom they were, the switch he first made did not work well in uneven terrain, so he redesigned the whole system. Having the ship read two signals. The direct ping from the sonar on the camera and the reflected ping from the sea bottom.¹⁶⁴ Edgerton seems to have a great influence on the search at the Loch Ness without being present or mentioned excessively. From previous letters there have been some contact between Love and Edgerton regarding the sonars. Rines and Edgerton knows each other, and it would not be unusual that the expertise that Edgerton have in underwater photography would influence the choices of technology used. By having established contact with Edgerton and Rines being interested in the search it is easier to perhaps borrow the equipment from Edgerton. This means that the LNIB now might have a channel to acquire specialised underwater cameras. Rines confirms in the first sentence in a letter to Love that Love and his team should be at Temple Pier and working on the project. Rines informs that the plan of sending Love some smell attractants and tape of sounds have fallen thru. Because of the delay they experience in the freezer- dryer and other preparations promised by individuals at Harvard Medical school and the department of the Army at Natick. They are still hopeful to get some of the equipment to Love before Rhines go back to the Loch Ness himself in September to join Loves team. Marty Klein conducted tests

¹⁶³ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to Henry Walter from Robert Rines, May 5th, 1970

¹⁶⁴ Bruce, *Seeing the Unseen*, 6.

in Moosehead lake on his MK-300 Klein associates' sonar. They want Robert Love to see the results in the phase that the Academy's participation in the project.

Sonar tests: two types

1. Interpret side-scan sonar readings from looking at steeply descending ledge walls on deep underwater trenches.
2. If sonar is fixed in position of the vicinity of where the release of sight, smell and sound attractants and operate it in a mode that would indicate a large object moving, distinguished from stationary echoes.¹⁶⁵

They believe they have enough data to interpret what they would discover while exploring the trenches or walls. Particularly to see caverns, caves or discontinuity. This will only be done if Love thinks it is worth it and does a run with the vessel. The wide wall reflection from a 300-foot trench in the Moosehead lake shows on Enclosed xerox. Similar to the Trenches in the Loch Ness topography. They have documented the sonar artifacts with photographs of the boundaries and other cliff architecture to use as a guideline. Klein were also thinking about using flashing a strong strobe light underwater together with a synchronized camera if they encountered anything resembling the test objects even if the light range is limited. A possibility could be placing the strobe light a bit of shore and camera closer to shore to try to capture the silhouette which might be more probable. They are confident that if "Nessie" would make it into their perimeter if the sonar the sonar recording it will indicate something about size and speed component even with the difference from their test objects from Lake Moosehead.¹⁶⁶ They seem to be thinking about different ways to trigger the camera, using flash and the sonar at the same time but now under water. So they are now starting to combine the technology they have had the most faith in during these years of field operations.

September 1970 Robert Rines, president of the Academy of applied science from Belmont MA. arrived at the Loch Ness with a small team of electronic and sonar experts, they were bringing with them underwater listening and playback equipment. The small team also brought Klein Associate high-definition side scan sonar. This sonar can be operated from a fixed position or trailed from a moving vessel, pulled by a boat. Shortly after the equipment

¹⁶⁵ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to Robert Love from Robert Rines August 10th. 1970.

¹⁶⁶ Dinsdale, *Loch Ness Monster*, 43.

had been attached a small scaffolding pier extending into the Urquhart Bay, two large intruders went through the sound screen in one direction and shortly after one returned from the opposite direction. The echoes did not appear to be from fish, they showed as quite large and had a shape. The echo did not just seem to be spurious echoes and it did not seem to be from the divers or other disturbances.¹⁶⁷ The next day it was decided to trail the sonar after Dinsdale's *Water Horse* because of the disturbance from other boats in Urquhart Bay. They trailed the sonar further down the loch and used the side-scan sonar for two days down the loch. The side sonar both transmitted sound and received the echo, the echo then transformed it through the electronic system and the echoes showed as sepia stains on a white sheet of chart paper. During the patrols they did over the two days, the electronic system picked up echoes in locations. The chart produced distinct echoes; one was in a great 700 ft. trench that the sonar discovered immediately offshore. That was where Torquil MacLeod had seen the monster in March 1960, in the final reports of the Academy of applied science to the LNIB it concluded with being large moving objects in the and that there is abundant fish life and that this could support a large creature. The sonar also discovered ridges into the walls of the loch in the same region. This was later verified by a diver in 1971 when he visited LNIB Information Centre at Achnahannet.¹⁶⁸ They also discovered that there was so much fish life and especially eel the possibility that eels was one of the main food most lived on seemed like a possibility. The decision was then to play back eel noises underwater hoping this would attract the monster. LNIB tried this technique, working from *water horse*, they also supplemented this using bating experiments like sex hormones and various other substances.¹⁶⁹ The eel and smaller fish was discovered when the submarine *Pisces* dived in 1969, so this finding isn't new. However the use of eel as a bait or attractant brings in a new factor that fits in the thoughts the LNIB had before about luring it. Instead of triggering the creature with sound, they will now try to bait it. The experiments were effective in a different and unexpected way, using sex lures and other substances attracted the attention of the press. But even if the press showed attention to the lures, they still did not make the monster surface. Other experiments to draw the monster out was started, they tried to dump pebbles soaked in salmon oil into the lock within the reach of the sonar, the pebbles were meant to create streams of cent underwater, which they hope will bring the monster up, but was still no result. However, when they lowered hydrophones in this area in more than 600 feet of water Isaac

¹⁶⁷ Dinsdale, *Loch Ness Monster*, 137.

¹⁶⁸ Dinsdale, *Loch Ness Monster*, 138.

¹⁶⁹ Dinsdale, *Loch Ness Monster*, 139.

Blonder from the Academy team claims to have had a strange experience. The hydrophones were attached to a 600ft cable and after lowering the hydrophones about 200ft, it was abruptly stopped by something solid. Blonder was paying out the cable by hand and claims he could feel the hydrophone bounce and scrape over the obstruction producing loud rasping noise. Suddenly it was clear of the obstacle and continued to dissent over 600 feet without another pause.¹⁷⁰

In 1971 Dinsdale joined Rines in America and got further support. At the Massachusetts Institute of technology professor Harold Edgerton undertook to modify one of his cameras to suit in the Lochs environment so they could use his underwater cine-strobe camera.¹⁷¹

Dinsdale and Rines catered to the press while they were in the United States, appearing at interviews on TV and radio, talking to the press including the New York times and they made their case for continuing observation and research.¹⁷² When Rines arrived at the Loch Ness again he brought with him Professor Harold Edgerton's underwater flashing cine camera.¹⁷³ They tested it both in Loch Ness and a pool in Inverness. The operation started in Urquhart Bay, using the LNIB working boat. The equipment was then Attached to the buoys and then left unattended over the night, taking pictures. They had tried to take every precaution to anchor it safely on the bottom, marked the spot with barriers for support in case it started to drift into deeper water. But even with those precautions when the morning came the camera was missing. Searching over the whole Loch Ness for it, they came out with nothing and decided to head back to Achnahannet. The steersman spotted the buoys in the middle of the loch, and still attached was the camera. The camera was undamaged but looking at the film it was no clue of how it had gotten there. What the film did show was the camera had reminded under water the whole time, taking pictures. But the film did not show anything except the rope used to attach the camera to the buoys and there were no pictures of the monster or anyone who had loosened the camera or moved it.¹⁷⁴

Dinsdale and Rines tried to attach the strobe light cine camera to *Water Horse* but they discovered there was some problems. *Water Horse* was a small boat, and it was difficult operating the camera, and have room for two people. They had moved the boat and camera to loch Morar. As they drifted in the loch, they lowered the camera to the bottom leaving it there

¹⁷⁰ Dinsdale, *Loch Ness Monster*, 140.

¹⁷¹ Dinsdale, *Loch Ness Monster*, 141.

¹⁷² Dinsdale, *Loch Ness Monster*, 141.

¹⁷³ Dinsdale, *Loch Ness Monster*, 142.

¹⁷⁴ Dinsdale, *Loch Ness Monster*, 143.

to flash away, all night. In the morning they loaded the camera with colour film and when this was developed, they found out the photographs to be excellent. The pictures showed rocks and boulders visible at the range of 60 ft. They still did not have photograph of an intruder or monster, but their trip top Loch Morar had helped them to master the technique of using the strobe cine camera in a more stable loch than Loch Ness. As the season progressed at Loch Ness the LNIB and the Loch had more than 50,000 people visiting throughout 1971.¹⁷⁵

The Newsletter and report from 1971 gave an update on the Achnahannet and the developments there the list is excessive and shows how the bureau was planning on using fund and how they planned the 1971 expedition. It was scheduled from May to September but Loves team might have arrived earlier to have time to try out the hydrophones before testing them at Loch Ness. The report starts off with mentioning the site improvements both for the crew and visitors, and their new features as darkroom and workshop which will now be available. The crew issue seems to influence this year expedition by outer influence with the postal strike which most likely caused problems with responses and planning for joining the expedition even if it only lasted seven weeks.¹⁷⁶ The weather have been bad during the winter but the spring have been early and warm. This has resulted in many monster sightings, which is not clear if it is because the perception of “Nessie weather” is still an influence. Most of them have been recorded talking about their sight by Tim Dinsdale. Because of one sight lasting twenty minutes, witnessed by a dozen Scottish workers opposite of Foyers, they decide to reopen the Foyers Vehicle top camera station. It is obvious that the noise made from the generators at Foyers worksite does not affect the creature. It was seen to approach the bouys within 200-300 yards of the shore. Moving at a great speed, leaving a bubbling wake. Other sightings recorded was from: Urquhart bay, Dolores Bay, the activity is encouraging for them, but the weather causes visibility problems for a camera.¹⁷⁷ Since the witness sightings are still mentioned it seems they use them to narrow where to focus the search. Using these areas as camera sights.

The expansion of parking and the developed area for the crews gathering to try to photograph or see the monster seems to have extended, by the looks of the list. By adding a darkroom

¹⁷⁵ Dinsdale, *Loch Ness Monster*, 144.

¹⁷⁶ http://news.bbc.co.uk/onthisday/hi/dates/stories/march/8/newsid_2516000/2516343.stm

¹⁷⁷ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Loch Ness Investigation: Phase 1 Newsletter, 12th.June 1971

they can now develop film on site,¹⁷⁸ excluding the time it takes to send photos off to have them developed and analysed. It does however bring out a different question regarding who will be developing the films and who will analyse them. Will they be analysed on site or will they be sent off to professionals? And if there are professionals at site who are to develop and analyse, will they be subjective about what they see or influenced by being at Loch Ness. This is the issue that have tried to be solved by supporting the witness statements with technology, but if they are to develop and analyse the photos taken by themselves, could possibly put them in the same position as Dinsdale was in, with his first film. The analysing will perhaps be done by the same person taking the photo or film and will therefor not be objective about what is shown. Dinsdale did not realise he had not filmed the monster until he got the film viewed by Kodak and discovered it was just a shallow part of the Loch making the disturbance. Another problem with this is the development of the photos on sight does make it possible for manipulation. Which would make any photos or film developed on sight questionable as proof of existence since its not done by an unbiased third-party.

The follow up report to this summer expedition shows how some of the plans and their predictions was correct. The postal strike did influence the turnup for crew but they still managed to have three to five stations manned; Invermoriston, Foyers, H.Q Strone, New Does. The follow up does point out that no pictures where obtained that season. but they did have multiple witnesses recorded on their experiences and what they saw.¹⁷⁹ The use of camera is supposed to be validating these witness statements and by having numeral sightings it should have been possible to capture a photo? Is this because the timing of where and when is off, does the unmanned stations not work or is it because the photos that where taken is not good enough quality, so they are disregarded straight away?

The LNI only have 3 vehicles remaining, they are all used at camera stations. They will not be getting new vehicles this year, Dinsdale and Raynor is putting theirs up for use same for two vehicles from Hepple. But the report does state that the need for new vehicles in 1972 is a reality.¹⁸⁰ It seems like expansion of inventory at the Loch Ness is happening in 1972, however with at least 4 vehicles in use it is a change in how to search for the monster. The vehicles are also working as camera stations. This means that the possibility to film and take

¹⁷⁸ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Loch Ness Investigation: Phase 1 Newsletter, 12th.June 1971

¹⁷⁹ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Final Operations Newsletter – L.N.I 1971, Follow up newsletter for the “phase one” newsletter 12th of June

¹⁸⁰ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Loch Ness Investigation: Phase 1 Newsletter, 12th.June 1971

pictures from more locations and further locations from their operation base is now an option. Making the expedition more mobile than before. It seems like cameras are what holds the most faith and is being parred with other equipment both sonar and cars.

The LNIB have multiple cameras in use at Loch Ness, Two camiflex 35mm with 36”lenses, one Arriflex 35mm, 36” lense, two Arriflex 20” lenses and one Arri 17” lense. All of them are functioning 12th of June. the last one, the 17” have apparently been damaged during the year and the motor is going faster than it should while the shutter for the lens now is uncontrollable. The shutter now goes at 40 fps. Raynor and Dinsdale will was trying to fix the camera when the report was sent. The report continue with the long range cameras. Three long range 16mm Bolex cinecamera, one long range camera and the bureau have also some private owned long range cameras to their disposal, or the private owned are brought by someone attending the expedition.¹⁸¹

By this report they are bringing six different cameras for this years search and they have 4 cinecameras where atleast one is specified as long range. Even if one have some issues with the shutter which was to be fixed, it seems like a larger inventory and larger amount of cameras. The possibilities for this expedition to manage to capture something on camera seems likely when the cinecameras, the possibility to zoom with multiple of these cameras and some are long range should give a large coverage of the Loch Ness from land and with the vehicles making it possible to be more mobile around the Loch most of it should be covered at different times of the day. From the follow up letter to this report at the end of the year they have included a section at the beginning of the report regarding the strobelight cinecamera. The underwater research done by The Academy for Applied Science team from Belmont, Massachusetts under Robert Rines spent a lot of time working with the LNI at the Achnahannet. They where testing out the new Underwater Stroboscopic synchronous movie camera Prepared by Dr. Harold Edgerton at the M.I.T. Testing was done in the inverness swimming pool and in Urquhart Bay. In Loch Morar underwater pictures in goods definition and excellent colour could be obtained up to 60 feet. This equipment can be left unattended to flash away all night in depths up to 200ft. some curious results were obtained but awaits analysis.¹⁸² The coverage from this camera means that they can now observe underwater at night as well as the coverage they have during day with all the different cameras and

¹⁸¹ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Loch Ness Investigation: Phase 1 Newsletter, 12th.June 1971

¹⁸² Harold Edgerton Papers, MIT Archives, box 75 folder 2, Final Operations Newsletter – L.N.I 1971, Follow up newsletter for the “phase one” newsletter 12th of June

observation points. The National Institute of Oceanographic have undertaken to get some bottom scraping equipment for the LNIB, but they will most likely make their own. This means that the summer of 1971 it would be at least 3 boats operational at the Loch Ness to track the water with sonar, use cameras or just as transport or to keep watch on the water.¹⁸³ So the search with cameras are now focusing on above and below water surface and at all times of the day and night.

Baiting Attempts. Murray Stewart is interested and curious about the loch and have given £100 worth of a special Flamingo Park bait, hope to use this during the summer months. Only bait that have caused some positive “monster interest”.¹⁸⁴ What the report reference to with monster interest is vague and somewhat unknown. But it might refer to previous tests done to see if there is a reaction somewhere in the Loch while using it. This might have been used by Love with the hydrophones to listen to change in sound or movement. Isaac Blonder, president of Blonder Tongue Laboratories in New Jersey and his son Greg worked with the Academy team lead by Love. Isaac and Greg Blonder brought tape-deck and hydrophone equipment to monitor incoming sounds, record them and play them back almost instantaneously. This technique usually makes animals curious. But no results in the Loch Ness. No new sounds were recorded and there were issues with the equipment.¹⁸⁵ This does seem to be a different technique than the plan was for the academy team by using lures mentioned earlier to listen. Instead of using pheromones and other types of lures this technique was to send out a mating signal and see if there was a response as they had experienced before doing this type of research. Charles D. Naegeli who was a consultant in electronics also came to visit Achnahannet during his holiday, bringing with him, an underwater transmitter. His experiment with the underwater transmitter is almost the same as the Blonder’s attempts but this device was design to influence mammals, the mammal probe did not seem to make a disturbance anywhere on the Loch and is not mentioned with a result for this expedition and attempt.¹⁸⁶ There was many attempts of using baits and different lures in combination with other technology and technology already in use at Loch Ness.

¹⁸³ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Loch Ness Investigation: Phase 1 Newsletter, 12th.June 1971

¹⁸⁴ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Loch Ness Investigation: Phase 1 Newsletter, 12th.June 1971

¹⁸⁵ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Final Operations Newsletter – L.N.I 1971, Follow up newsletter for the “phase one” newsletter 12th of June

¹⁸⁶ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Final Operations Newsletter – L.N.I 1971, Follow up newsletter for the “phase one” newsletter 12th of June

Murray Stewart mixed baits and lures, including “sonar targets” positioned under water in different localities. This had positive results. The academies lures turned up later as Rines promised Love in a previous letter. These “lures” consisted of sex hormone and other attractants for underwater animals. They did not produce results this year.¹⁸⁷ The baiting and trapping alone does not seem to give results as they hope for. The reference to previous attempts was having an reaction is not mentioned in the other reports as something important. The reports from LNIB or letters between members are usually quick to release information or discuss what is working or giving results, which was not happening with the baiting experiment. So the baiting attempts might just be different ideas being added as previous years, without getting a result. The attempt to make arrangements with Caledonian Canal Authority to implement an experiment involving the skippers at the Loch Ness was not successful either. The idea was to have the skippers leave their fish-finding sonar on while in transit thru the loch. 100 sample end-to-end cards have been handed out and the expert skippers are to fill them out if they see anything unusual on their sonars. This experiment can produce some valuable information and possible statistics. If this is proved, there will be possible to raise funds to increase the number of sonar charts obtained. By the end of the year its clear that this did not get the results that was hoped for. Out of all the 100 cards handed out only 17 was submitted. Out of these 17 it was four which showed unexplained contact with a phenomenon. The report concludes that more analysis is needed regarding these readings, however it seems like an attempt to have more sonar work done in the Loch.¹⁸⁸

Two new camera sites have good potential. “Invermoriston” 2, on the far side of the Invermoriston Bay, this placement gives best mid-day light conditions and have good shelter from the wind coming from Southwest. “New Dores” new lay-by site about 100 ft. -above water covering almost the whole Dores and water, and some of the shore down to the Loch-end. Why the two new sites have good potential seems to be because of placement regarding the sun and shelter, and the covering of Loch area. It was some sightings at Dores which might explain why it is added to the list of camera sites. The other areas that have had

¹⁸⁷ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Final Operations Newsletter – L.N.I 1971, Follow up newsletter for the “phase one” newsletter 12th of June

¹⁸⁸ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Final Operations Newsletter – L.N.I 1971, Follow up newsletter for the “phase one” newsletter 12th of June

sightings are being observed more closely just in case the creature does show up again in those areas.¹⁸⁹

Steve Thorps of the National Institute of Oceanography and his team did experiments in Loch Ness to study the phenomenon of internal wave patterns or seiches that has been established in the Loch Ness. And they used the LNI base at Achnahannet and the harbour there. The paper and press were interested and Thorpe gave the LNI access to what he has said to the reporters about the *Monster internal waves* in the Loch Ness.¹⁹⁰ These waves do not show on the surface of the Loch. He still concluded with that there is no relation to these monster internal waves in the Loch Ness to an animate monster In the Loch. In this report it is also mentioned that Achnahannet as their basecamp for operations will probably be only for one more year. The question is if there is possibility of setting up operations elsewhere or if the base perhaps disappears. The internal waves are important to understand to use the equipment in Loch Ness. This would have an impact of how objects in the water appears, which might not be in a anticipated way based on other lakes. The tests done with sonars and cameras before going to the Loch Ness are done in different Lochs and there is no mention before of having seen this types of underwater waves there. This can mean there is a factor in how items is perceived in the Loch which have been overlooked. With 1972 it is again important with a photo before the LNIB base is removed. This might have had an impact on the sightings and the choice of having numeral tests, experience and equipment. Dinsdale as well as many others claims to have had a sighting this year of a smaller head on about 200 yards range from *Water Horse*. Dinsdale recorded his own reactions two minutes after he saw it, but there were no other witnesses. Dinsdale assures that the “Surgeons photograph” is genuine because the object he saw was identical to it, just a bit more thick set and a rounded, wormlike extremity and too quick for photography.¹⁹¹ It is still the need of photographs and it is curious how the technology that is clearly favoured, the camera, is not managing to capture one photograph. What Dinsdale claims is also interesting, one thing is to assure the “surgeon photo” is real, which have been revealed much later was a hoax. But the creature was to quick to be taken a

¹⁸⁹ ¹⁸⁹ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Loch Ness Investigation: Phase 1 Newsletter, 12th.June 1971

¹⁹⁰ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Final Operations Newsletter – L.N.I 1971, Follow up newsletter for the “phase one” newsletter 12th of June

¹⁹¹ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Final Operations Newsletter – L.N.I 1971, Follow up newsletter for the “phase one” newsletter 12th of June

photo off. Does this mean that the cameras Dinsdale is operating is too slow, not high enough quality, or too advanced and technical to be manageable in hurried situations?

The final conclusions in the Academy of Applied Science report on the side-scan sonar obtained in the 1970 state that 1. Large moving objects in the Loch. 2. Abundant fish life that could support a large animal. 3. Large ridges in the Loch walls that could harbour large creatures. The latter confirmed by a diver that has seen them himself during a dive and has seen the ridges and undercuts. The trawler sonar shows promise but extensive use and good statistic relays on the skippers leaving their sonars on and handing in the charts voluntarily.

The summary of this report makes it clear that the evidence needed is a clear photo and that the stacking of evidence that they have collected have to be able to be used as proof for something when they are accumulated. Which does not seem to be the case. The equipment seems too excessive and there might be the rush to capture proof that makes it difficult to remove some equipment and instead focus on what they have the most faith in. There are no reports again until the report for 1972 operations comes and it shows that the LNIB are struggling to some extent with the equipment and the skills needed to use the technology they are bringing in. Dinsdale send the 1972 reports and have suggestions to how to operate more efficiently and the plan of how to capture a good photograph to be used as proof and to improve photography techniques. Dinsdale points at the problems with previous expeditions and how to improve on some areas and makes a new plan for the crew rotation to make the most of the possibilities at Loch Ness and have a breakthrough in 1972. This will be the tenth year the LNIB have field operations at Loch Ness and 1972 will be the last year they have their main base at Achnahannet. Dinsdale starts off trying to define the problem that they had to work on for the 1972 expedition.¹⁹²

Definition of the problem is difficult, because it involves many factors – but we are familiar with most after so many years of active fieldwork, and therefore if we continue to improve our techniques, and tactics on the basis of lessons learned it is probable a solution will be found to the control, major problems, which is how to obtain a short sequence of clear cine film. of the Animal in moving profile on the surface.

¹⁹² Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to: The Chairman, and Scientific Directors Loch Ness Investigation Bureau Ltd. Recommendations for this season's fieldwork, February 29th. 1972.

Subsurface photography, is so highly specialised, it is best left to those who specialise in it, and who can give their whole time to the operation of equipment. we can, however, do much to assist the development of such experiments.¹⁹³

The main goal as have been shown during the other expeditions are to catch a film of the monster in profile moving in the Loch. This is again what is the desired outcome while using the cameras, which is where the largest problem is. The ability to do so seems to be impossible but there is a plan in place for this to happen. Dinsdale now suggest that underwater photography should be left to those who are specialised in this and we can assume he is referring to the Academy team with Love and Edgerton to handle this or other outside forces with that type of education or specialised training. Dinsdale do suggest that the crew and LNIB will assist in the experiments, but it does seem from this suggestion that LNIB will not pursue subsurface photography outside of the assistant role of a team led by trained professionals. The trust seems now to have shifted from only having faith in the technology but to also revolve around the experts in the field. This might be because of the previous years the camera alone has not been able to capture adequate proof and to start working below surface might be to much of a stretch for amateurs to manage. This is a opinion he takes further into the second and third point of improvements, photographic and human fault. As a recommendation for the fieldwork done during this year's expedition the goal is, besides to capture proof of existing creature or animal in Loch Ness, to keep the best of the old and introducing new ideas and equipment. The recommendation and the end of year report as a complementary report of 1971 expedition shows how the idea that the professionals shall do the underwater photography. The Bottom topography that was done previously using echo-graph machines operated by the team from the Academy in 1971, shows that there is a ridge under water boarding off Tychat Trench. Rines claims to have seen the creature in that location and are supported by Freddie Carry who also claims sightings there on more than one occasion. The ridge might explain why the creature breaks thru the water with its back passing over it, showing it as a humped animal as it crosses over to Tychat Trench. Therefor in 1972 Narwhale will be on that location and they will try to do flash or floodlight photography at short range. This might mean that they will either try to use possibly Edgerton's camera underwater, without mentioning who will operate it, since its

¹⁹³ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to: The Chairman, and Scientific Directors Loch Ness Investigation Bureau Ltd. Recommendations for this season's fieldwork, February 29th. 1972.

recommended not to be done without experts. Or they might use it above water, which seems more likely, but what camera they will use is not specified.¹⁹⁴

The photographs Dinsdale says are subject to technical or human fault. Dinsdale is referring to the faulty pictures and films taken that are not adequate as proof regarding the quality. This Dinsdale points to untrained crew and the lack of updated equipment. Dinsdale then concludes this with the goal of adequate pictures since these issues seems to make perfect photos and film impossible. Dinsdale refers to the film sequences from 1967 and 1969 as adequate film to strive to capture. However, to make sure that this will capture the animal in profile which the previous film sequences have not been able too. The human error Dinsdale thinks can be reduced by camera and target practice. in 1970 and '71 the training was to have minimum 15 sec. on target which was obtained by almost 90% of the cameramen in training. By doing this they discovered those that were not suitable as cameramen by either not having the co-ordination needed or had visual issues along with other issues making them unfit. While training can be done for the cameramen Dinsdale does point out in this plan that a lot of the success of managing to get adequate film is relying on camera effectiveness.¹⁹⁵ Dinsdale mentioned before the camera quality is vital for capturing the adequate proof and this is normally linked with newer and more developed cameras. So the camera quality is still the reason for not being able to capture the photograph needed to prove the existence of the creature.

Another factor Dinsdale mentions regarding camera and humans are the interest which is linked to their motivation. the motivation to be the first one to capture good enough film or photograph of the creature in the Loch to serve as proof of existence. The weather at Loch Ness can be demotivating because of the cold, rain, attacks from swarms of midges¹⁹⁶ and loneliness. The changes in rotation and sending the crew out with gas cookers makes the stations better equipped to “keep spirit up”, By having the vehicles and rotating stations this brings variety for the “watchers”, so not every day is the same, which should help on eliminating the dwindling motivation and monotone tasks.¹⁹⁷ Previously the crew have been

¹⁹⁴ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to: The Chairman, and Scientific Directors Loch Ness Investigation Bureau Ltd. Recommendations for this season’s fieldwork, February 29th. 1972.

¹⁹⁵ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to: The Chairman, and Scientific Directors Loch Ness Investigation Bureau Ltd. Recommendations for this season’s fieldwork, February 29th. 1972.

¹⁹⁶ Midge – A small fly. In the north west of Scotland the highland midge is usually very prevalent from late spring to late summer. Same time as expeditions was held by the LNI

¹⁹⁷ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to: The Chairman, and Scientific Directors Loch Ness Investigation Bureau Ltd. Recommendations for this season’s fieldwork, February 29th. 1972.

operating during the day depending on the weather condition but in 1972 that will be changed. In the years before the LNIB have wished for many participants but have not released a specific number, making it likely there have not been crew member restrictions before. Dinsdale recommends a crew on maximum twelve people and a group commander. This will make it possible to do the crew rotation, half of the crew working at the base Achnahannet and the other half doing the field work out of camp. The reason for this type of rotation is to break the monotone work, hopefully making the crew give all of their attention to the tasks out of base one day, then have less straining work the next day at base.¹⁹⁸ The vehicles for the 1972 expedition was being negotiated on, in 1971 reports there was mentioned the need to expand inventory and to get more vehicles. The negotiation is to get vehicles they can modify and build up internally to use them as long range camera vehicles. This means that flap-slots will be cut in the sides of the vehicles, and the main camera, 20" Arriflex mounted inside, supporting long range still camera. This permit the LRCV remaining effective to take photographs while moving, in all weather conditions and a high degree of mobility. The vehicle and crew will leave base in the evening to an evening watch site, using the light for evening watch, when that light is gone they will move to a new location and wait until the morning when the sun will be a backlight for early morning watching keeping the sun behind the camera on the evening site and morning site. At mid-day the unit will move to a new location, which first should have the sun high giving a good over-light, without compromising the quality, later when the sun starts to fade, this should improve the angular lens and give the light conditions that works for this type of photography. LRCV will have independent camera batteries different from vehicle batteries but with a plug-in for charging circuit so they can top it off when the vehicle is running. This will avoid the problem with flat batteries during the 24 hour shift. The LRCV will be the top priority with manning and can only be used of competent drivers. If necessary it could be done with a one person crew, but two is optimal for efficiency and they can then switch on driving and watch. LRCV stations will be divided into two, Easterly watch and Westerly watch.¹⁹⁹

The technical faults they have been experiencing with the cameras and especially the long range cameras are most common with flat batteries, broken and lost lenses and film getting stuck and sticking because of the humid climate. Another problem regarding the long lenses is

¹⁹⁸ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to: The Chairman, and Scientific Directors Loch Ness Investigation Bureau Ltd. Recommendations for this season's fieldwork, February 29th. 1972.

¹⁹⁹ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to: The Chairman, and Scientific Directors Loch Ness Investigation Bureau Ltd. Recommendations for this season's fieldwork, February 29th. 1972.

visibility. The long lenses are good but the visibility when using them relies heavily on direction and the light quality, and these cameras seem to need frequent follow ups from a technician on site. The need for good lighting means that long range cameras give so bad quality film that they can't be used in bad weather or when the sunlight is strong. Dinsdale proposes that tracking of the weather should be enough to have an indication if the long range will be good to use from day to day, since this can be anticipated and predicted. The Long range camera is good when the sun is high or behind it, Dinsdale also recommends back-lighting, like a sunset, which will give a low-light photo if taken from a vantage point. The shotgun approach does not work, and the conditions have been bad previous years. The shotgun technique they have been doing is basically to shoot as many frames as possible, which is not necessarily bad, but this means a lot more work analysing photos and film. The solution Dinsdale recommends instead of doing the shotgun technique is doing something new at sites and fixed places, and to film when there is a sighting, and the lighting conditions are good from a vantage point and to do it quickly. Which means a change in technique from just shooting film and photos then searching for good ones to a more confident use of the equipment with more purpose as the camera is in use, a technique more similar to the single-shot technique.²⁰⁰ This type of photography usually produces better pictures and less work afterwards trying to find something good.²⁰¹ When moving around to different vantage points and moving to better light conditions means to move with the light, keeping the sun above or behind the camera. Twice has the angle ruined a good photo where light has been directly in to the lens of camera and ruined the photo. First time was from High Dores when Dave Whittaker filmed what he could see clearly, but the film came out over exposed and showed only a narrow V wake. 1970 and 1971 400 yards within Fr. Brusey about 10-foot of head and neck sighting but Dinsdale was blinded by the sunglaze. Similar to what has happened to the cinefilms where the films are useless because of visibility the photos taken previously have also been regarded not adequate as proof, where Dinsdale's opinion is that this can be the solution for the issues. The vantage points and camera positions for the 1972 expedition is recommended being determined by the sun and opposite of the field scan. Dinsdale also recommends using the Tourist intelligence for this. By that he means to use the witness statements taken previously and use them with the information regarding where they saw the creature and position themselves around these areas. With this they can have multiple camera

²⁰⁰ Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to: The Chairman, and Scientific Directors Loch Ness Investigation Bureau Ltd. Recommendations for this season's fieldwork, February 29th. 1972.

²⁰¹ <https://photographydegrees.org/shotgun-or-single-shot>

positions and move them around, minding the light, if they would have the crew and capacity to do so.²⁰²

Urquhart Bay have had the longest history of sightings. It also have good camera coverage from Strone. But the camera is exposed to the elements and the sun conditions is not good until long into the morning. Recent years more daytime boat activity and noise have caused sighting time to change from daytime to evening. Reports on disturbances in the water have been reported from 08.pm

Because of the change in activity in the water the watch site Strone will not be a permanent watch site unless its Nessie weather, meaning sunny and not too windy. When it is bad weather and Strone is not manned by crew they will use "Narwhale". "Narwhale" will be equipped with a 16mm camera and platform, using both the cine photo and flood light. "Narwhale" will be anchored while doing this at night and until the morning to try to capture the creature at the changed times it had been spotted. Probably because of safety "Narwhale" will have a crew of two and Dick Raynor should operate "Narwhale" himself or delegate to someone capable, as well as going on "Narwhale" as crew member should be voluntary. There is two places to go while on "Narwhale" where they think the chance of getting a close-up silhouette photography.

Back at the Achnahannet base on Moy head it will be manned in all weathers from morning til evening as before. There it will be used An Arriflex 36" which will also be used to train the crew before they go out doing the field work. A second 36" wedgehead Camiflex, mounted by tripod each day manned by the Group command, if there is an emergency at Achnahannet to back up the Arriflex if it fails mechanically or run out of film.

This second long range unit can be taken out by Group commander either as a spare at Bedford but will remain mainly as a spare at Achnahannet. The group commander can if he prefers take the camera and go in his own car to areas of recent sightings, if he wants to do personal watching or immediately to a sighting point if a tourist come in to report seeing the creature. The reasoning for this is for the group commander to have some watch time and to support the watch office camera and cameraman. And to take in the incoming recent information. Even if this is the last year with Achnahannet as main base it will still keep crew accommodations, workshop and a darkroom capable of developing test strips. It is not mentioned in the report if that is just for the 72 expedition or if it is for future field work as well. Dinsdale seems in this report to try to solve why the photographs are not coming out as

²⁰² Harold Edgerton Papers, MIT Archives, box 75 folder 2, Letter to: The Chairman, and Scientific Directors Loch Ness Investigation Bureau Ltd. Recommendations for this season's fieldwork, February 29th. 1972.

adequate proof. Dinsdale then proceeds to find the error which is leading to the idea that it is the motivation of the crew and the lack of training. The faith in the camera and the technology seems to still be there but Dinsdale seems to think its because of human error that the photos do not show the wanted result.

May 1st operational newsletter to Monster hunters and interested parties. This Newsletter will contain the information about the operations of 1972 and give a summary for the work of 1973. The spring tour lecture the LNIB was invited to do in 1972 by the Academy of Applied science, specifically Robert Rines. The speaker was Tim Dinsdale who was there speaking about the monster, the tour was in the eastern states including California and the Pacific northwest. Dinsdale travelled the U.S for this lecture tour from 26th of March and lasted to 9th of May. The bookings where few in the beginning but the British Tourist Authority helped, giving the caused media coverage in TV and radio. This helped on the booking and Dinsdale looks to have had a busy schedule after this. Dinsdale reports on good media coverage during the tour where he went, with national and local media following. The lectures was mostly taken seriously, with one exception. This exception is not elaborated, but Dinsdale makes a point out of the interest of the participants, when they understood it was not a joke. The film from 1960 was also showed where it was possibilities for it. The lectures performed was in several University societies and technical establishments, one of those being the MIT, where there was about 1000 participants, thirty at Boston Aquarium. Dinsdale was also given the opportunity to talk to the technical staff at Eastman Kodak in Rochester. In California he was at UCLA and at the Institute of oceanography. Dinsdale and Rines also had meetings with specialists and companies. These meetings was to improve their equipment and the search potential, Dinsdale in this report says cryptically it will show to be valuable later in 1972. Dinsdale and Rines also got to see the some of the Walt Disney colour movie, filmed at Loch Ness in 1969. This movie was to be shown at the Educational TV in Amerika and hopefully in the UK.²⁰³

While in the U.S, Dinsdale and Rines also went to San Francisco and talked to Peter Byrne, director of the International Wildlife Conservation Society. Dinsdale had met Peter Byrne in New Jersey at Ivan Sanderson's Society for investigating the unexplained. After Byrne had

²⁰³ Harold Edgerton Papers, MIT Archives, box 75 folder 3, *Operations Newsletter – Loch Ness and Loch Morar 1972-'73*, page 1.

several expeditions for the “Yeti” in Himalaya, he is now in San Francisco hunting the “Big Foot”. Dinsdale introduced Byrne to someone from the Academy in Belmont who did support Byrne with some financial aid. Byrne also had lectures and was talking to a huge Audience in New York at the Explorers club before going back to the hunt for its third year. New books releases that have been released in 72 and will come in 73 includes the report from Loch Morag, Dinsdale thinks this a good contribution to the literature about the Highlands water monsters. Both of Dinsdale’s books about the Loch Ness monster and sea monsters are being republished and updated (“Loch Ness Monster”, and “the Leviathans”) Dinsdale are also waiting for the release of the children book “the story of the Loch Ness Monster” which will be published in July. The LNIB have had winter lectures in the UK at least in 1972 and the winter months in the beginning of the year 1973. As the usual winter talks and lectures Dinsdale writes.²⁰⁴ So, this seems to be a regular winter happening. This could be where they do some recruiting for the expeditions since they seem to go to Universities and colleges for these talks and lectures.

The field operation of 1972 starts of with Dinsdale’s own expeditions and what he was doing, including some fieldwork at Loch Morar. Still the recognition and achievement goes in 1972 are to Robert Rines from the Academy of science and Harold Edgerton from MIT with the LNIB team for underwater research. They operated the strobe-flash synchronized camera underwater at Urquhart Bay. 8th of August 1972 this team, about 1.45 am, the Raytheon sonar picked up Echoes from something large moving within range of the camera. This is indicated in the report from the Royal Photographic Society Journal. Dinsdale is positive about this image seen, he thinks this will be what validates the search.²⁰⁵ The plan for 1973 is changing from previous years. Since the LNIB will not have main base at Achnahannet, 1972 was the last year for it to be their base. It is now unlikely that LNIB will arrange a full-scale expedition. However, the LNIB hope that those who are going to Loch Ness will contact for borrowing equipment and work in self sufficient groups. David James, Executive director of LNIB, did express this at the end of the year of 1972, at the Christmas party that where hosted. Dinsdale will again return to the Loch in May and June and to help out the Academy team from early to mid-July. When Dinsdale arrived at the Loch Ness, he was met with the “typical” weather. The wind was so strong “Hunter” was blown into the sandy shallow bay,

²⁰⁴ Harold Edgerton Papers, MIT Archives, box 75 folder 3, *Operations Newsletter – Loch Ness and Loch Morar 1972-'73*, page 2.

²⁰⁵ Harold Edgerton Papers, MIT Archives, box 75 folder 3, *Operations Newsletter – Loch Ness and Loch Morar 1972-'73*, page 2

while both anchors were down. When “Hunter” was pushed over some deeper water, Dinsdale was able to reverse out of the silt. Dinsdale says the water was rough and many canoes and small boats tipped over but the crew on those were dragged out of the water in good but cold shape.²⁰⁶ In this newsletter it shows that the report from February 1972 discussing the 72’s field operations would be the last organised LNI search. The base they had at Achnahannet would then only keep the accommodations for that last year it seems. The results from the search 1972 are finally published in “The outdoor message” in July 1973, claiming that finally there is proof of existence in the Loch Ness. Going thru the history briefly before coming to last years search, they point out the credentials of the analysing party of the sonar transcription. The pictures that were taken by Edgerton are also analysed and are taken as photographic proof of the animal. The hope for the Academy and LNIB is that now the confirmation is out that more businesses and others will contribute in the search. The Academy are planning a search for the summer and are already looking into new equipment to bring, amount that a new movement sensor.

While its not much information about the search in 1974, there are media coverage for the 1975 findings. But before the search it is one news article showing some of the ideas that will be tried out for that year’s search. As the last report from Tim Dinsdale said it would be put together a new expedition by the LNIB, but he does encourage others to keep the search going, this might be one such attempt. The Hertfordshire firemen have produced a plastic monster and have a sound clip from British Broadcasting corporations to have a mating call. This plastic monster are supposed to be a female, 20 feet long and are convinced that looks alone is enough for the monster to be drawn to their faked female monster. Why they believe the Loch Ness monster is a male, is not answered.²⁰⁷ The search done from the Academy and Rines team have been a success based on the news articles that comes forward at the end of the year. “The Boston Globe” 22. November 1975’s headline confirms findings of the Loch Ness. The search that has gone on for hundreds of years have finally given proof of something in the Loch Ness. New photographs have been obtained and it is compared to the old ones taken in 1972. These new photos are allegedly showing a silhouette of something in the water and have been sent off for analysis with the return of confirmation. Rines and his team are so sure of these findings that they have set up a conference regarding the findings. The conference is set to the 9th of December 1975 in Edinburg, the invite is for scientists all over

²⁰⁶ Harold Edgerton Papers, MIT Archives, box 75 folder 3, *Newsletter* from Tim Dinsdale, May 31st.1973

²⁰⁷ The Truscaloosa News, 6th June 1975

the world. Many of these scientists have studied the evidence of the monster from the Academy of Science. Rines is confident that these findings are not another hoax and have faith that those on his team and who have done the research have done this work with integrity and would not risk that the research they have done to be undermined by themselves by posing a hoax. The photos from 1972 which showed possibly a flipper was enhanced and analysed at Jet Propulsion Laboratory in Pasadena.²⁰⁸

Jet Propulsion Laboratory was created early in the 1930's and are experts in robotic spacecraft. And was one of the first laboratories which focused on the outer space, they are also working closely with NASA.²⁰⁹ This was the laboratory which analysed the photos in 1972 and enhanced them. There is no mention of this in the 1972 section of their history, and they were focusing on sending a spacecraft to Venus.²¹⁰ This raises a few questions of why send the photos there for analysis. As before when JARIC was doing the analysis of Dinsdale's film its not an obvious choice. It might be because of the reputation of these laboratories. There is little doubt that most would have heard of JPL and their connection with NASA and the U.S government in 1975. The focus on space, closely after the moon race would perhaps make these images seem better and more trustworthy than they deserve.

Dr. John Prescott the executive director of the New England Aquarium has been a disbeliever in the Loch Ness monster. However, after seeing the photographs he still does not believe in the monster but do think more work at Loch Ness is to be done. Prescott have been in contact with Rines since he discloses to the paper what Rines have informed him off. Rines have estimated to Prescott that the creature is about 12 feet long and the head and neck 8 feet long. Rines had also speculated about the creature could have a long tail. Prescott cannot elaborate further on this, other than he believe it is an animate object judging from the silhouette. That is all Prescott says on the matter other than pointing out the water is murky around the silhouette. The photographs that have been mentioned numerous times as adequate proof would have to be clear images which without a doubt can show what is living in Loch Ness. Prescott says that the water is murky around the silhouette, which clearly means that the photos are not a clear image. The belief that this would be the definite proof seems to a judgement based on the equipment used and the photo that came out of it. The equipment was advanced using underwater photography with the use of sonar, later photo enhanced to show this image.

²⁰⁸ Harold Edgerton Papers, MIT Archives, box 75 folder 3, The Boston Globe, *Fabled Loch Ness Monster is for real, researchers report*. Vol. 208 No. 145, November 22, 1975

²⁰⁹ <https://www.jpl.nasa.gov/who-we-are/history>

²¹⁰ <https://www.jpl.nasa.gov/who-we-are/history>

Two factors are important here, the trust placed on the technology producing the photo and the photo enhancement. The trust and faith in the equipment seems to be strong, and the thought of this equipment not to be able to prove that the photo is real seems not to be relevant for Rines and his team. The other factor that the photo is already tempered with, being enhanced would make estimates of size and what is seen difficult to analyse.

The picture taken by Rines in 1972 was photo enhanced but does show a spade-shape object. Some speculations if these were the end of the tail with a fin, or an arm fin perhaps. New photos taken summer 1975 was taken with new equipment. Edgerton had developed a new high speed camera system, that managed to capture the monster on tape. The newspaper states how Edgerton is specialised and have developed the super-fast photograph technique and the use and development of strobe flash photography. The newspaper had unfortunately no statement from Edgerton since he was away with Jacques Cousteau. Dr. George Zug have seen the photos and does believe this proof the existing of living animals in the Loch Ness. He believes the photos are good and does show something in the Loch they are not familiar with. He is convinced that what Rines caught on camera is living or at least parts of living animals. Prescott disagrees with Zug about the qualities of photos, they are colour photos, but they were not good. Prescott could see or determine the skin texture or the colour of what was taken photo off. Probably because of the murky water that he mentioned earlier in the article. Rines hopes that by doing this conference and analysing the results will give them some clues about what kind of animal the Loch Ness monster is. Rines say that no one knows what they are or can classify them and the reason for this conference is to try to gather clues so that they can possibly identify it. Rines have also been advising government officials in Britain how to protect these animals and once it is announced to be real, how to keep people from doing “unfortunate things over there” at Loch Ness.²¹¹ These unfortunate things is not specified but we might think that it is regarding hunting the creatures, as the Scottish house of commune was afraid of. Or have something impact the environment in the Loch, pollution or something in that regard. About how those photos were obtained Prescott says that Rines used two cameras. The more sophisticated one was a camera triggered by a sonar system, this failed. But the other camera used a timer and strobe lights. The camera was on a timer to take a

²¹¹ Harold Edgerton Papers, MIT Archives, box 75 folder 3, The Boston Globe, Vol. 208, No.145 *Fabled Loch Ness Monster is for real, researchers report*, November 22th. 1975, page 1

photo every 12 minutes. It was this simpler camera, as Prescott describes it, that was able to capture the creature under water.²¹²

The day after this there is two articles talking about the findings. Both *Boston globe* and *Brocton enterprises* does a piece about this. The *Boston Globe* article “Hub group’s Loch Ness data backed” have talked to Peter Scott, who is one of the organisers for the conference that is scheduled for 10th of December. Scott points out that the most exciting find is the picture of the flipper and that is the picture he finds the most interesting. Scott points out that there is no known seal or whale who have this type of shaped flipper, but Scott does point to the similar shape found in fossils of the prehistoric reptiles. The article points to the other article of the *Boston globe* from the day before, where Rines did confirm that his team had taken pictures which did prove existence of the Loch Ness monster. Scott points out at the end of the article he is against the capturing of the Loch Ness monster, and that the creature might be as long as 40 feet so the capture might be dangerous. Scott believes that after the conference that those who do not believe in the monster and think those who do and searches for it are insane, will have changed their mind by the end of the conference. *Brockton enterprise* cover the same information as was released regarding the photo and most of the information in the article “Loch Ness monster said real” have already been covered by other newspapers like *The Boston globe*. This article does however start a bit differently than the rest, not as scientific and sceptical as a first impression. They start off generally with the Academy of Applied science have reported that “Nessie”, The Loch Ness monster, is not a myth and is alive and very much real. The scientists now have evidence to prove this. After this short capturing introduction, it goes into the interviews with Robert Rines, George Zug and John Prescott. Included are also a short piece of the report from St. Adamnan abbot of Iona year 565.²¹³

There seems to be some discrepancies about the claimed size of the monster. Rines are estimating 12 feet while Peter Scott is estimating 40 feet.²¹⁴ This also says something about the quality of this photo. When the size of the creature assumed are so different, the enhancement and the estimations cannot be estimated from the same variables. The difference about the articles is the addition in the *Boston Globe* of Peter Scott, which makes sense, since it functions as a follow up article to the previous article where the statements of proof where reported in the

²¹² Harold Edgerton Papers, MIT Archives, box 75 folder 3, The Boston Globe, Vol. 208, No.145 , *Loch Ness Monster is real, Say scientists*, November 22th. 1975, continued from page 1.

²¹³ Harold Edgerton Papers, MIT Archives, box 75 folder 3, The Boston Globe, Vol. 208, No.145 , *Loch Ness Monster is real, Say scientists*, November 22th. 1975, page 1-2.

²¹⁴ 12feet about 3.64m. 40feet – 12.19m

same paper. While *Brockton Enterprise* seems to publish the same news as the *Boston Globe* did, just one day after.²¹⁵ The conference that was scheduled for the presenting of the evidence was set up by the Royal society of Edinburgh, The University of Birmingham and Heriot-Watt university who according to the *Boston Evening Globe* had backed out. Leaving Robert Needleman, a director of the Academy of Applied science, and Robert Rines in a limbo. Not sure if the conference they were leaving for the next day would happen or not. They are planning to go to Scotland and says that many other scientists have already made travel arrangement. But in the *Yorkshire Post* that the article includes information from, there was 140 scientists invited for this conference. However, only 30 had confirmed travel and of those 30 some have also pulled out. The article was posted 3rd of December, only 7 days before the conference was to happen. When Needleman is asked about what would happen, he says he doesn't know, he was not informed about anyone pulling out from this until he saw it in a newspaper. Rines does not have any more information about this, but he will contact some of the English scientists, but he points out it is the British scientists who is in control of this.²¹⁶ There have been a sudden change from the optimistic tone in November 1975 when the decision of a conference was published, and the photos was taken as proof to suddenly the conference might be cancelled. The student newspaper *The Michigan daily* from University of Michigan posted their story 5th of December "Loch Ness monster, Fact or Fantasy?". The article focuses less on the science around the searches and more at the picture and their description of it, as a rust-coloured object. The picture was shown to about 50 students at Franklin Pierce Law Centre in Concord. The paper jokes about the time when the idea was to send "Nessie" as an underwater agent to attack the German submarines during the second world war, and how "Nessie" clearly do not need a law to protect it. It protects itself so good, that few have seen him/her/it.²¹⁷ the student newspaper don't mention anything about the conference being cancelled, or have much other information than the report of the picture that seems to be in their opinion, anything. The description is vague, but still delivered in a way that seems like the whole picture is nothing but a joke.

The presentation of the Loch ness evidence was presented to both houses of parliament, scientists and press at the house of commons 10th of December 1975. The presentation is building on findings from scientists and others from 1972 to 1975 and are regarding the

²¹⁵ Harold Edgerton Papers, MIT Archives, box 75 folder 3, Brocton Enterprise, *Loch Ness Monster Said Real*, November 23th. 1975

²¹⁶ Harold Edgerton Papers, MIT Archives, box 75 folder 3, The Boston Evening Globe, *US scientists still plan trip to Loch Parley*, December 3rd. 1975,

²¹⁷ The Michigan Daily 5th december 1975

underwater sonar and the photographic results from the Academy of Applied science and the British LNIB. The presentation is parted into analyses done by scientists at different Institutions regarding the film from 1972 and what their thoughts are about further search and the new film taken in 1975 if they have commented on it. First to start off this presentation is George Zug, curator at the Smithsonian Institution. The data presented for 1972 is the 16mm sonar record film, that shows a series of small objects, probably fish, and a series of larger animate objects, from 20 to 30 feet large. Therefor the conclusion from this film is that the smaller objects are fish, and the larger object is the *Nessitoras Rhombopteryx*, previously named the Loch Ness monster or “Nessie”. The 16mm have been computer enhanced and shows that the larger object seems to have a rhomboidal shape connected to a narrow base to a large object. This is interpreted as the flipper of the object attached to its larger body. Zug then moves on to the 1975 16mm film, which have several frames with objects that have symmetrical profiles, indicating that they are animate objects or parts of one. Zug is proposing the idea that one frame might be the body and the neck, and another is the head. Zug believes that the data presented is evidence of a large animals in the Loch Ness but that the evidence is not sufficient to identify what kind of animals they are. Zug thinks that this should be enough evidence to justify more research around the natural history Around Loch Ness and the plants.

Harold Edgerton gives a shorter summary of the picture taken in 1972 but does not mention the new evidence from 1975. Edgerton and Charles Wyckoff have together decided at the photo taken with Edgerton strobe elapsed time camera equipment have caught a something looking like a flipper, probably 6 to 8 feet but not shorter than 4 feet. Press release regarding the picture taken in 1972, released November 24th 1975 points out that even if the photo was published in the *Photographic journal* and shows something flipper like, that cant be denied, its still insufficient to serve as evidence. Because this shape does not help to identify anything, and a flipper shape is to little to go on. McGowan, after looking at the evidence from 1972 and 1975 do not question the integrity of the scientists or the data. McGowan do agree that the evidence is enough to support the claim of an animate object in the Loch ness and therefor it should be actions taken to protect the Loch Ness from irresponsible activities. Roy Mackal have also looked at the evidence from 1972 and 75 and have compared the findings. And he does agree that there is an animate object. He points to two pictures of “flipper-like” objects, and a third photo that can be showing the upper body of an animal with the neck. Referring probably to the 1975 photograph. Mackal have 10 years of experience in the Loch Ness data, he was one of the directors of the LNIB. He thinks this is good evidence, they have worked with recognised

specialists in the field. But he also points out that more research is necessary and that there must be a consideration for preservation and conservation of this kind of population or animals. Though no one have been specific about the population. The Loch Ness monster is usually referred to as a single creature. And there have not been seen more than one at a time.

In Peter Scott's presentation half is about the same as he has said to the press. That there is resemblance to prehistoric Specimens in fossils. However, he does explain why he thinks these photos are of a living, moving animal. The flipper picture shows that shape, no one is denying that, but as Scott points out that the two flipper pictures are taken about one minute apart. And the flipper has changed position. This is consistent with an animal paddling and are moving around between photos. Peter Scott have been involved with this search since 1958 and was one of the founding board members of the LNIB, and despite all his efforts of watching the loch, diving and flown over the Loch he have not seen the Loch Ness monster, which he and Rines have named *Nessiteras Rhombonteryx*. The rest of the reports on this from Alan Cillespic, A.W Crompton, D. Stones, H, Lyman, J. Prescott. All do agree that the picture shows something that does look like an animate object, identification seems unlikely but that there is grounds to continue the search. The last report from Stone, Lyman and Prescott does also point out that there must be some action taken to protect whatever is there, but the animal but also in regarding to the environment. Once whatever is there is identified this might increase traffic and pollution, which would not be favourable and could end their hoped of learning more about this creature or make it go extinct.²¹⁸

Regarding this protection of the creature the sonar and photos became important. In 1975 the conservation of wild creatures and wild plants act.75 was passed in the UK. This was to give the best possible way to protect any animal where its survival was threatened. But to be included and protected by this act the creature had to have a common name and a scientific name. To give this to the Loch Ness monster it had to have a formal description. The sonar and the photos then become important. The sonar and the photos where comparable with the size and a total body length of 20m with a flipper about 2m, seems possible. The body then includes the neck for about 3 to 4m. The head seems to be rather small which may include horns. The descriptions of the back are said to be as an upturned boat and is supported by the still photos taken. The picture from June 1975 may show different variations in the same species, including the view

²¹⁸ Harold Edgerton Papers, MIT Archives, box 75 folder 3, Presentation of Loch Ness Evidence to the Members of both Houses of Parliament, Scientists and Press in the Grand Committee Room, House of Commons, December 10th, 1975.

of the head, neck and body. The proposed name for the creature in Loch Ness is *Nessiteras Rhombopteryx*. The “Nessiteras” is a combined word with the name of the Loch, Ness, and the Greek word *teras*, meaning wonder. So the Ness wonder. “Rhombopteryx” is the combination of the Greek word *Rhombos*, referring to a diamond shape and *Pteryx* meaning wing or fin. This adds up to the species in the Loch Ness to be, the Ness monster with diamond fin.²¹⁹

There is not much more to go on but speculation in the Nature article if there is possible to record under water to see more than just pictures. If they could film on tape under water with some TV equipment, they might see more details of the creature. Or it could be possible to see if there was something in the sand and silt at the bottom of the Loch, like new bones.²²⁰ The possibility of collecting specimens can be difficult and the ethics around it are in a grey area. The collection of specimens that are in danger of being extinct or capturing it and it then does become extinct would not have a positive outcome. No matter what the purpose of was catching or killing the Loch Ness creature, if captured or hunted.²²¹

The *Yorkshire post* 12th of December 1975 have one of the last articles of the year about the Loch Ness monster. “How the Monster became respectable”. The monster is now portrayed as a scientific respectable phenomenon. All the research done for the scientists seems to be recognised. The photographs and all the scientific publicity make it difficult to ignore that there is something living in the lake and to push that unexplained phenomena away is getting harder. It is more people starting to believe it exist. The writer of the article was not a believer until he was at the house of commons and saw the colour pictures. Earlier the pictures shown in the media was black and white, difficult to make out and did not necessarily make sense for someone not trained to analyse these pictures. What properly convinced of the existence was not only the colour pictures, but how the scientists talked and described what they saw. And these were not just ordinary scientist. They are at the top of their fields, teaching at universities or leading them. The use of photographs was by the author seen as inventive and objective and the pictures are analysed by a different party, not the scientists themselves. The article does point to those who did not agree and especially with the statement to Peter Scott that the Loch Ness monster might be a prehistoric Plesiosaur. The writer shows how there was a debate with objections, reservations, claims and counter claims. The questions surrounding this was how about the ice age glaciation, would that have helped or hindered the monster in

²¹⁹ Nature vol. 258, December 11 1975, p. 466

²²⁰ Nature vol. 258. December 11, 1975. p.468

²²¹ Nature vol. 258. december 11, 1975. p.468

the Loch, do they breathe air, how do they reproduce, eggs? Are they reptiles, cannibals, and the list goes on with unanswered questions to the phenomena? Unfortunately, they cannot be answered without more research. The good thing in all this is that both sides are asking questions and almost reaching a scientific discussion. Unfortunately hoaxes and other false claims have made the British museum sceptical to most regarding “Nessie”. Dr. Sheals, the keeper of Zoology at the British museum, is not happy that Peter Scott have named the creature and a scientific name at that. Sheals finds it presumptuous and precipitous. The journalist goes as far to claim that the issue would have been resolved if Dr. Sheals would not have been so protective, the flashy arrogance of Rines and over eagerness of Peter Scott. Regardless there have been many contacting Rines to join for the next expedition, even the three members of British Museum have shown privately excitement and an interest in joining.²²² This last news about the photos shows how the photos does not seem to get recognition. The photos appear to be real only for those who are looking for the Loch Ness monster and for others its not conclusive proof of a creature, at most it can be worth examining more, and others think the photos are just a log.²²³ Rines upset many in the crowd at the end of his presentation, by claiming to have pictures “cleaned up” by data. This might be Rines trying to show that there is better pictures, but on the other hand why not shown those when presenting the case.²²⁴ To openly say that the pictures are manipulated in any way does not seem like the best way to present the evidence and why this was said or done is a question. Perhaps the enthusiasm around the photos was not enough and he thought it would change if he brought in the data enhancements and clean-up. These photos and the search the last years does seem like they are trusting the technology to find the evidence in what they wish to see. They stack technology and equipment, hoping if its all put together it will give valid proof. This last photo seems like the last attempt on stacking the use of camera, on the sonar, on flash and produce a photo which then was enhanced by the computer, hoping this would be enough for a valid proof.

The article in the *New Scientist* 1982 tells that the monster hunt had become quiet, there are few sources after 1976 bringing up the matter and the interest have somewhat faded away.

²²² Harold Edgerton Papers, MIT Archives, box 75 folder 3, Yorkshire post, *How the Monster became respectable*, December 12th 1975.

²²³ Harold Edgerton Papers, MIT Archives, box 75 folder 3, The Boston Globe, *Fabled Loch Ness Monster is for real, researcers report*. Vol. 208 No. 145, November 22, 1975

²²⁴ Harold Edgerton Papers, MIT Archives, box 75 folder 3, The Boston Globe, *Fabled Loch Ness Monster is for real, researcers report*. Vol. 208 No. 145, November 22, 1975

Funds had stopped coming in and the opportunities and collaboration between institutions seems to have stopped. But this article brings a fresh new perspective “Loch Ness monster unveiled” brings up a new theory. Casting light over a possibility that has been mentioned but the scientist did not look deeply into. Robert Craig the writer of the article points to two crucial mistakes that was done and goes thru his reasoning and his findings in the article.

Craig has listened to the witness statements that was recorded and he as the ones before him have concluded that many of these witnesses was done by people one could explain as intelligent and not provoked to make up stories to feed to the press. The statements have many of the same characteristics which he comes back too. The books published have also contained drawings of what people have seen, describing a sleek animal belonging in the prehistoric times, blurred photographs describing neck, tail, head and flipper which could belong to a marine animal. Craig states that this is innocent wishful thinking, however he does point to that this is clues given about what the creature in the Loch is and that scientists have missed this important clue and have forgotten about the effect of hydrodynamics. The scientist has then tried many solutions to confirm this animal, and as craig said, it does not seem that anyone of them was thinking what if it is not an animal. A headmaster of a local school dared to state it could just be logs floating in the river. One of the first clues Craig notices is the location of this monster and where there have been seen monsters before. There are three Lochs that stands out, Loch Tay, Loch Morar and Loch Ness. The question Craig is then left with if there is more than 500 Lochs in Scotland, so why are there only confirmed sightings in three of them? The common thing between them is firstly they are all deep. This is important regarding the water pressure. Loch Lomond will Craig use as a control since it has not had any claims about a monster living in it. Craig gets rid of the gas theory that have been brought up and debunked before, due to the witness statements claiming to see frothing and bubbles, but they also claimed to see long objects with them. Like telegraph poles. Craig then comes to his second clue. Telegraph poles looks like trees.

Craig recaps here, that what they now so far are that the Monster and common places are deep water. Loch Ness is 250m deep and the pressure is about 25kj per sq.cm at the bottom. Craig speculates in what would happen if that were harnessed. He brings up multiple comparisons to describe the strength of this pressure which in all fairness is not that force full compared to the comparisons Craig does. But poses a question, what if it was encapsulated, then brought to the surface and released. Craig then brings in his second clue, the objects in the water that resembled telegraph poles. Craig deducts from this that what he is looking for must be a tree.

But not a random tree, a specific one. Sightings have been done and recorded since 500 AD, this means that the tree Craig is looking for is native to the area. There is one tree fitting the criteria except for some smaller bushes and tiny trees. The selected species have been around long enough to have been present when the ice melted 10.000 years ago, and the trees are *Pinus Sylvestris*. This tree species is special, they have adapted and have its own Petro-chemical to protects itself. The *Pinus Sylvestris* produces resins to protect its trunk from pest and decease, with turpentine tar-oils, phenols²²⁵ sugar and gasses of different sorts it is a strong tree that can survive in most conditions. Craig then concludes that the second clue is the *Pinus Sylvestris*, and the tree can be found around Loch Ness, Loch Morar and Loch Tay. The absence of the *Pinus Sylvestris* is at the control Loch Lomond. Meaning that the Loch Lomond who fits the criteria for being deep, does not have the pine tree and neither any sightings of a monster. The correlation of the Lakes and monster seems therefor to be the depth of the Loch with the presents of the *Pinus Sylvestris*. Craig then preforms his own experiment. One of the pine trees have fallen and ended up in the Loch, Craig names this log “Sylvester”. The log sank slowly to the bottom of the Loch and is partly covered in silt. In normal conditions a log sinking to the bottom of a lake should have made it staying at the bottom, crushed over time by the pressure. The pressure squeezes the trunk layers of bark, cork and cambium surrounding the trunk. But “Sylvester” contains resin the outer skin of the log develops a strong outer skin.²²⁶ The water will then access the trunk end and branches until stopped by the resin and the whole trunk will be capsulated and preserved, with the water pressure its all held tightly together. The decay will happen in some form, especially since water is now present inside the log before the resin capsulated the entry points. With the decay some gasses will form and causes expansion and the pressure in the log can be extraordinarily strong because of the backpressure from the water outside. This expansion with the pressure then pushes the resin and tare to the exits of branches, stumps and the ends of the trunk, causing extrusions and blisters that are filled with gas bubbles. When enough of those blisters it will create buoyancy and the log starts to float. As the log raises to the surface again the first 130m will probably not cause problems. The last 60m the pressure inside the log will start to rise and release pressure and might make it to the surface. Craig

²²⁵ Phenol or Carbolic acid, Phenol is a mild acidic and are poisonous.

²²⁶ The *Pinus Sylvestris* grows wild in Europe and thrives in nutrient poor soil. Or where its little soil to grow in. the roots of the tree are special in the way they stretches down into the ground and collects water from deep in the earth, making sure it doesn't dry out and can then outcompete other tree and plant species in the use of resources. When the *Pinus Sylvestris* dies it releases resin which is conservatory and was also used to conserve mummies in the old Egypt. Making the *Pinus Sylvestris* a tree that breaks down very slowly and can naturally preserve itself up to 700 years even in wet climates.

points out the witness statements saying the monster disappearing in boiling froth and foam, but as he said that is unlikely. It is difficult to make that in fresh water and the chemical content in the Loch Ness is low. Craig also points out the way marine animals move, they do not perform manoeuvres to make large frothing or bubbles, most likely they are making a smaller splash determined by the water and the size of the animal. The foaming many describes can only be made with the release of high air pressure or gas, maybe the simultaneous release of chemicals could maybe cause the frothing described.²²⁷

This could explain some of the sightings done at the Loch Ness, with the frothing. But this does not necessarily explain the sonar and underwater photographs. A log could be mistaken for the neck of the monster, but what about the sonar and pictures showing body and a flipper? The article does bring up an important piece of the factors surrounding the Loch seemingly overlooked. The environment around the Loch Ness and the need for control environments. As Craig points out that the Lochs who have the *Pinus Sylvestris* also have sightings of a monster, while the control Loch does neither have monster or that specie of the three. Robert Love did take water samples at the Loch so the focus on the immediate environment was thought of, but the sample was taken to see if there was anything decomposing.

So, the focus of the Loch was not necessarily on the whole environment of the Loch and around it, but rather what the environment was for the creature in the Loch Ness, this might have led to overlooking a simple explanation. If it was the case that it was a log, that might also explain the pictures and the sonar. The photos might be real, but are not of the monster, rather a log or something else in the water. With the underwater waves that occur in the Loch Ness that can have pushed the log into different directions, before sweeping it away. Since the last 60m or so the log will start to break up because of the pressure internally, the waves could have moved the log out of reach, and when it surfaced it was just seen as another piece of driftwood.

3.3.1. Summary

The 1970 starts with the sonar report being sent around early in the year, giving the report from the sonar search done in 1969. In the letter to Edgerton, Love have added that he thanks

²²⁷ *New scientist*, 5 August 1982

for the advice of recording the sonar, if not he would not have believed that he did make contact with "Nessie". This is a different approach from the 1960's and before where the sightings were given great value as contributions for the research. Now Love admits himself that he would not trust his own judgement of what he saw did he not have the recordings to support it. So already in 1970 the camera is more trusted and they use one type of technology to validate another. A different question that is now being discussed is if the creature is still alive. This leads to the idea that it might be possible to borrow Edgerton's camera to photograph the bottom of Loch Ness. Another idea was to use the Honeywell sonar and connect the camera to the sonar to do a sonar scan and photograph the bottom of the Loch. If the creature had died it should be possible to see some of the remains, was the idea behind it.

Funding have been granted again to the LNI and the idea of the bottom sonar scan can then also give a depth profile and then monitor with hydrophones. If the creature is still alive and in the Loch, the use of hydrophones would be useful because of the noise factor that keeps resurfacing. The idea that the creature might be sensitive to sound and the sonar might drive it in front of itself, the hydrophones would then be able to at least pick up the sounds from that. The use of traps are starting to be used more in 1970 and there is more traps in use than the previous attempts with noise cages and eel attempts. This year the idea of using traps are many, the idea of using active and passive traps with bait, connected to a trigger if something disturbs the bait will set off a camera attached. Another idea is the use of attractants that Dinsdale will use when he returns to the Loch. The British university wants to try a feeding experiment, which might be something closer to the eel experiment previously tried in the 1960's. Robert Rines, from the Academy of Applied sciences joins in this year of the expedition, and has a plan for baiting. He has already been in contact with Henry Walter, the president of International flavour and fragrances, and reaches out to David James to discuss his plans. David James seems to have some ideas with the baiting with the British Museum.

The 1970 with the thought of the creature being dead the focus is split on the continuing search for the creature, and the focus on the water. Trying to find anything that might suggest something abnormal is in the water, alive or dead. Love did take some water samples in 1969 and these have started to return. The PH level in the water are acidic/neutral area on the PH scale, in the 6.2-6.5 range. This is stable thru the Loch Ness, nothing indicates that the PH have majorly different levels. Other substances found can be related back to the fish and eel that lives in the Loch, and the same goes for the analyses of the bottom of the Loch. Other differences are commonly seen because of rain and melting snow finding its way down to the

Loch. The focus on the environment of the Loch is new for the last few years. The temperature in the Loch is what stands the most out as something less normal. Above the 100ft mark to the surface the temperature is average on 13°, with some degree movement up and down depending on weather. The temperature below the 250ft mark seems to stabilise at 5.5°. The temperature above seems to be a bit more flexible, being influenced by weather and season. But that does not happen below the 250ft. The temperature does not change significantly and the change that usually happens in other lakes does not happen in the Loch Ness.

The photography that are tried acquired from land is still important and seen as a valuable proof they must try to obtain. Dinsdale is made the LNI surface photograph director, probably because this would be his tenth year going to Loch Ness and being the most experienced around the Loch for where the watch points are. Love and Edgerton are still in contact, and Love reports to Edgerton that the experiments are going well, referring to the sonar search and acoustic monitoring, as well as the baiting experiments. Love does plan to use the same tactic Edgerton did before by equipping a pinger to the camera and take photos close to the bottom of the Loch Ness. Love is planning on using Edgerton's camera for this if he can borrow it. The sonar search and the use of camera idea was to make sure the creature was not laying on the bottom, but it seems that the mission of doing that search have also now been included to the mapping out the bottom of the Loch. Marty Klein have already done test in moosehead lake and wants Love to interpret some of the scans showing ledges and trenches under water. This sonar could be used in the Loch Ness later and the question was if it would be possible to use the sonar and some sort of baiting at the same time, like the baiting and camera perhaps. When Rines returned to the Loch again in September with a team consisting of electronic and sonar experts they brought the Klein High definition side scan sonar. This sonar could be used operated in a fixed position or it could be trailed after a moving boat. The sonar was first attached to a scaffolding on the pier extending into Urquhart bay and shortly after this was mounted it registered two large intruders in the sound screen in one direction, and shortly after one returned thru the scan again. The intruders showed to be large and the echoes picked up did not seem to be consistent with what is to be expected from fish.

The results of the baiting during the 1970 operations is not explicitly mentioned again, but the use of sex lures in 1971 does catch the interest of the press. The lures and bates did not give any positive outcome in regards to catch proof of the Loch Ness monster. 1979 does not seem to have had any luck with their tries with the equipment used.

Isaac Blonder from the Academy team used hydrophones and claimed to have hit something with the hydrophone while lowering the hydrophone. It had hit something and bounced over an obstruction constructing a loud rasping sound, before suddenly being free of the obstacle and lowering as normal. The hydrophone was lowered in the area close to where the Klein sonar was mounted. This area had in 1971 been used to try to lure the creature with more bait and traps. The area around Urquhart Bay had already been discovered earlier that year to have ridges around the walls of the Loch and this is also verified by a diver the same year. The hydrophones have possibly managed to hit a ridge or a ledge before scarping off and continue down the depth.

For 1972 Dinsdale have new field recommendations, to keep the best of the old and introduce new ideas and equipment. One of the biggest changes for the LNI is this year the underwater photography shall be left to the experts and the LNI crew will just assist if needed. The LNI will then focus on using cameras from land. The vehicles and new crew and plan are making everyone more mobile and to cover a larger area. Having focus on camera and photo equipment and how to produce good photographs. The factor they now are working around is the sun. How, where and when the sun can be used as an asset to the photograph, creating backlighting and are getting more technical in the use of the camera. Instead of using a lot of film taking multiple photos, the shotgun method, the focus is now to get an adequate photo as proof. To take closer to single frames but make each photograph good. During the 1972 operations the underwater photography was left to the experts and Robert Rines with Harold Edgerton worked in the Urquhart bay. They operated the strobe-flash synchronized camera and in the night a sonar went off indicating that something was moving within the range of the camera. There was some pictures obtained which showed what they assumed was a flipper and this where discussed again in comparison with others taken in 1975. In 1972 the change in how to do the field operations shows how the stacking of technology continues. Its still camera which seems to be most trusted and combined with sonar it's the only constant use of technology. Dinsdale is going debating how to capture the photograph needed as valid proof and shows the technology is more trusted than the crew operating it. The human error is the reason the photo is not captured. When questioning the technology its usually mentioned that it had an error or malfunction. Not that it did not work, its either no sightings, which are not proof, or its almost getting evidence.

In 1975 the seminar which was important for the LNI was cancelled by some of the supporting corporations. But information was still given out and the creature living in the

Loch Ness was named based on the pictures of 72 and 75. The reason for the rush in naming the creature and making it an official creature was the worry surrounding the conservation of wild creatures and wild plants. The act 75, passed in UK. This was done to protect animals where the survival was threatened. But to do this there was certain criteria, one of them the need for a common name and a scientific name, and to get that it needed a formal description. This is when the sonar and the photos became more important. The information from sonar and camera defined the size and body type. The release of this information and the seminar about the photos shows how the stacking of technology continues and there are comments about the photos looking like logs. Rines also comments that the seminar is not shown the “good” photos that are more enhanced by computer. The enhancement is already an issue because of the difficulty just to estimate size of what is captured on the photo.

In the early 1982 it is stated that it has been quiet around the Loch Ness and no discoveries since 75-76. Craig, the writer brings up an interesting point about the idea that it could be logs drifting in the water and how they can sink before returning up. The idea about logs is not new, Burton mentions the vegetation in around the Loch Ness to be what is seen. The only problem was to mention vegetation and the gas naturally in the Loch creating it. If it would have mattered is still unsure. The participants of the LNIB seemed to be fairly set on the fact that it was a monster in the Loch and different explanations which should have been explored where dismissed. The specification of the log in the lake is done in 1975, after the seminar. Some of those who are against the photos showing a monster does say it looks like a log.

4. CONCLUSION

4.1. SUMMARY

My hypothesis was “How technology initially developed for military purposes was used at the search for the monster in the Loch Ness. Why did the technology change during the search for the Loch Ness monster from 1930-1975 and what can this tell about the use of the relation

between trust in technology, evolution of technology and how is this related to the Loch Ness?"

How it was used varied from the sonar to use of flashlights. The development of the sonar was vital for the search at Loch Ness and shows most clearly in 1975 with the passing of the Act 75, where it is used to try protecting the creature in Loch Ness from extinction if it existed. The first use of military equipment was the infrared film used to battle the mist and the flashlights that was borrowed from the military, was used to try to catch a photo or sighting of the creature at night. Second came the use of hydrophones and sonar. The sonar was further developed by different companies as the Klein sonar used at the end of 1960 and beginning 1970. The wide scan sonar fitted with the camera using a strong flash and triggered when the sonar detected something. The use of the sonar was to try trace or track the creature. Or be used as an addition to a photo or film to prove existence.

Why did the technology change during the search from 1930-1975 is more complex. The technology changes due to development of newer equipment. The 1930 use of technology at the Loch Ness was the camera. The "surgeon photo" from 1934 was the first solid proof and marks a change from the witness statements being regarded as proof. After this Mountain equipped twenty men with cameras on the shore of Loch Ness to try capture a new photo. The camera seems to be regarded as flawless at this point, if the photo is not clearly faked, it was hard to detect edited photos. In 1960 the technology changes slightly again with Dinsdale capturing two occurrences on film, one is a current in shallow water. But the other film shows how something moves across the Loch making a V wake. Dinsdale then does something new to prove its real, he gets a boat to cross after to show the difference. This was considered the most valid proof for many years. The technology moved on as more people got involved and the organisation around it got connections. The LNIB which was established in 1961 with David James. The use of sonar and hydrophone was first started by the Cambridge students who were at the Loch Ness in 1962 to test their new equipment. The same year David James returned with the flashlights from the military, bringing in military equipment to try to illuminate the Loch at night, other military equipment taken to use is the infrared film to cope with the mist and other issues caused by the climate around the Loch. The factors of when and where the creature are is starting to make its way into where the searches are performed and the need to aid this require different equipment and lures are starting to be used and the equipment the LNIB tries to acquire are silent or makes less noise. Dinsdale mentions this on multiple occasions the need for better equipment, as the time progresses.

Already in 1964 the use of professional equipment was borrowed from the ATV which should have been more effective and precise than the personnel on land with cameras. The weather starts to become an important factor and the term “Nessie weather” is part of the technological advances made in the decision of equipment for the following years. Connections to JARIC and have the analysed short films done by them probably had an influence in the trust given to the equipment used and every field operation have cameras and ciné cameras present and used. In the 1970 the environment in the Loch Ness which previously had been mostly mentioned in connection to the participants of the field operations became interesting for the Loch itself. To try to understand the Loch and creature better and to make a control if the creature had died and was laying at the bottom. Samples was taken, and tests conducted establishing PH levels, light exposure, what the ground in the Loch was made off and contained and lastly the temperature. Nothing except the cold temperature in the Loch stood out. To check if the creature could still be at the bottom and to perhaps encounter it alive it became more focus on monitoring under water and the sonars became more advanced. The use of sonars attached to cameras with automatic triggers were used at Urquhart Bay was somehow a success after multiple tries, Edgerton and Rines managed to get a photo of something resembling a flipper, but that was not done until there had been multiple baiting attempts, lures, sonar and camera together, hydrophones, mapping of the bottom of the Loch and divers in the area.

The technology seems to have gathered trust already in the 1930’s and perhaps the reasons are because the camera has become a more common item. There is no need to be educated in photography to take or get pictures developed. Which in theory means almost anyone can take a photo, and if its not out of focus, it will show what the lens saw. The trust to the camera is therefor already in some ways established without the need for proof. The “surgeon photo” makes the idea stronger that there is possible to capture the creature in a photograph. This idea dictates how everyone did their research on the Loch. They went with cameras and kept watch on the Loch Ness to hopefully manage to capture a photo. Tim Dinsdale is the first to capture the creature on film. Which is debated later. This is treated as a real film, the JARIC report that is released five years later does support this if its mentioned in sources relating to Dinsdale or LNIB. The report does not confirm any creature other than it cant say its not an animate object. This report from Jaric was taken as a win and only strengthend the trust they had in the technology. However, this trust was not extended to all technology. It seems to be a need to try many types of technology and those that do not work are not mentioned again or it

is just mentioned to not giving a result. Cameras and sonars are the most trusted technology used and the camera is used to confirm the sonar readings. Which becomes more apparent when the stacking of technology begins. Its more subtle in the 1960's, but in the 1970,71 and 1972 there is multiple combinations of using the same types of traps and lures, combining them with the more trusted camera and sonar, expecting this to give a result.

When the technology and trust comes together and there is a focus on what does produce a result there is clearly a divide in the trust to the technology in favour of the trust to the personnel and experts, especially in the above surface photography. This shows in the establishment of darkrooms and workshops established at the LNIB base, which eliminates the need of a third-party development of the films, and there is no mention of sending these photos to analysis. The trust in the camera equipment becomes apparent when it seems like the newer equipment can be operated by amateurs with basic training.

The underwater photography and sonar is left to the specialist and those educated in this field. Which does result in the combination of camera, flash and sonar working together creating a picture in 1972 and 1975. The problem with these photos is the photo enhancement and the pictures are not clear. It has been mentioned multiple times that the proof needed is a clear, sharp photo of the creature to be used as undeniable proof. When the presentation is “murky” enhanced photos, it does not create trust in the photographs.

4.2. CONCLUSION

The technology and the use of camera and sonar becomes the most trusted of the technical equipment brought in. The trust seems to be built on small experiences which does not qualify as proof on its own which leads to a stacking of equipment and a chase after newer and better equipment. The idea that the quantity and quality is established by having newer equipment makes the chase for the proof lead to overlooking other factors that is valid findings but gets discharged as they do not prove the Loch Ness monster, but other natural phenomena. While the sources can tell a story of many participants and the source material is found as a part of Harold Edgerton's story, it brings a new light to how and why the technology was used in the Loch Ness and how this was used to try proving the creature living there. Unfortunately, it does seem like there is a stretch to keep reading meaning into pictures and findings to force a valid proof which the technology does not support. The mention of logs and vegetation in the

Loch have been overlooked and the focus on the Loch and its environment itself have been analysed but have been disregarded. Which is unfortunate when there is other occurrences that would be interesting to look further at if they weren't locked in a focus on one objective. The conclusion for my hypothesis, "How technology initially developed for military purposes was used at the search for the monster in the Loch Ness. Why did the technology change during the search for the Loch Ness monster from 1930-1975 and what can this tell about the use of the relation between trust in technology, evolution of technology and how is this related to the Loch Ness?", is that the technology developed for military was used to prove the existence of the Loch Ness monster. The technology changed and was adapted to acquire the proof using this technology and was stacked to try make the desired outcome. This relates to the trust in technology that the technology can't be faulty, its wrong use, not new enough equipment or not enough. This comes together at the Loch Ness when the simpler explanation of logs and environment, a simple solution and explanation, disappears in the objective being only one solution to explain it all, the Loch Ness monster.

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5.6. IMAGES

Image 1/ figur1: "Surgeon photo"