ELEMENTARY SCIENCE IN IRISH PRIMARY SCHOOLS FROM THE LATE 1800s TO THE PRESENT DAY

TO WHAT EXTENT IS ELEMENTARY SCIENCE A NEW SUBJECT IN IRISH PRIMARY EDUCATION TODAY?

By

Julieanne Gallagher B.Ed. (Hons)

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MASTER OF SCIENCE

This work was carried out under joint supervision of:
Thomas Mc Cloughlin, Education Department, St. Patricks College
&
Dr. Odilla Finlayson, School of Chemical Sciences, Dublin City University

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I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Masters in Science is entirely my own work and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my own work.

Signed: Juliearne Lyallagher (candidate)

ID No.: 55134998

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Abstract

Elementary Science in Irish Primary Schools from the late 1800's to the present day: *To what extent is elementary science a new subject in Irish primary education today?*

This thesis examines science in Primary Education in Ireland since the late 1800's. Much research has been done on science in education. Quayne (2003) described the development of post-primary science education in Ireland and drew attention to some features in primary science but did not seek to answer any specific questions. Kelham (1965) described the provision of science in schools in Scotland and Ireland. In this thesis the life and work of Henry Edward Armstrong and of William Mayhowe Heller, their philosophies into the teaching of elementary science and Armstrong's heuristic methods and his influence with Heller is discussed. The teaching of Science in Primary schools will be examined from the late 1800's with Heller organising the implementation of elementary science into the Irish National School system from 1900-1922 using Armstrong's heuristic teaching approaches. The thesis continues to analyse the teaching of science right through the century with the First National School Programme of 1922 to the 1971 curriculum and finally the revised 1999 curriculum. The history of Elementary Science gathered from documentary evidence together with the results of interviews with currently teaching and retired teachers are used as sources to provide an insight into science in the primary classroom from the late 1800's to the present day. Inspectors' reports and sample lessons from 1900 and 1999 provide a further insight into science teaching in the last century. Finally the thesis draws conclusions as to why science in the 1999 curriculum is considered by many teachers a new subject in Irish Primary Education. Elementary science is not a new subject in Irish Primary Education today. In fact lessons from the attempted 1900 implementation of science might even be applicable to the science curriculum of today.

Acknowledgements

Many people helped and supported me in completing this research. I would like to acknowledge especially the contribution of the following:

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Recognition is also due to the teachers who were interviewed and various other teachers including my principal for their participation in this study. Without their help and cooperation this research could not have been carried out.

My family and friends for their support and assistance during the course of this research and Philip for the inspiration and motivation to keep me going.

Chapter 1

Introduction

The thesis outlines the history of Science Education in Irish Primary schools from the late 1800s to the present day and attempts to answer the question in the title *'To what extent is Elementary Science a new subject in Irish primary education today?'* The rationale for the research arose from the researcher's desire to become better informed about Science teaching in the Irish classroom. The perception by a lot of teachers is that science was not taught in Irish primary schools prior to the introduction of the 1999 Primary Curriculum. As a recently qualified teacher, the researcher was expected to have full understanding of the 'new age' science teaching methods of questioning, group work, investigations, experimentation etc. The older teachers were apprehensive about teaching this subject and its teaching methods. Reading, writing and maths were considered more important. It was the way education had always been. Science was a 'new' subject for Primary schools it seemed. Many teachers complained that they did not know science, didn't know how to teach it and shouldn't have to change their teaching methods. How could they let children work in-groups and make discoveries? It is thought that with science children would need to be told the answers in order to learn anything. However with the science in-service days it is thought that teachers discovered that they had been teaching a form of science all along in the way of nature walks, plant and animal life. This brought to light that science had been part of Primary Education in Ireland previous to this. From this came the researcher's interest and decision to research the history of science in the Irish classroom. In what form did science exist, what lessons were taught, how were they taught and why did many

teachers dread teaching science and have the belief that it was a new subject to enter Ireland's Primary Education? The contributions of two men, Henry Edward Armstrong and William Mayhowe Heller to the introduction of Elementary Science into the National School System will be outlined and how this influences our present day science programme.

In Chapter two, biographical detail on H.E. Armstrong, his life and works will be given. It will explain the development of his heuristic tendencies from youth, the meaning of the term 'heuristic method' and his attempt to get his methodology used in schools. His use of his children in a heuristic experiment to highlight that it could work will be discussed, as will his ideas on how science should be taught on a practical and theoretical basis in schools. His acquaintance with W.M.Heller will also be mentioned.

Chapter Three will give some biographical detail on William Mayowe Heller, his life and work. The chapter will assess the influence of Armstrong on Heller and give detail on Heller's philosophy and thoughts on science education. An outline of why Heller came to Ireland and his science syllabus will be given. Detail on Heller's task of inspecting and promoting Armstrong's heuristic form of instruction in Ireland will also be mentioned.

In Chapter Four some background information will be given on the state of the science curriculum in Irish National Schools before 1900 with the beginning of the National system of education, The Powis Commission of 1868 and the Belmore Commission of 1898. This chapter will analyse the reasons for and the aims of the revised programme and Heller's

contribution to it. Finally the chapter will examine the changes in the content and methodology of the new syllabus brought by the Belmore Commission.

Chapter Five will give some background knowledge on the proposed methodology and content of the 1900 Elementary Science programme and track the progress and problems in implementing the programme. Teacher training for the programme and funding will be examined as will teacher methodology and morale in teaching science under this programme. This chapter provides an analysis of Heller's determination to maintain influence of Elementary Science and the adoption of the Natural Method in instructing Elementary Science. Finally an outline of the success of this programme in rural schools will be given and the scheme of Rural Science and Horticulture that was provided for these schools in 1907 will be discussed.

In Chapter Six an analysis of Elementary Science as a subject from the implementation of the first National School programme in 1922 will be provided. How the societal and political context was altered in Ireland after the advent of independence will be discussed as will the criticism of previous programmes and the removal of science as a compulsory subject in the primary programme. To analyse the successes and failures of the Rural Science and Nature Study course that was introduced in 1926, the Reports of inspections of schools will be looked at. The changes made to the state of the Rural Science and Nature Study programme throughout the years until 1971 will also be presented.

Chapter Seven will discuss the need for the new 1971 curriculum and the move towards a more integrated curriculum. This chapter will give details of the Elementary Science

syllabus, the class organisation of progress reports, reading material, preparation, group and individual activities. Finally the implementation of the 1971 curriculum and its success in the primary school will be discussed.

The next chapter outlines the reasoning behind the review of the 1971 curriculum and the implications of the results. Chapter Eight will provide detail on the revised 1999 curriculum. Skills developed through working scientifically will be discussed as will the science technology of design and make. Finally teacher organisation in planning units of work, assessing pupils, recording lessons and the use of ICT in science will be analysed.

In Chapter Nine the researcher interviews teachers as a further method of research. The reasons for choosing this method of data collection and the methods of analysis are explained. Information on the participants, the development of the interview questions and the results found from the interviews are found in this chapter.

In concluding this work documentary evidence and interview data from previous chapters will be used in an attempt to answer the questions '*Is science a new subject introduced to Irish Education with the 1999 primary school curriculum'* and *'Why do many teachers believe science and its teaching methods to be new?'* This chapter will also analyse Armstrong's and Heller's contribution to present science teaching in Ireland.
A complete bibliography is supplied. The thesis also contains several appendices, which present much valuable material, samples of data and correspondence relating to permissions to conduct the research.

Chapter 2

Bibliography of Henry Edward Armstrong 1848-1937

2.1 Introduction

This chapter will provide detail on Armstrong, his life and work. It will explain the development of his heuristic tendencies from youth, the meaning of the term 'heuristic method' and his attempt to get his methodology used in schools. His use of his children in a heuristic experiment to highlight that it could work will be discussed, as will his ideas on how science should be taught on a practical and theoretical basis in schools.

2.2 The life of Armstrong

Henry Armstrong was born at Lewisham, Kent (now a part of London, Illustration 2.1 and 2.2), England in 1848, and the eldest of a family of seven. His father Richard Armstrong, a self-educated man, was a successful merchant who acquired a large house on the outskirts of Lewisham.

Here Armstrong had many things to investigate in the extensive garden by the Ravensbourne River. He investigated a variety of natural wonders surrounding him, a few of them being clay, rich pond life, butterflies and fish. He took to keeping pigeons, breeding silkworms, fishing, keeping rabbits and mice and collecting butterflies.[1]

[1] *H.E.Armstrong and Science Education,* edited by G. Van Praagh, John Murray: London, 1973 P1.

Illustration 2.1. Lewisham, Kent, England. 1884[2]

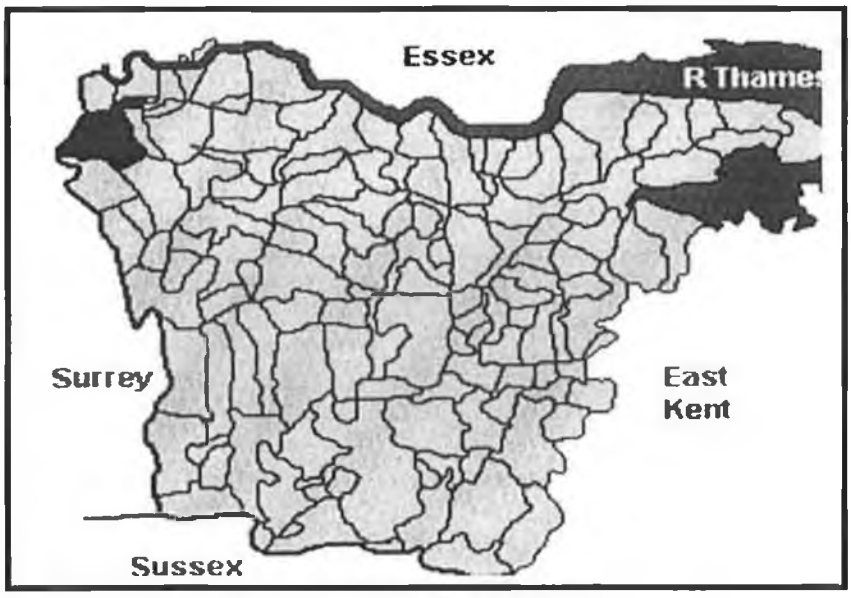
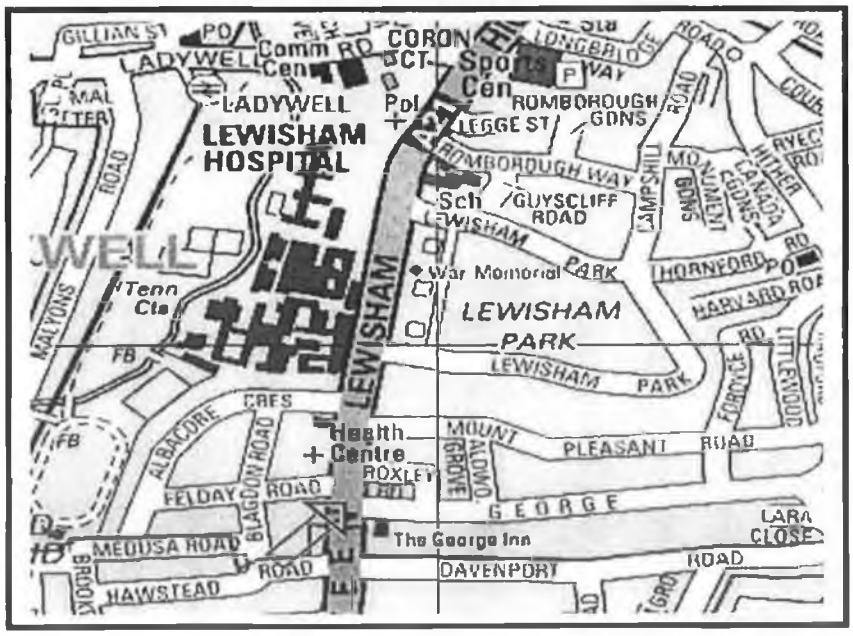


Illustration 2.2. Lewsiham, Kent (now part of London), England. 2006[3]



[2] http://www.nwkfhs.org.uk/lewi_plc.htm
[3] http://www.ivorhowellcameras.co.uk/lewisham_map.htm

Armstrong first went to school at the age of thirteen to Colfe Grammar School, in Lewisham, England. In 1865, after a year spent with his uncle in Gibraltar for health reasons, his father entered him into the Royal College of Chemistry in Oxford Street. Here he spent three years assisting Sir Edward Frankland[4] who is known for his work on valencies, water analysis and organic chemistry. The training he received under Frankland was a liberal scientific experience and must have been instrumental in Armstrong developing a love for the practical.

At the age of nineteen Armstrong went to Leipzig to study under Adolph Kolbe[5] at the University of Leipzig in Germany to learn new laboratory techniques. He spent three years in Germany and after his dissertation and final examinations he returned to look for employment in England in 1870. Of his dissertation, Armstrong said

> *'Writing the dissertation I do not find an exceedingly agreeable task, one having to bear several points in mind, viz. If possible, by little judicious flattery to get the professors into good humour and not disagree too strongly with their theories, which in the present case, as my views are diametrically opposite to Kolbe's is not easy and then to bring a series of disconnected facts into connection and fill up the gaps with as much theoretical nonsense as possible; at the same time one must be careful what one writes as it is liable to be attacked afterwards.'* (Eyre, 1958, p51-52)

[4] Sir Edward Frankland 1825-1899
[5] Adolph Kolbe 1818-1884, was the first to apply electrolysis to organic compounds. In 1859 he discovered the 'Kolbe reaction' when he prepared salicylic acid leading to the cheap production of asprin.

Being interested in medical matters, Armstrong was appointed lecturer in chemistry at St. Bartholomew's Hospital in 1870. Here Armstrong was disappointed to find how dull his students' responses were. They never challenged his statements or made satisfactory notes of laboratory work. They wanted facts in order to pass examinations. It was here that Armstrong became interested in Education. He began making inquiries in schools. As Van Praagh (1973, p. 2) mentions, he visited schools, talked with the teachers and governors about any problems. He studied the curricula and timetables, the syllabuses of examinations and the qualifications of the teachers. Through his research it became clear to him that generally school education was unsatisfactory. [6]

On giving evening lecturers to apprentices undertaking further studies when he was Professor of Chemistry at the London Institution at Finsbury Circus, Armstrong again concluded that they were just as unresponsive and lacking in critical spirit. Armstrong said that many students had great imaginations but

> *'a simple personal report, giving an account of the work carried out under their very eyes or even with their own fingers, is entirely beyond their power'*[7]

Therefore when Armstrong was appointed the first Professor of Applied Chemistry in 1879 it made it possible for him to teach the way he believed that science should be taught. In 1881 the Finsbury Technical College was opened, the first college of its kind.

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[6] *H.E.Armstrong and Science Education,* edited by G. Van Praagh, John Murray: London, 1973 p. 2
[7] Armstrong's 'The Heuristic method of teaching' (Van Praagh) p. 73

Armstrong continued his method of teaching here, a method of experimental observation and deduction. This became known as the Heuristic Method. It became the pattern for future colleges. Armstrong had, as J. Vargas Eyre (1958) in his biography of Armstrong, says;

> *'founded his system upon the natural spirit of adventure of discovery latent in every young mind, until it becomes dulled by the perpetual presentation of cold, isolated facts which tended to be the method of teaching at that time.'*[8]

Similar principles were followed at the City and Guilds Central Technical College in Exhibition Road, South Kensington where Armstrong began work in 1885. Armstrong planned a new chemistry course here, one with a first year heuristic theme based upon the study of the conditions under which iron rusts, the atmosphere, the earth, chalk and sea-water.[9] This course failed due to unpopularity, a difficult administration system and due to the Department's emphasis on the practical as opposed to bookwork. However in terms of research and honours gained by his pupils, Armstrong's department had more prestige than any other Chemistry Department at the time.

Armstrong remained at the Central Technical College for nearly thirty years. It quietly closed in 1925. He became known as Emeritus Professor on his retirement.

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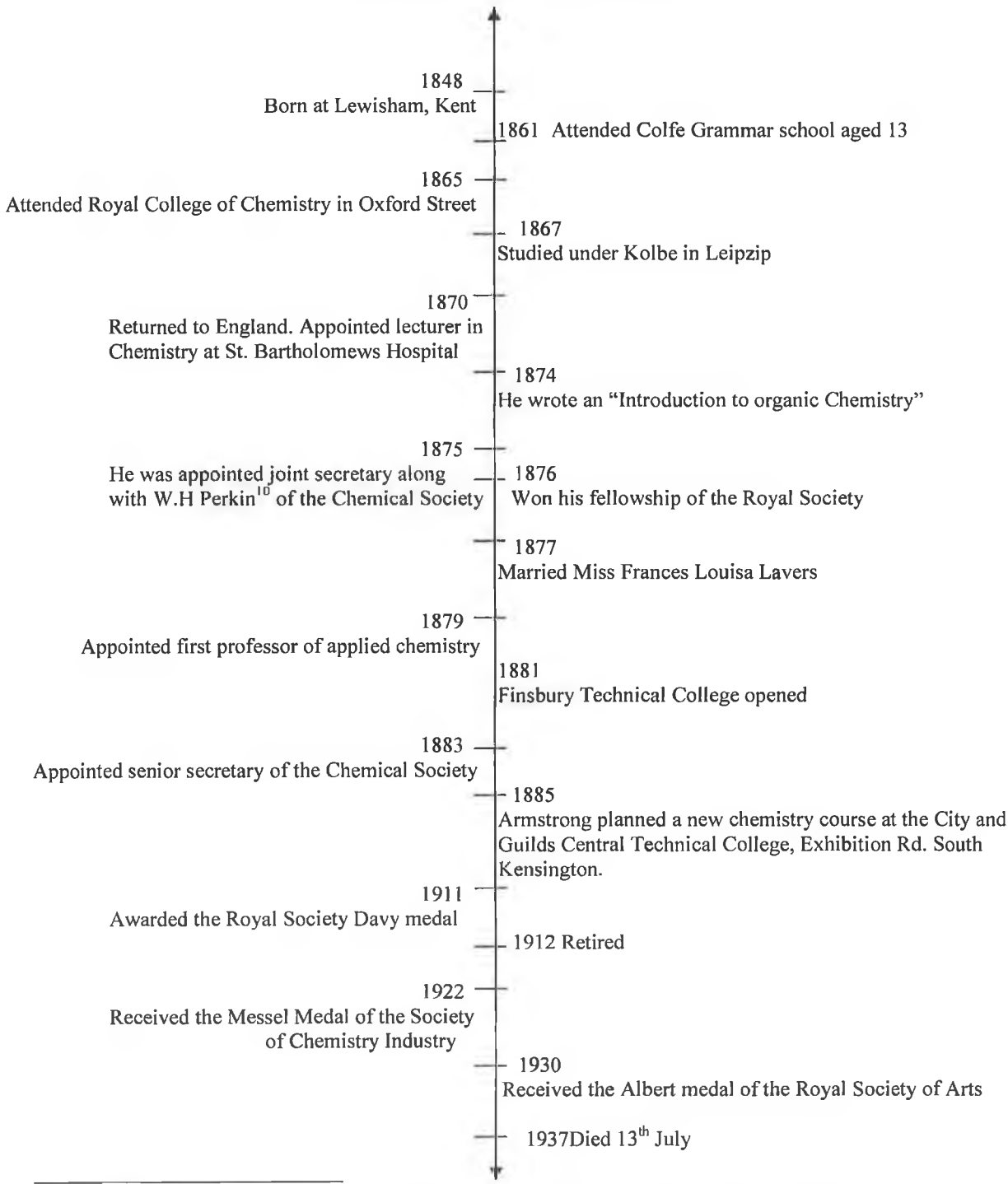
[8] Eyre, J.V. Henry Edward Armstrong 1848-1937. Butterworths Scientific Publications, London 1958. p. 287
[9] Eyre, J.V. Henry Armstrong 1848-1937. Buterworths Scientific Publications. London 1958. p. 287

During his retirement years 1912-1937 Armstrong published 30 papers as well as many letters, reviews and essays. He had married Miss Frances Louisa Lavers in 1877. She was apparently a driving force behind him. They had seven children. Henry Armstrong died on 13th July 1937. Fig. 2.1 summaries key events in his life.

Figure 2.1. Summary of the life of Armstrong



[10] William Perkin 1838-1907. English chemist who discovered the synthetic dye that gave the colour mauveine in 1857. He also initiated the synthetic perfume industry.

2.3 The meaning of the term 'Heuristic Method'

The word Heuristic has a common root with the Greek word Eureka (εὑρίσκω), meaning 'I find, I discover', a word uttered by Archimedes when he hit upon a method of determining the purity of gold. The definition of heuristic is '*enabling a person to discover or learn something for themselves, proceeding to a solution by trial and error or by rules that are only loosely defined'*. Armstrong came across the word in a paper by Professor Meiklejohn.

> *"I first came across it in an eminently suggestive paper by Professor Meiklejohn, one of the most valuable by far of those read at the International Conference on Education held in connection with the Health Exhibition at South Kensington in 1884... Professor Melikejohn, in the paper referred to, contends that the permanent and universal condition of all method in education is that it be heuristic."*[11]

Armstrong wrote in his report '*The Heuristic Method of Teaching or the Art of making Children discover Things for Themselves'* (1898), that heuristic methods of teaching are methods which involve placing pupils as far as possible in the attitude of the discoverer. They are methods where students find out rather than be told about things. [12]

Armstrong saw heurism as a method of teaching many subjects, not just science. However he felt that heurism should be *the only* method used to teach science and was in agreement with Professor Meiklejohn who said, the only method to be applied in the pure sciences was the heuristic method. Armstrong said of this method that it was the best

[11] Armstrong's 'The Heuristic method of teaching' as quoted in Van Praagh, 1973p. 60-61
[12] Armstrong's 'The Heuristic method of teaching' as quoted in Van Praagh, 1973p. 60

method in teaching science and was *a* method of study of great works of art in language, which is literature. [13]

Science was about getting pupils to think for themselves and to use skills such as questioning, experimenting, and investigations, to make decisions and be inquisitive about the world around them. Armstrong never gave formal marks for work. Instead he would write constructive remarks on the work which the pupils would then reflect on.

2.4 The origin of Armstrong's heuristic tendencies

Armstrong himself said that he clearly traced the development of his Heuristic tendencies from the following:[14]

1. His father, who was critical and inquiring
2. A school book (the only interesting one he had) 'Trench's Study of Words' (1851). From this book Armstrong first gained ideas as to the value of method. This was what he called in later years the *scientific method.*
3. His scientific training - Frankland and Kolbe made Armstrong a critical and passionate believer in self-education through laboratory research (Brock, 1973, p.8)
4. His first-hand experience of the importance of cross-examination and the verification of facts.

[13] Armstrong's 'The Heuristic method of teaching' as quoted in Van Praagh, 1973p. 61
[14] Armstrong's 'The Heuristic method of teaching' as quoted in Van Praagh, 1973p. 62

Armstrong's heuristic origins develop from these experiences in his life. These qualities are very relevant to school science today where children are encouraged to question, cross examine and verify their findings.

Armstrong's scientific training made him a believer in self-education. Frankland with Huxley[15] (Illustration 2.3) tried to stimulate practical science by holding summer schools. Huxley worked in the field of education and laid down the lines upon which biological teaching developed.

Illustration 2.3. Thomas Huxley[16]

[15] Thomas Huxley 1825-1895, an English biologist.
[16] Collier's Encyclopedia (1996). P.F. Collier & Son Limited, Canada. Volume 12, p 416.

He urged the extension of scientific and technical instruction but Huxley did not impress Armstrong with his lecturing when Armstrong first encountered it in 1853. One did not learn 'how to form opinions of your own'[17], but rather learn Huxley's opinions, whereas the Irish physicist Tyndall's lectures[18] were centred on demonstrations which fascinated Armstrong.

Armstrong's origin of his heuristic roots also came from his father who encouraged him to be critical, inquiring and encouraged him to read and thus took him to one of his school books 'Trench's Study of Words'. This lead to his discovery of the scientific method.

> *I still vividly recall to mind how from this book, as a mere lad, I for the first time gained ideas as to the value of method - of what I should now call scientific method...I owe to it more than anything else the growth of a desire to promote the teaching of method'*[19]

An important event in his life was the law case over the drug Salicylic acid in 1880. Kolbe had discovered a cheaper way of synthesising the drug and this process was patented but Neustadt, a London druggist, patented a process that was quite similar. An appeal was granted against the use of this patent. In the witness box on Kolbe's side, Armstrong's experience left him in awe of the importance of cross-examination.

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[17] Brock1973 p 2.
[18] John Tyndall 1820-1893 was famous for his explanation as to why the sky is blue- the so called 'Tyndall effect'
[19] Armstrong's '*The Heurisitc method of Teaching or the Art of making Children discover Things for Themselves*' 1898 as quoted in Van Praagh, p.62

'The display of judicial method, the stringent examination and cross examination of every particular, came to me as the acme of scientific treatment, I realised how far short we were from it in our ordinary treatment of our problems.'[20]

2.5 Armstrong's attempts and ideas on the implementation of heuristic methodology in science education.

In 1884, as secretary of the Chemical Society of London, Armstrong urged the society to appoint a committee to inquire into the teaching of science in schools. The British Association for the Advancement of Science (BAAS) took similar action. In 1889 he was President of the Chemical Section of the British Association and in reply to those critics who had questioned "How can it be done in Practice?" Armstrong presented a paper entitled "*Suggestions for a course of Elementary Instruction in Physical Science*". Another paper was given at a BAAS meeting the following year, on the same topic.

These reports did much to promote the introduction of heuristic methods of teaching experimental science in schools. Armstrong envisioned pupils looking at a textbook or manual only after they obtained their information from experimentation.

Following this Armstrong issued a detailed scheme for heuristic work in schools. There was a new approach to the training of science teachers and both syllabuses changed.

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[20] Brock (1973), p. 11

However, the new element of experimentation had been introduced to school leavers, older pupils, never with younger children. Armstrong had faith in the younger children and their capabilities. He spoke of the interest children had in finding out about the things that are before their eyes and that if this was developed properly, they would soon acquire the habit of working systemically and helping themselves.[21]

He wanted a situation where no books would be used in science class but that the children would gradually write their own book and so understand how books were written. The teacher would elicit from the pupils what is being done through questioning [22].

2.5.1 The role of textbooks.

From his paper '*How science must be studied to be useful'* Armstrong insisted that one must not look at a textbook and to avoid them at all costs. These textbooks in his opinion were destructive to all honest work in developing powers of self-helpfulness [23]. Indeed he referred to text books as 'poison' and 'often nauseating'[24]. However this is not the case with primary textbooks today. Textbooks are still being used in classrooms but are full of colour, graphics and interesting activities.

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[21] Armstrong's '*The Heuristic method of teaching'* 1898 as quoted in Van Praagh, 1973 p. 74
[22] Armstrong's '*The Heuristic method of teaching'* 1898 as quoted in Van Praagh, 1973p. 74
[23] Armstrong's *How Science must be studied to be useful'* as quoted in Van Praagh, p.43
[24] Armstrong's '*The Heuristic method of teaching'* 1898 as quoted in Van Praagh, 1973 p. 62-63

2.5.2 Hands-on experimentation

Self-experiment (i.e. hands on experimentation) was the cornerstone of Armstrong's philosophy. Armstrong felt that half the day should be spent on workshop to let the students be the discoverer. Young children like to be like a band of detectives. The material in textbooks today often invites children to discover for themselves through activities rather than giving the answers.

> *"Young children are delighted to be so regarded, to be told that they are to act as a band of detectives. For example, in studying the rusting of iron, they at once fall in with the idea that a crime, as it were, is committed when that valuable strong iron is changed into useless, brittle rust. With the greatest interest they set about finding out whether it is a case of murder or of suicide, as it were - whether something outside the iron is concerned in the change or whether it changes of its own accord". He then says ""A lady teacher who had thus presented the case to a class of young girls told me recently that she had been greatly amused and pleased to hear one of the girls, who was sitting at the balance, weighing some iron that been allowed to rust, suddenly and excitedly cry out, "murder!" This is the attitude we desire to engender; we wish to create lively interest in the work and to encourage it to come to expression as often and as freely as possible"* [25]

What a child or student finds out themselves they will remember. If they find it interesting they will remember more and finally if they keep written accounts of their findings it would be sufficient as a good lesson in handwriting, grammar and English compositions.[26]

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[25] Armstrong's '*The Heuristic method of teaching*' 1898 as quoted inVan Praagh, 1973p. 68
[26] Van Praagh 1973, p. 73

Van Praagh interestingly says:

> *"Where did the Nuffield Science Teaching Project get its 'Chinese proverb'; 'I hear and I forget, I see and I remember, I do and I understand?' None of the several Chinese audiences to whom I have quoted this has ever heard it! Perhaps it derives from Armstrong."*[27]

Science teaching was greatly improved throughout the country due to this reform brought about by Armstrong's efforts. Armstrong had many meetings addressing both the public and teachers as he launched his campaign for the adoption of the heuristic method. The Board of Education sent out pamphlets on this method. However, on being told that pupils were to try and discover the answers to selected problems themselves this led to misunderstandings.

Critics of the heuristic method thought it meant that children should be able to make new discoveries. Armstrong meant that the children make new 'discoveries' i.e. uncover a fact that was previously unknown to them, although well known to others. As G. Van Praagh (1973, p5) says,

> *'There would be nothing "new" about the fact except to the discoverer'*

2. 6 Armstrong's teaching of his children in a heuristic experiment

In order to prove that his method was achievable and realistic and to discover how the work should best be done, Armstrong involved his three youngest children in his

[27] Van Praagh 1973, p. 8

experimentation. Richard aged 12, Nora aged 10 and Harold aged 7 were ideal for trying out an age graded Elementary Science programme. The progress of this 'experiment' was described at a conference of science teachers in 1900. The children gave demonstrations of the experiments at the presentation.

At Christmas 1897, Harold was given a little book entitled 'The Monkey that would not Kill' by his father. In the story the monkey was thrown into the sea with a stone tied to him - one that he was unable to lift. However while under the water the monkey was then able to lift the stone and walk to shore *because the stone was lighter in water than in air.* [28]

The children were asked if this could be true and were encouraged to try for themselves. The children used a balance that was at hand and knowing how to weigh they weighed the heavy stone in air and then in water. They discovered that the statement in the story was true.

The children furthered this experiment to investigate if other things besides stones lost weight in water. They discovered that water certainly changed the weight of objects but on a visit to a seaside they discovered that objects lost weight to a greater extent in seawater. They experimented using a canvas bag full of stones, which the older children carried into the water. The youngest child was unable to lift the bag when on the beach but could easily lift it when in the water. This gave way to the investigation into salt water!

[28] Armstrong's 'Junenile Research' 1900 as quoted in Van Praagh, 1973p. 81

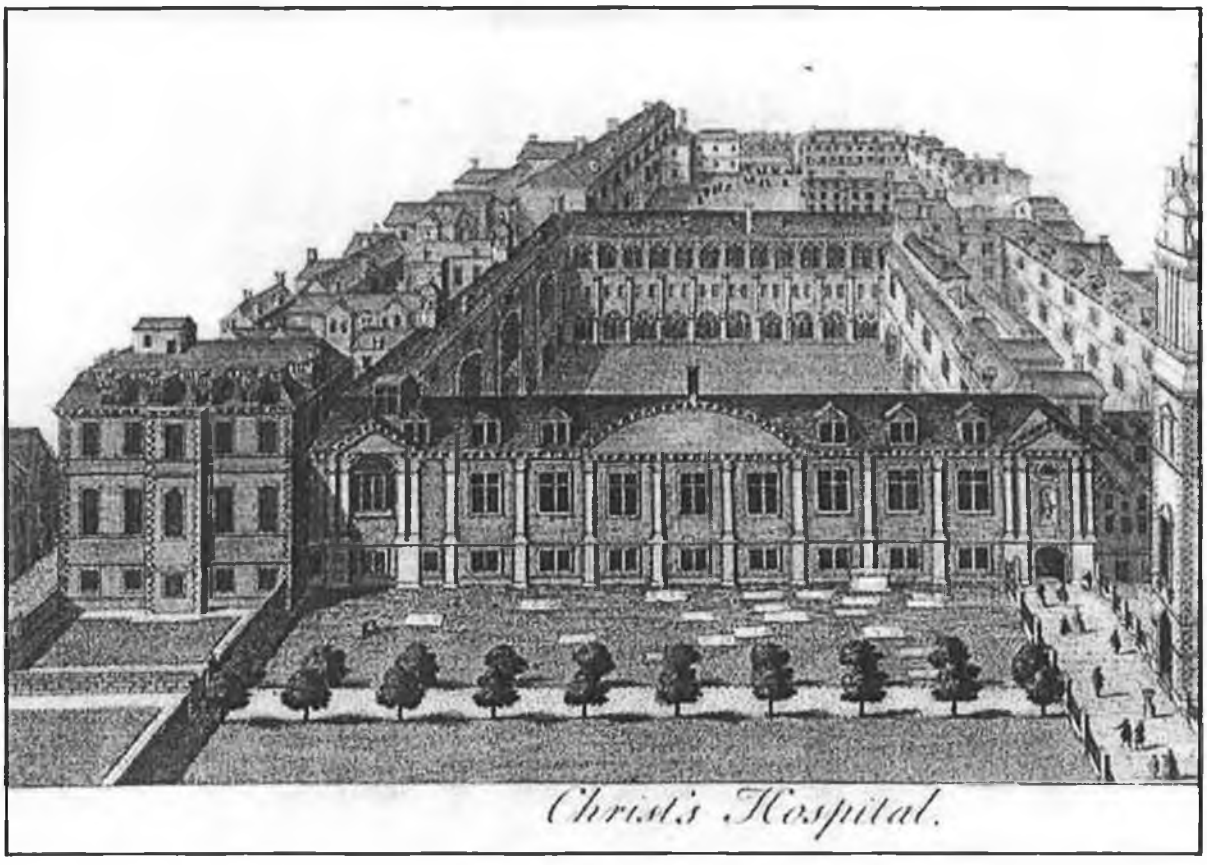
The younger girl and boy were also involved in other experiments to do with the properties of water. These were also suggested in a story –'*The Three Giants*' in Stead's series of '*Books for the Bairns*'.[29]

During these experiments the children were not exposed to science lessons other than those under the supervision of their father. Armstrong forbid St. Dunstan's, the school his son attended, to teach his son science because he didn't want him to be exposed to 'non heuristic' methods. Every Sunday they did their experiments and wrote up their discoveries roughly. During the week they transferred the work neatly into a good notebook under their governess' supervision and drew illustrations.

Charles Brown was a pupil of Armstrong's and witnessed these experiments. When Armstrong who was governor of Christ's Hospital School at the time was asked to recommend someone to be the first science master there, Charles E. Browne was recommended. Being impressed with Armstrong's method, Browne was in a good position to put the techniques of the heuristic method into practice in Christ's Hospital (Illustration 2.4).

[29] Armstrong's 'Junenile Research' 1900 as quoted in Van Praagh, 1973p. 83

Illustration 2.4. Christ's Hospital 1870[30]



[30] http://en.wikipedia.org/wiki/Image:Christ's_Hospital,_engraved_by_Toms_c.1770..jpg

He decided to adopt the scheme for the preliminary science course at Christ's Hospital in London, modifying it to meet the different and more difficult circumstances of working under ordinary school conditions with large classes of some thirty boys.[31] Under the 'Heuristic Method' the children didn't work by themselves, the teacher was always present advising and encouraging.

Armstrong appreciated the difficulties he would face in getting practising teachers to participate fully in the spirit of the heuristic doctrines. He realised the difficulty in carrying out a heuristic teaching approach properly, that teachers could prevent advance by underestimating the powers of young children. Classes were organised for teachers so they could carry out the experimental work that they would later do with their own pupils. In 1896 Armstrong was given permission to hold Saturday morning sessions for London science teachers at the Central Institution. In the first two years nearly 200 teachers attended and the course was repeated over the next three years.

William Mayhowe Heller who was a former pupil of Armstrong (Illustration 2.5) when in 'The Central' college in London was influenced by this to come to Ireland and oversee the implementation of Elementary Science into the Irish National School system in 1900. In the next chapter the influence of H.E Armstrong on Heller will be discussed.

[31] Browne, C.E. Henry Edward Armstrong and Charles E. Browne. Imprint: Christ's Hospital, 1968. LondoHarrison &Sons ltd., 1968, pp12-13

Detail will be given on Heller's proposed syllabus and attempt to make it work after an outline of his life and work.

Chapter 3

William Mayowe Heller

3.1 Introduction

This chapter will give some biographical detail on William Mayowe Heller, his life and work. The chapter will assess the influence of Armstrong on Heller and give details on Heller's philosophy and thoughts on science education. It will outline why Heller came to Ireland, his detailed 'course H' syllabus and his task of inspecting and promoting Armstrong's heuristic form of instruction.

3.2 Life and Career of William Mayowe Heller

William Mayowe Heller was born in London in 1868. He was educated at Westminster School and was a pupil of Henry Edward Armstrong at the City and Guilds Central College between 1885 and 1888. Heller taught science at two secondary schools and was appointed science demonstrator for the London School Board in 1891. In 1897 he was appointed headmaster at a large school in Birmingham.

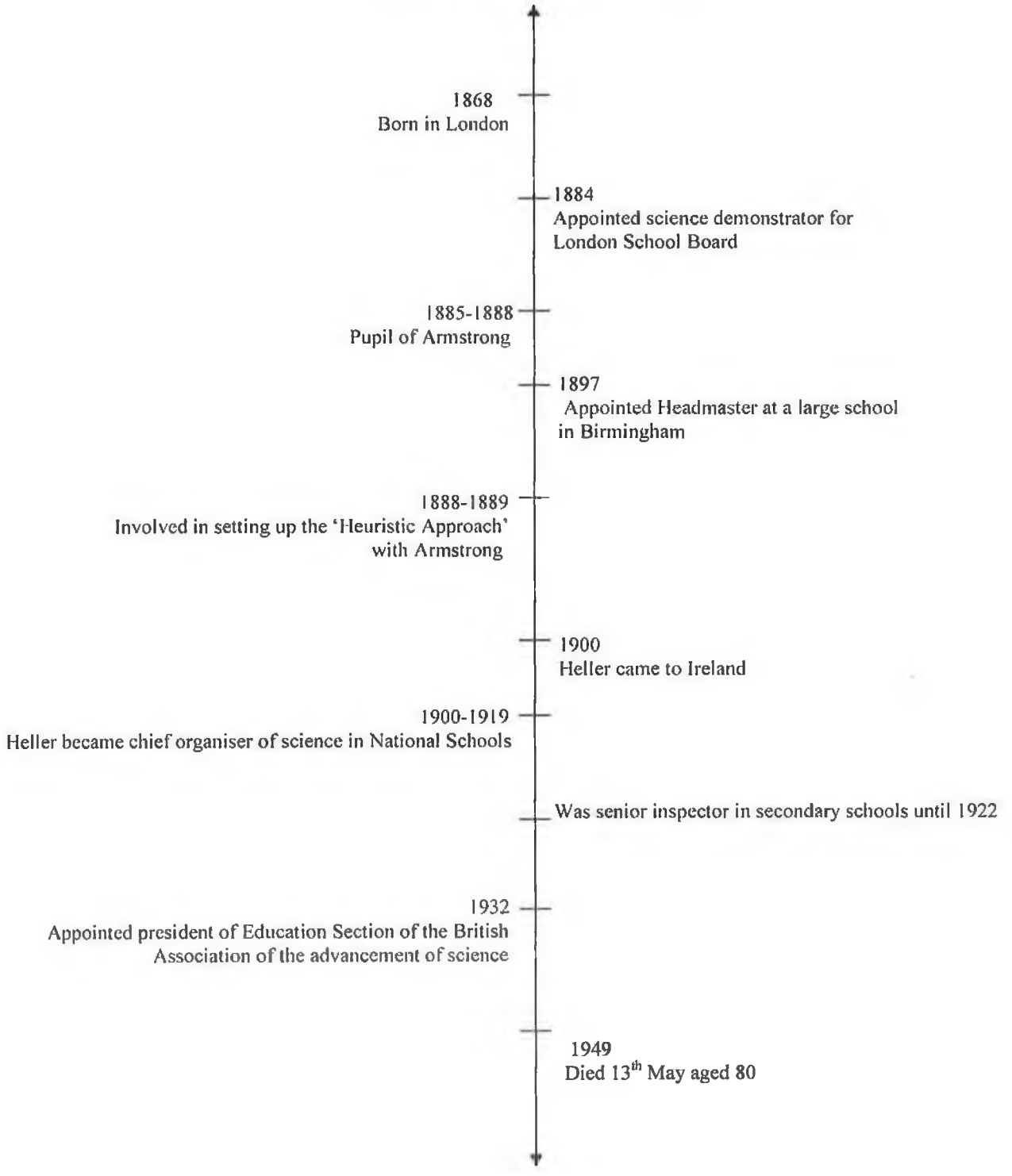
Heller was not only a past pupil of Armstrong but worked with him on numerous occasions. In 1888-1889 he was involved in setting up a 'heuristic approach' at St. Dunstan's with Armstrong and they also worked together in Christ's Hospital in Greyfriars, in implementing Elementary Science programmes for children.

In 1900 Heller came to Ireland in order to oversee the implementation of Elementary Science under the new proposed syllabus into the Irish National School system. He brought with him his methods learned from his teaching and training experiences. The new syllabus of 1900 was as a result of a study by the Belmore Commission (1898-1899). Heller was interviewed by this commission in 1898 and gave written material in the form of syllabuses. He became chief organiser of science in National Schools and worked on the implementation of the syllabus from 1900 to 1919. He later became a senior inspector in the secondary schools until 1922 and then technical instructor until the new Department of Education was formed. In 1932 he became the President of the education section of the British Association for the Advancement of Science.[32]

He was married to Madame Clossett who was well known as a vocalist and musician in music circles in Dublin during this time. He lived in Dublin for about fifty years and died on 13th May 1949, aged 80. He is buried beside his wife at Mount Jerome cemetery. Fig. 3.1 gives a summary of the life of Heller.

[32] Durcan, T.J. *History Of Irish Education from 1800 (with special reference to manual instruction)*. Bala, North Wales, Dragon Books, 1972, p.90.

Figure 3.1. Summary of the life of Heller



3.3 The influence of Armstrong on Heller

When the heuristic method was becoming dominant in England and Wales, Heller was a pupil of Armstrong at 'The Central'. Armstrong was a huge influence on Heller as many years later Heller said of Armstrong,

> '*There is probably hardly a teacher of science today whose methods, consciously or unconsciously, have not been modelled by Armstrong's crusade. As an original thinker on education Armstrong ranks with Huxley; as a constructive reformer he is pre-eminent. It is sometimes difficult to understand how he acquired his keen insight into aims and methods of schoolwork. It is the experience of more than one of his old students who have embraced the teaching profession, that only after some years of schoolwork did they appreciate to the full the fundamental importance of much that he taught them., through years of strife with the conservative forces of educational tradition may occasionally have led us to policies of expediency, our courage has been maintained by the faith that he gave us.*'[33]

Armstrong and Heller worked together in St. Dunstan's College as mentioned earlier (p.24) and Heller assisted practically in putting the heuristic system into operation and from here gained first hand experience of the difficulties. The system was such a success that Armstrong decided to train teachers into the system. The London Board appointed him demonstrator in 1891 and Armstrong started to hold teacher-training classes in heuristic methods in Whitechapel.[34] Heller who eventually ran these classes, did so until coming to Ireland.

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[33] The Central: Journal of the Old Students of the College. Vol. XIII. Birmingham: Percival Jones. 1916, p.20. Appendix 7, p. 129.
[34] Brock (1973) p. 28-29

Heller followed the same methods of teaching science as Armstrong and believed him to be the reason science teaching was as it was in 1932.

> *'One name beyond others stands out as its advocate where science is taught-Prof. Henry E. Armstrong – originator of this Section of the Association. To his advocacy of training in scientific method the advancement of science in schools owes whatever progress has been made. His trenchant criticism has been supplemented by copious constructive suggestion. Therein he stands, almost alone, among the small band of scientific men who, during the past fifth years, have helped us to put purpose and method into our work. Like other great reformers, the full appreciation of his tireless efforts may not be reached even in his long lifetime.'*[35]

Heller was of the opinion that science teaching had progressed this far due to Armstrong's' efforts. He mentions that Armstrong's' efforts at putting purpose and method into teachers work may not be appreciated in his lifetime. Little did he know that Armstrong's' methods of science teaching would be encouraged as the protocol for science teaching one hundred years later.

3.4 Heller's philosophy and thoughts on science education

Heller's philosophy and thoughts on science education were heard in his 1932 presidential address to the British Association. He says of science in the elementary schools:

> *'In the elementary schools little substantial progress has been made; here more than elsewhere the child is dependant upon the school for his educational equipment for life; if he does not get some introduction to natural knowledge at school, he will find few opportunities later'*[36]

[35] British Association for the Advancement of Science. Annual Meeting, York, London. Addressed by W. Mayhowe Heller, 1932. p. 215-216
[36] British Association for the Advancement of Science. Annual Meeting, York, London. Addressed by W. Mayhowe Heller, 1932. p. 211

Heller was confident to speak of this lack of progress due to the large-scale experiments he conducted in both England and in Ireland. Through the work done by thousands of teachers in these experiments they proved that purposeful science teaching was possible and effective in large and small elementary schools.

> '*I could not speak so confidently if I had not conducted large-scale experiments in both England and Ireland. That both these experiments were subject to serious interruptions does not in the least affect their value. What has been done, can be done, and I am sure will be done again.*'[37]

Like Armstrong Heller believed that science teaching would provide pupils with knowledge and mental and personal characteristics that would demanded of them at an older age in the outside world of employment. [38]

Heller spoke of teaching science to pupils as being able to character build and lead to habits of self-reliant work that would be demanded of them in later employment years. Not being like a grammar or arithmetic lesson where the lessons are full of foreign ideas to their experience, a science lesson enables a pupil to display their own knowledge and ideas and display logical thinking. During a science lesson, pupils can work in-groups, put forward their own ideas, put them to the test and thus learn from doing.[39]

However it depended on the method of teaching. Among teachers teaching science, Heller found three schools of thought:

1. Those who don't think and advocated nothing

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[37] Ibid., p. 212
[38] Ibid., p. 213
[39] Ibid., P. 214

2. Those who advocated the didactic method

3. Those who advocated the natural method

Heller displayed his humour on commenting on the first group as being a group that he was not concerned about and just hoped that they realised their mistake in vocation and didn't teach a large number of pupils![40]

In regards to the second group who advocated the didactic method, these were teachers who had an end in view. The aim of these teachers was to produce a pupil with word knowledge of the subject who would be able to write about the subject area efficiently when needed. This method was used by many teachers due to the circumstances in their classrooms of a starved laboratory, no time for preparation or beliefs that literary was the main importance. Heller had respect for these teachers as they played the school game as they saw it – they believed that from hard work alone education would be achieved. As Heller himself says;

> *"If a science teacher, he may find himself confronted with the demand for an annual list of success, no time for preparation, and a starved laboratory; under such circumstances the text-book and didactic instruction becomes a substitute for real teaching."*[41]

Heller used the term Natural Method in contradiction to the didactic method. It was called the natural method, as its aim was to satisfy the natural curiosity in young people about the world in which they live. Children were encouraged to think for themselves and given this

[40] Ibid., P. 214

[41] Ibid., p. 215

opportunity. Lessons were argumentative discussion where the teacher was a leader to inspire success and wide knowledge.

Heller makes reference to the heuristic method suggested by Prof. Meiklejohn (see earlier p.12) and defined by Armstrong in many schemes of work in connection with the natural method;

> *"You will say that natural method as here defined is but thinly disguised Heuristic Method first suggested by Prof. Meiklejohn in connection with the teaching of English. I have avoided the term because it has in these countries become associated with much intemperate controversy... Heuristic Method as defined by Prof. Armstrong in many valuable constructive schemes of work, which he has published from time to time, has passed beyond the stage of controversy. It is accepted as an essential component of science teaching by thoughtful teachers in every country to which my inquiries have extended. Is there, in fact, any alternative method? Although applicable to many subjects, it is so specially adaptable to natural knowledge that it has become associated almost exclusively with science teaching."*[42]

Heller believed that the child had to be exposed to 'natural knowledge' in the school, that this was the only opportunity to achieve it. Heller made use of the term natural knowledge instead of Nature Study, as the latter is generally used to cover junior biological studies and too often aimless and lacking in any experimentation. He stated that science teaching should be at elementary level to the under fourteens. He believed that science should be taken as seriously as the '3 Rs'.

[42] Ibid., p. 215

Science in the junior school was in Heller's opinion the most thoughtful, skilful, natural and scientific in its method and could cover excellent work or a multitude of sins.[43] Science at this stage was referred to as 'Nature Study', which was described in an earlier report from Heller as 'the laborious elucidation of the obvious.'(Heller 1932). Heller believed that more should be done at this stage to get the children thinking;

> *'They love to see things happening, and happening quickly. Little experiments on burning and breathing, how water boils, where the sugar goes to in a cup of tea, and a dozen other things about air and water, arouse enthusiasm and set them thinking hard.* [44]

One would agree with Heller's' beliefs as children love learning through guided activity. We turn once again to the Chinese proverb used by Armstrong, that through doing we understand!

Heller spoke of the quality of teaching science, that it had to be of the highest order to avoid disastrous consequences.

> *'In recent years I have had the opportunity, as an examiner, of assessing the value of the science instruction given in the elementary schools of most of the larger centres of population in the United Kingdom. Although I was dealing probably with selected cases the results were wholly depressing, and consultation with the teachers into whose hands successful candidates passed confirmed the poor impression I had formed of the quality and nature of the teaching.'* [45]

Heller said that general science in the classroom is essential and the subject could not be fenced in by present-day examinations. The interests of the pupils, the teacher or

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[43]Ibid., p. 219
[44]Ibid., p. 219
[45] Ibid., P. 211-212

even the environment of the school should be where the science starts. Like Armstrong, Heller was not a huge advocate of the use of textbooks (see earlier p. 16).

> *'I am not sure whether the mass of text-books available is a blessing or an evil; their multiplicity and success is a proof that the great majority are misused.' 'Textbooks used otherwise than for reference tend to stereotype instruction and to check investigation and initiative. I am glad to say that I know of no one book that provides a natural and rational course of instruction.'*[46]

Animal studies, another area in junior schools education didn't impress Heller, even though it was in the syllabi at the time to study birds, fishes, insects etc.

> *'I do not think that animal studies are to any great extent practicable under ordinary school conditions; the treatment is generally encyclopaedic, does not set children thinking, and the facts are soon forgotten.'*[47]

To finish, he says:

> *'The curricula of many school-especially secondary schools-are based upon the demands of external examinations, and take little thought of the human material handled or the shape into which it should be moulded to fit accurately into its place in the machine of life. Its results in mass-production from the same mould without reference to the markets it is intended to supply.*
>
> *School science for the average boy and girl should, in the first place provide broad and real knowledge that will, as far as possible, render intelligible the phenomena of common experience; and secondly, provide a training in the formation of sound judgements and alertness. Its teaching cannot be adapted to traditional linguistic methods.*
>
> *Science teaching is a profession the preparation for which is at present neither deliberate nor adequate.'*[48]

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[46] Ibid., P. 216
[47] Ibid., P. 219
[48] Ibid., P. 227-228

3.5 Why did Heller come to Ireland?

In 1898 Heller put forward his proposed experimental science syllabus to the Belmore Commission. Armstrong and he had been interviewed as witnesses of this commission the year before. One of the Commissioners, Professor G.F. Fitzgerald of Trinity College Dublin viewed Heller's methods in Heller's teacher training classes at Berner Street as well as interviewing him. He was very impressed and kept contact with him. Heller sent written submissions to the Commission detailing what they (Heller and Armstrong) had witnessed and heard in London. In the commissioners report Heller is mentioned

> *' A detailed syllabus of such a course (Elementary Science that is) drawn up by Mr. Heller a science Demonstrator under the London School Board maybe found in Appendix A '*[49]

The detailed syllabus was 'Course H' a course Heller was deeply involved in at the time as Science Demonstrator with the London Board. This can be seen in Table 3.1. In Heller's proposed syllabus, lessons advised for standards I to III mainly concentrated in mathematics and the basic operations of addition, subtraction etc. from standards IV to V the main priority was measurement (weights of liquids, solids, and reading the thermometer). Chemistry really began in standards VI.

[49] Final Report: House of Commons, Parliamentary Papers.1898 Vol.XLIV p39

Table 3.1. English Education Department: Day School Code (1897), pp.46, 47

EXPERIMENTAL SCIENCE **"Course H" of the Day School Code of the English Education Department.**					
	Standards I & II	Standard III	Standard IV	Standard V	Standard VI
Course H. Experimental Arithmetic, Physics and Chemistry. N.B. - Instruction in this subject should be experimental. The experiments being carried out by the scholars	Thirty object lessons illustrating addition, subtraction, multiplication and division of whole numbers experimentally ascertained by measurement of lines in inches and centimetres, the number of squares in a given area of squared paper ascertained by counting	Thirty object lessons illustrating decimals, inch and centimetre rulers to be used, the inches and centimetres being divided into ten parts. Addition and subtraction, the same methods to be used as in standards I and II. Results in each case to be recorded in columns. Multiplication and division of above by whole numbers	Metre, its sub-divisions. Addition and subtraction of lengths containing them. Results to be recorded in columns as in standard III. The gram and its sub-divisions treated similarly. Application of above to numbers generally	Measurement of length, area, volume and weight. English and French systems relative weights of liquids and solids. Floating bodies, barometer. Thermometers, graphic representation	Distillation, filtration. Evaporation, wet and dry bulb, thermometer, solubility. The heat unit. Heat capacity, latent heat, substances burnt in air such as coal, sugar also metals such as iron , copper etc. investigation into the increase in weight of certain metals when burnt. Rusting of iron, candle, phosphorus, and sulphur burnt in air contained over water. Active and inactive parts of air. Composition of air.

In 1898 Heller put forward his proposed experimental science syllabus to the Belmore Commission.

Armstrong himself told the Belmore Commission in London in 1897 that the course was a success and how teachers were interested in its success. In the interview Heller outlined his proposal for introducing Science into the Irish system, that it would advocate both manual instruction and experimental science. [50]

His views on the inspection and results fees system were clear. Under this system fees were paid to teachers based on the results of an examination of pupils carried out by the inspector.

> *'It would be absolutely impossible for a teacher to give intelligent instruction under the results fees system. Considers that an increase of salary might be made where the report was very favourable, but should not be withdrawn in any subsequent year. Would be opposed to any variable grant, as it should not be requisite as an incentive if the teachers have their work at heart. A very general test of the class, together with inspection of the teacher, should be sufficient to determine the relative efficiency of the masters.'* [51]

It is quite likely that from this George F. Fitzgerald proposed Heller to the National Board of Education to oversee the Belmore Commissions' proposals in implementing Elementary Science into Ireland. He was invited over to Ireland in 1900 to oversee the revised syllabus recommendations as far as experimental science was concerned. His duties

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[50] Commission on Manual and Practical Instruction, Evidence taken in England between March 18th and April 9th, 1897. (Digest of Vol. II) p. 343

[51] Commission on Manual and Practical Instruction, Evidence taken in England between March 18th and April 9th, 1897. (Digest of Vol. II) p. 326

as Head Organiser were to oversee, train and inspect the introduction of Elementary Science and object lessons into the National School system.[52] Heller began his huge task of training, inspecting and promoting Armstrong's heuristic form of instruction, which would keep him in Ireland for the rest of his life. Each year from the introduction of the programme until 1914, Heller would submit to the Commissioners an annual report detailing the progress of the new syllabus. The next chapter will detail a brief history of the National system of education and the introduction of the 1900 revised programme as a result of the Belmore Commission.

[52] Durcan, T.J. History of Irish Education from 1800 (with special reference to Manual Instruction) Imprint: Bala, North Wales: Dragon Books, 1972, p.121

Chapter 4

Before and after The Belmore Commission of 1898

4.1 Introduction

In this chapter some background information will be given on the state of the Science curriculum in Irish National Schools before 1900 with the beginning of the National system of education, The Powis Commission and the Belmore Commission of 1898. The reasons for and the aims of the revised programme will be analysed and Heller's contribution to it. Finally the changes in the content and methodology of the new syllabus brought by the Belmore Commission will be examined and discussed.

4.2 The Beginning of the National System of Education

The British Parliament introduced the "System of National Education"[53] for Ireland on the 9th September 1831. It was designed to provide solutions to religious and political problems in addition to educational ones. A Board of Commissioners who were appointed to superintend the implementation of the system devised a special programme of school instruction. The aim, methodology and content were what the British Government thought to be the needs of the school-age population at the time – political, religious and educational needs. The programme was prescribed mainly through the provision of

[53] Primary Education: Murphy, I., in Catholic Education, ed. Corish, P.J. Gill & MacMillian, 1971. P.5.

specially selected, sanctioned textbooks[54] and excluded the Irish language, Irish history, Irish poetry and Irish music. [55]

It was hoped that

1. When the youth of all religious persuasions were educated together, religious animosities would no longer exist due to 'Habits of early intercourse and attachment'[56]
2. A literate and numerate population would be the result of the educational opportunities for all.

We know from history that these two aims failed however as a consequence an educational programme arose that excluded the Irish Language and Culture:

> *"Reading, spelling, writing and arithmetic, with a little geography, remained the staple on which most boys and girls were reared, though in the senior classes grammar, more advanced geography and, where appropriate, needlework or agriculture could be added."*[57]

4.3 The Powis Commission

Prior to 1900 there was very little, if any, science taught in the National School system.[58] In 1868, The Royal Commission of Inquiry into Primary Education in Ireland was appointed.

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[54] Golstrom, J.M. The Social Content of Education 1808-1870: A study of the Working Class Reader in England and Ireland. Irish University Press, 1971. Page 62
[55] Dowling, P.J. A History of Irish Education. Mercer, 1971. P. 122.
[56] First Report of Commissioner of Irish Education Inquiry 1924-27, quoted in Report of the Council of Education, Government Publication, Dublin 1954. Page 34
[57] Lyons, F.S.L. Ireland Since the Famine. London, Weidenfeld & Nicholson, 1971. P. 86
[58] Durcan, T.J. History of Irish Education from 1800 (with special reference to Manual Instruction) Imprint: Bala, North Wales: Dragon Books, 1972, p.121.

The report of this Commission suggested the main lines on which primary education in Ireland was to develop for the next thirty years at least.[59] This was to

> *"Inquire into the nature and extent of the instruction afforded by the several institutions established in Ireland for the purpose of elementary or primary education."*[60]

This Commission thereafter became known as the Powis Commission after the Earl of Powis who expressed dissatisfaction with the existing programme in 1870 and suggestions were made for its improvement. The 'Results System' was one of the first proposals of the Powis Commission to be introduced. It was first advocated in England in 1857 and eight years later it was one of the first recommendations to be accepted when the Powis Commission made a similar recommendation for Ireland.

> *"One important suggestion of the Powis Commission was quickly acted upon and that was the recommendations that a portion of each teacher's salary should depend upon the marks the children under his charge received at regular examinations to be held under the charge of the inspectors. Payment by results had been introduced into England in 1862, and in 1866 the Government had suggested to the commissioners of national education that the scheme be adopted in Ireland. At the request of the Powis Commission Patrick Keenan, then chief of inspection, drew up such a scheme for its consideration."*[61]

This scheme became known as payment by results. It was a system unfair to both pupils and teachers. Pupils who had attended school for at least 100 days were the ones that could be presented for the examinations.

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[59] Report of the Council Of Education 1954. The Stationery Office, Dublin. P. 48
[60] Report of the Council of Education, 1954. Op. Cit., p. 48
[61] Akelson. Donald H. The Irish Education Experiment. Routledge & Kegan Paul, London 1970. Page 317/

'A great deal of useless knowledge was acquired in parrot-like fashion, and the teacher tended to give most attention to the pupils who were likely to make up the 100 required attendances each year.'[62]

Teaching methods were largely mechanical because of the 'Results system', stimulating only the memory to the detriment of intellectual development.[63] The programme of instruction was a narrow one with the obligatory subjects being the three Rs. This commission stated that any child who passed two of the three Rs could be presented for examination in other subject areas and earn payment for each pass. Many schools didn't offer the optional subjects, as they had to be taught outside normal school hours:

'Extra subjects for which results fees are claimed...must be taught in Ordinary National Schools before or after ordinary school-hours, except on Saturdays... and they must not be taught during the time allowed for recreation.'[64]

In 1870 these extra subjects were limited to grammar, geography, agriculture and the following science sections: Geometry and Mensuration, Algebra, Plane Trigonometry, Navigation, Mechanics, Hydrostatics and Pneumatics, Geology, Inorganic Chemistry, Animal Physiology and Zoology, Botany, Magnetism and Electricity, Physical Geography, Heat and the Steam Engine, Light and Sound. It is quite a comprehensive programme with many of the above science sections not taught to children under the age of ten.[65] The science courses were intended for examinations from 5th class upwards and were comprised

[62] Durcan, T.J. History of Irish Education from 1800 (with special reference to Manual Instruction) Imprint: Bala, North Wales: Dragon Books, 1972, p.98
[63] Report of the Council of Education, Department of Education, 1954, p. 56
[64] Rules and Regulations National Education (Ireland) Vol.III. Appendix 1, 1898, p. 123
[65] Ibid., p. 105

of three examinations. The science syllabus pre-1900 was clearly laid out and contained sub-sections. For example under the section, Light and Sound:

> *'First examination: Sound-Sound waves, nature of them-density and elasticity of sound affected by heat-velocity of sound through air, how determined calculation of distance by light and sound-velocity of sound through water-law of inverse squares as applied to sound-reflection of sound-echo-whispering galleries.* [66]

Very few schools offered science to their pupils however. Agriculture as a subject in the schools was in a much better state. Instruction in agriculture, entirely theoretical in the ordinary school, was introduced in class IV and was based on a standard text book, *Introduction to Practical Farming*, particular chapters of which were set as the syllabus for each class. [67]

It can be seen from Table 4.1 that science wasn't a huge success in primary education. This doesn't come as a huge surprise as the schools were discouraged from teaching science due to the regulations that came with the course:

'Branches of Natural and Physical Science will not be paid for in any school in which the Inspector shall report that the facilities and appliances for teaching them are inadequate.' [68]

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[66] Rules and Regulations of the Commissioners of National Education in Ireland. 1898, p 117
[67] Report of the Council of Education, Department of Education, 1954, p. 54
[68] Ibid., p.122

Table 4.1. Indication of subjects examined under this system 1899

Extra and Optional Subjects 1899[69]			
Subject	**No. of schools in which taught**	**Pupils Examined**	**Pupils who passed**
Drawing	2,146	98,360	78,025
Singing	1,475	84,809	75,474
Algebra	1,357	14,476	9,984
Geometry/ Mensuration	827	5,397	3,787
Magnetism/ Electricity	7	177	112
Botany	2	61	57
Physiology	2	79	44
Inorganic Chemistry	2	32	29
Light and Sound	1	28	15

Due to the results fees offered by the Board of National Education and the fact that Elementary Science was an optional subject, teachers preferred to teach it rather than the course from the Science and Art Department. It was an area where teachers taught the results of the scientific investigation rather than give any definite kind of mental teaching. Towards the end of the century this Department ceased to pay for second class passes and from there the number of National Schools which taught any form of Elementary Science (with *the Board of Education of the Science and Art Department)* seriously decreased.

[69] Durcan, T.J. History of Irish Education from 1800 (with special reference to Manual Instruction) Imprint: Bala, North Wales: Dragon Books, 1972, p.97

'There are now, indeed, so few National Schools which teach any branch of Elementary Science, either in connection with the Board of National Education or with the Department of Science and Art that this subject may be said to have practically disappeared from the primary schools of Ireland.'[70]

From this time to the end of the century the restriction on the range of subjects seemed to relax with optional subjects including book-keeping and vocal music and a wide variety of other subjects that could be taught outside school hours. Nevertheless the programme was a narrow one and was determined more by the 'Results structure.'[71] This payment by results system dictated the method of instruction to the extent that any subject not coming under this umbrella was just not taught.[72]

4.4 The Belmore Commission of 1898

To briefly contextualise the period at this time, Irish affairs were determined at The British Parliament, London. The Irish population was in continuous decline since the Great Famine (1845-1849), there were poor social and health services and infant mortality was high. There had been considerable agitation in Ireland at the close of the nineteenth century in relation to the agrarian situation, political independence, educational reform and cultural revival (Nic Ghiolla Phadraig, 1990). During the 1890s the system of payment by results was abolished in the elementary schools of England and Scotland and the curriculum broadened to take in manual and practical subjects.

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[70] House of Commons, Parliamentary Papers Vol.XLIV. 1898. pp36
[71] Report of the Council of Education, 1954. P. 52
[72] Durcan, T.J. History of Irish Education from 1800 (with special reference to Manual Instruction) Imprint: Bala, North Wales: Dragon Books, 1972, p.97

The Commissioners of National Education in Ireland were aware for some time that the system of education in Ireland, which they were responsible for, was not satisfactory. Up until now the interest of parents and local groups in National School affairs, was practically non-existent. It was hoped that a radical change in the Irish Education System might attract their interest.

> *'The "Practical educationalists" felt that the manual and practical subjects should find a place in the primary schools programme. The "Child-centred educationalists" felt that the curriculum should take a more cognisance of the nature of childhood and that the interests and needs of the child should be central importance in the development of programmes of elementary education.'*[73]

A Memorandum on the subject of manual instruction in the National Schools was submitted to the Lord Lieutenant, asking a commission to be set up. On 25th January 1897, a commission was set up under the chairmanship of the Earl of Belmore, Thereafter known as the Belmore Commission, to determine how far manual and practical instruction would be included in the Educational system.

> *'to inquire and report with a view to determining how far and in what form manual and practical instruction should be included in the educational system of primary schools under the Board of National Education in Ireland.'*[74]

Between September 29th and December 17th 1897, the Commissioners drew evidence from a wide range of teachers, inspectors and staff of training colleges in Ireland,

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[73] Coolahan, J. Irish Education: Its History and Structure. Dublin: Leinster Leader Ltd., 1981, pp 142-143
[74] Report of the Council of Education, Department of Education, 1954, p. 58

England, Scotland and Europe. As we have seen, among the English witnesses were Armstrong and Heller. Otto Salomon, Director of the Sloyd Seminarium at Nais in Sweden was interviewed by three of the Commissioners. Observation reports were made on work in other European countries, a result of 93 meetings and of visits to Denmark, Germany, Switzerland, France and Holland, and of evidence provided by Professor Fitzgerald of Trinity on the American system of education.

> *'In England, a course of object lessons, which may be regarded as the first stage of Elementary Science, is compulsory in the lower standards of primary schools; and many schools carry on a course of science teaching into the upper standards. In Scotland, too, considerable progress has been made, of late years, in the same direction. And on the Continent, some form of Elementary Science is almost compulsory in primary schools.' 'All witnesses are agreed, the mere fact that some form of it (Elementary Science) prevails in all kinds of schools in so many other countries outside Ireland, proves the consensus of opinion on the subject; and the fact that it is being more and more widely extended, is sufficient evidence that its importance and value have stood the test of experience. Nearly all authorities insisted on the teaching of science as an efficient means of training the faculties.'*[75]

It was found though interviewing teachers that children became quicker in taking in other elementary subjects through having science instruction. The final report took upon Armstrong's advice;

> *'The general purport of the evidence may be summarised by saying that* "in the teaching of science in elementary schools, instead of scientific facts merely being taught, the children should be rather taught how to find out things for themselves". *It was held by all the expert witnesses that Elementary*

[75] House of Commons, Parliamentary Papers Vol.XLIV. 1898. pp36

Science ought not be taught without practical illustrations and experiments, in which as far as possible the pupils should themselves take part.'[76]

The Belmore Commission submitted its final report in June of 1898. The commission recommended

1. The ending of the system of payment by results
2. Those practical subjects such as Elementary Science should be included in the Primary school programme.

The Commission recommended a revised programme be introduced, giving the following reasons[77]

I. The present system was one-sided in character, leaving the useful faculties of the mind untrained and consisted mainly of the study of books.

II. Children should be taught not just from information in books but from observing the world around them.

III. Children should reason on the facts that they observe.

IV. Skills of using both the hand and eye should be acquired to execute the conceptions of the brain.

The aims of the programme were to provide an all-round education and also equip the children to avail of further education opportunities.

"The System of National education...would thus lay a solid foundation for any system of higher education-literary, scientific or technical"[78]

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[76] Ibid., pp37
[77] G.B. Parliamentary Paper, House of Commons, 1898. Op. Cit., p.4.
[78] G.B. Parlmentary Papers, House of Commons, 1898. Op.cit., p.6.

4.5 The revised Programme of instruction in National Schools of 1900

This Revised Programme introduced a wide curriculum. The three Rs remained a core part of this programme but it recommended woodwork be introduced to boys' schools, needlework and domestic science to girls' school; while drawing, singing, physical education and Elementary Science were recommended to be taught in all schools. The Elementary Science was to be made compulsory as soon as teachers were trained to give it.

As far back as the report given in 1837 by the Commissioners of National Education, it was expressed that their intention was to provide instruction for those areas of science, which had a practical application to husbandry and handicraft. It was decided in the report given by the Commissioners of National Education 1898 that the subject of Practical farming formed no fitting part of the schools programme as the 1837 report had lead them to believe.

> *'This opinion is quite in accordance with the evidence we received in England. Mr. John Chlamers, Head Master of Burton School, Westmoreland, stated that he would not think anything of a system of teaching agriculture merely out of books. Mr. James Bareman, Organising Secretary to the Westmoreland County Council, was of the opinion that mere textbook teaching of agriculture was useless. Another witness, Mr. C. Courtenay Hodgson, Organising Secretary to the Cumberland County Council, was of the opinion that theoretical instruction without work by the pupils on an experimental plot was quite valueless.'*[79]

It was decided that the details of farming could only be learned through practice on a farm and that to teach the theory of farming to pupils would be of little profit. However it

[79] Final Report: House of Commons, Parliamentary Papers Vol.XLIV, 1898, p40

was agreed that the scientific aspects of agriculture on the simplest aspects of Natural and Physical Science was absolutely necessary for proper appreciation of farming.

Six standards or classes of pupils were provided for in the 1900 programme. In cases of low pupil intake, the circumstances of the school and locality would be taken into consideration in estimating the work done by the teachers. The ages of the pupils were to be taken as a rule as displayed in table 4.2 although it was not compulsory for children under six or more than fourteen years of age to attend school under the Irish Education Act of 1892. Children could not be retained on the roll of schools after reaching the age of eighteen.

Table 4.2 The age rule for each standard in the 1900 programme

Standard	Age
First Standard	3-9 years
Second standard	9-10 years
Third Standard	10-11 years
Fourth Standard	11-12 years
Fifth Standard	12-13 years
Sixth Standard	13 years and above.

Heller had great influence on the revised programme. His proposed 'Course H' syllabus carried great weight (Course 1 in Irish System). This together with the promise by one of the Commissioners, Professor Fitzgerald, to 'have this rational system introduced wherever practicable in our Irish school' meant that the revised programme contained a

strong 'flavour' of both Heller and Armstrong. Under the *1900 Notes, Hints and Observation for the Information of Managers and Teachers* it states;

> *'As regards Course I of Elementary Experimental Science, it is intended that, as far as possible, all experiments should be performed by some, at any rate, of the scholars. The teaching should be directed, in the first place, to produce accurate habits of experiment, observation and thought. He experiment should be undertaken with the object of solving a definite problem and the explanation or discussion of results should not take place until the experiment has been repeated by individual members of the class a number of times. An accurate Balance is essential to such a course, and should be attached to the composition and style of the accounts of the experiment; these notes should represent the scholar's own version of the experiment. The primary purpose of such a course is to produce accurate habits of thought and work, and the mere giving of information should be subordinate to this purpose.* [80]

With this radical change in the content, the methodology was also transformed from that of a didactic and subject-driven style to a heuristic and child-centred method. The content of education was to relate to the reality and interests of the child (Thomas Walsh, 2004).

> *'In connection with Object Lessons and Elementary Science Lessons, as in connection with Manual and Practical Instruction, the Heuristic method should be continuously employed. The pupils should cultivate the habit of obtaining knowledge directly and at first hand, finding out for themselves, and thus developing the faculty of observation.* [81]

The topics from Course I on Experimental Science are displayed in Table 4.3

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[80] Appendix F-1900 to the Reports of the Commissioners 1898, Revised programme of Instruction in National Schools under Notes, Hints and Observation for the information of Managers and teachers, pp. 74-5

[81] Appendix F-1900 to theReports of the Commissioners 1898, Revised programme of Instruction in National Schools under Notes, Hints and Observation for the information of Managers and teachers, pp. 74-5

Table 4.3. Topics included in Course I on Experimental Science 1900

Standard	Content[82]
3rd Standard	'Measurement of lines, areas and volumes. Water displaced by body immersed in it. The seesaw or lever leading to a knowledge of the pair of scale or balance. Relative weights of different kinds of material.'
4th Standard	'Floating bodies. Weight of a body in water. Air has weight. Water pressure. U tube, barometer, syphon. Measurement of hotness by thermometer. Evaporation, moisture in the air. Soluble and insoluble substances. Experiments to elucidate nature of burning in air. Changes in appearance and weight of various substances heated in air.'
5th Standard	'The units of heat and temperature. Revision of relative weight experiments. The rusting or slow changes occurring to iron, copper, lead and phosphorus, in the air. Active and inactive part of air.'
6th Standard	'Revision of heat experiments. Lime, chalk and marble. Effects of heat, water and acids on each. Measurement of gases evolved. Chalk gas proved to be identical with that produced by burning carbon in oxygen. Experiments to show chalk = lime +carbonic acid gas. Hard and soft water.'

Specimen timetables were set out for boys' and girls' school (see Tables 4.4 and 4.5). They were to highlight how provision could be made for instruction in the subjects of the New Programme. Two 45-minute sessions weekly were advised for pupils in boys' schools but two 30-minute sessions allocated for pupils in girls' schools. The extra time allocated to boys for science was to be used in needlework or cookery with the girls.

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[82] 68th Report of the Commissioners of National Education, 1900-1901. P. 88

However in 1904 there came an element of gender segregation within some subjects such as Elementary Science. The revised Programme was implemented 1900-1922 with some revisions, most notably in 1904. The programme provided for a general course of elementary experimental science for boys while for girls it was modified as to bring the instruction into a relationship with materials and operations of the household. The notes for teachers in 1904 endorsed the use of the environment of the child to stimulate learning. The education of the children was certainly enhanced, availing of a wide and varied curriculum, taught in a heuristic and discovery-like method. Details of the implementation of the revised programme 1900-1922 will be discussed in the next chapter.

Table 4.4. Specimen Timetable – Boys' School[83]

Specimen Time Table – Boys' School												
Showing Number of Minutes devoted to Subjects each day												
Days of the Week	Spelling Grammar Reading	Writing Composition	Arithmetic	Kindergarten	Drawing	Object Lessons and Elementary Science	Cookery	Needlework	Singing	School Discipline	Recreation	Total No. Of Minutes per day
Monday	60	30	30	-	45	-	-	-	25	20	30	
Tuesday	60	30	30	30	-	45	-	-	-	15	30	
Wednesday	60	30	30	-	45	-	-	-	25	20	30	} 240
Thursday	60	30	30	30	-	45	-	-	-	15	30	
Friday	60	30	30	45	-	-	-	-	25	20	30	

[83] Rules and Regulations of The Commissioners of national Education in Ireland, Alex. Thom & Co. (Limited) 1898. P. 67

Table 4.5 Specimen Timetable – Girls' School[84]

Specimen Time Table – Girls' School

Showing Number of Minutes devoted to Subjects each day

Days of the Week	Spelling Grammar	Writing Composition	Arithmetic	Kindergarten	Drawing	Object Lessons and Elementary Science	Cookery	Needlework	Singing	School Discipline	Recreation	Total No. Of Minutes per day
Monday	60	30	20	-		-	6 0	30		30	30	
Tuesday	60	30	20	30	-	30	-	40	-		30	} 240
Wednesday	60	30	20	-	30	-	-	40	30		30	
Thursday	60	30	20	30	-	30	-	40	-		30	
Friday	40	30	20		30	-	-	30	30	30	30	

[84] Rules and Regulations of The Commissioners of national Education in Ireland, Alex. Thom & Co. (Limited) 1898. P. 67

Chapter 5

The implementation of Elementary Science 1900-1922

5.1 Introduction

This chapter gives some background on the proposed methodology and content of the 1900 Elementary Science programme and tracks the progress and problems in implementing the programme. Teacher methodology and morale in teaching science under this programme will be examined as will teacher training for the programme and funding. This chapter provides an analysis of Heller's determination to maintain influence of Elementary Science and the adoption of the Natural Method in instructing Elementary Science. Finally the success of this programme in rural schools will be outlined and the scheme of Rural Science and Horticulture that was provided for these schools in 1907 will be discussed.

5.2 The proposed methodology and content of the 1900s Elementary Science Programme

The Revised Programme for Instruction was introduced in 1900. The compulsory subjects were English, Arithmetic, Kindergarten and Manual Instruction, Drawing, Object Lessons and Elementary Science, Singing, School Discipline and Physical Drill, Cookery, Laundry work and Needlework were compulsory in Girls' schools. Geography and History were not included as subjects but teachers were expected to convey knowledge of these subjects by the alternative use of Literary, Geographical and Historical Reading Books.[85] It was proposed that agriculture, since it did not properly belong to elementary education and had

little value, be replaced by Elementary Science for rural schools and there be an extension on the scheme for school gardens.[86] The teachers did not favourably receive the revised programme as there had been no consultation with them and investment in funds and in-service training was not forthcoming.

> *'Teachers were given a freedom to which they had not being accustomed and were asked to teach subjects which they could only have studied superficially. Strain was inevitable... lack of equipment did not increase the popularity of the practical subject.'*[87]

In the teachers' notes in connection with the programmes of instruction for National Schools, it clearly states the importance of the adoption of the natural method of experimental enquiry to instructing Elementary Science.

> *'Heuristic method is merely carefully directed enquiry, in which the pupils are led, wherever possible, to draw their own conclusions, or in any case to understand clearly the reasons for inference drawn by the teacher.'*[88]

Following the Pupils' experimentation, the results and conclusions were to be thoroughly discussed and recorded and a composition (linked to English lesson) stating the purpose for which the experiment was performed was to be written. The inspector would see these at a later date.

The following form was the way records were to be kept and had to be readily available for inspection by the Board's officers. Table 5.1 shows the record of one week's

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[85] Commissioners of National Education of Ireland, Appendix to the Seventy First Report, 1905. H.C. 1906 (Cd. 3154, XXIX 635), pp. 192-202
[86] Report of the Council of Education, Department of Education 1954, p. 58
[87] Report of the Department of Education 1954, p. 59
[88] Notes for Teachers in Connection with the programs of instruction for National Schools. Office of National Education. Dublin. P.E Lemoss & W.J.Dilworth. May 1908. P. 93

work where the minimum amount of practical work was done. The object of the experiment in Table 5.1 was to find the weight of 1c.c. (i.e. cm^3) of water.

Table 5.1. Record of one minimum week's work following pupils' experimentation[89]

Object of Experiment- To find weight of 1c.c. of water				
Names	**Date**	**Volume of Water Taken**	**Weight of Water**	**Weight of 1c.c. of water**
A.B... C.D...	January 20	12c.c.	11.97gm	.996gm
E.F... G.H...	January 21	18c.c.	18.09gm	1.005gm
J.K... L.M...	January 22	24c.c.	23.81gm	.992gm
N.O... P.Q...	January23	32c.c.	31.79gm	.993gm
R.S... T.W...	January24	45c.c.	44.50gm	.998gm

The pupils' notes were what teachers had to use to base their conclusions and generalisations on the pupils. The minimum amount of time to be devoted to science at this point was an hour and a half each week. It was expected that one pair perform an experiment every day during the school year. A suggested list of experiments can be seen in Appendix I of 1908 Notes for teachers'[90]. Suggested experiments included finding the

[89] Notes for Teachers in Connection with the programs of instruction for National Schools. Office of National Education. Dublin. P.E Lemoss & W.J.Dilworth. May 1908. p. 97

[90] Notes for Teachers in Connection with the programs of instruction for National Schools. Office of National Education. Dublin. P.E Lemoss & W.J.Dilworth. May 1908. p. 96

weight of wood, marbles, stones, water, ice, milk, oil, beer etc, mercury, ebony, potato, a litre of air and the weight of water at different temperatures.

Comparisons were made between the;

1. Heating effects of steam and boiling water,
2. Melting points of butter, lard, wax etc.
3. Weight of an egg with an egg suspended in brine solution,
4. Weight of a floating body with the weight of water it displaces.

The girls' course was modified and they were exempt from the experiments listed below. This was so '*to bring the instruction into closer relationship with the phenomena, materials and operations of the household.*'[91]

1. To find the capacity of a bottle by weighing the water it contains
2. To find the weight of 1c.c. of ebony, potato
3. To find the weight of 1c.c. of ice
4. To find the densities of solids by the principle of Archimedes
5. To find the densities of liquids by the principle of Archimedes

Modified programmes were provided for smaller schools that were confined to the principles underlying hygiene and domestic economy. A full course of instruction in science was not expected from one-teacher schools. In schools that were equipped with apparatus, the teacher had to submit an alternative programme where the teacher and the

[91] Notes for Teachers in Connection with the programs of instruction for National Schools. Office of National Education. Dublin. P.E Lemoss & W.J.Dilworth. May 1908. p. 91

equipment were used to illustrate and make interesting lessons. The alternative programme had to be approved by the inspector first. Schools that were not supplied with apparatus were required to teach a regular and systematic course of lessons in Hygiene. Health and Habits were to be taught during the winter months and during the summer months observation lessons were to be carried out. Though this requirements in all standards would be met.[92]

In the schools that received apparatus for Elementary Science teaching, a special classroom was devoted to practical work and experiments were carried out simultaneously by a number of pupils.

It is obvious from the Data in Table 5.2 that the Elementary Science programme touched a large number of children. It can be noticed from these figures that it took five years to fully get Elementary Science integrated into the National Schools. We can see Heller's determination to maintain the influence of Elementary Science even though he compromised by being open to Hygiene being included in the programme from 1906. In order for the survival of the programme he had to compromise from the original programme of 1900.

[92] Notes for Teachers in Connection with the programs of instruction for National Schools. Office of National Education. Dublin. P.E Lemoss & W.J.Dilworth. May 1908. P. 92

Table 5.2. Number of National Schools in which pupils were under instruction in certain subjects since 1900

Number of National Schools in which pupils were under instruction in certain subjects since 1900. The total number of schools in operation for each year is shown in brackets.[93]							
Subject	1900 (8,684)	1905 (8,659)	1906 (8,602)	1909 (8,401)	1910 (8,337)	1911 (8,289)	1912 (8,256)
Drawing	5,942	8,587	8,559	8,380	8,314	8,272	8,256
Object (observation lessons, Elementary Science)	3,096	8,423	8,510	7,883	8,031	8,196	8,178
Domestic Science			665	1,171			
Hygiene			5,482	7,440	7,785		
Singing	3,963	6,751	6,815	7,176	7,222	7,315	7,442
Kindergarten and Manual Instruction	1,293	4,447	4,979	6,012	6,366	6,750	7,260
Needlework	1,700	6,279	6,330	6,382	6,369	6,378	6,376
Cookery	263	360	561	2,342	2,437	2,522	2,707
Irish	88	1,863	2,072	2,999	2,800	2,576	2,577
Arithmetic and Algebra		1,507	2,812	2,234	2,033	1,941	1,406
Geometry and Mensuration		1,304	1,938	1,743	1,574	1,489	1,406
Laundry work			113	336	449	716	727
French	24	204	239	220	245	256	228
Domestic Economy*					254	199	190
Latin	6	89	128	101	118	135	110

*Domestic Economy was an alternative course in Cookery and Laundrywork

5.3 Advantages and disadvantages of implementing this Elementary Science Programme.

The 1954 Report of the Council of Education states of this programme:

> *"It was justifiably claimed that the new system had certain advantages. It gave freedom of school organisation, especially to the smaller schools which were then, as now, in the majority; it substituted the heuristic method of instruction for the didactic."*[94]

[93] Durcan p. 117
[94] Report of the Council of Education, 1954. P. 60.

The new system certainly had advantages especially in the case of smaller schools where it improved infant training, and gave attention to both oral and written expression in English, the teaching of the different subjects were more practical and gave a wide curriculum for the pupils.[95]

However while these advantages of the Programme might be similar to the 1971 Curriculum, in the early1900s they did not succeed. The 1954 Report of the Council of Education offers the reasons why it failed to be implemented. The wide scope of the Belmore Programme was a great weakness. Teachers were given a freedom they were not accustomed to, a syllabus that was new to them and asked to teach in new methods that they found difficult to relate to.[96]

In the case of Elementary Science it was deemed too technical for young children:

'The study of electricity and magnetism, even by the average city boy at such an age, was too technical... teachers were given a freedom to which they had not been accustomed and were asked to teach subjects which they could have studied only superficially.'[97]

5.4 Teacher training

Since there were not a lot of teachers trained in science instruction at the beginning weekend courses in the new subjects like Elementary Science were organised for teachers and experts like Heller brought from England to direct these courses. In a general report written by Heller he states;

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[95] Report of the Council of Education, 1954. P. 60.
[96] Report of the Council of Education, 1954. P.60
[97] Report of the Council of Education, 1954, p. 60

'During the year 1901, courses of instruction were arranged in a considerable number of new centres, including Dublin, Belfast, Londonderry, Coleraine, Waterford, Wexford, Cork and Killarney.'[98]

Table 5.3. Tabulated statement of the classes held in the year 1901 and particulars relating to each class.

Date	Centre	Nature of Course	Organiser	No. of Teachers	Men or Women
1901					
February	Dublin	Day Course (full)	Head Organiser and Mr. Ingold	41	Men
Feb.- March	Dublin	Evening, Part 1	Mr. Ingold	42	"
"	Belfast	Day Course (full)	Head Organiser	39	"
"	Belfast	Evening Part 1	"	36	"
"	Belfast	"	"	36	"
May-June	Cork	Day Course (full)	"	35	"
"	Belfast	"	Mr. Ingold	30	"
"	Belfast	Evening Part 1	"	41	"
May-July	Dublin	"	Mr. Thompson	27	"
July	Belfast	Day Course Part 1	Mr. Ingold & Mr. Hamiliton	12	mixed
"	Cork	"	Miss Maguire	12	"
August	Belfast	"	Mr. Hamiliton	34	"
"	Cork	"	Mr. Thompson	33	"
"	Waterford	"	Miss Maguire	21	women
"	Killarney	"	Mr. Ingold	29	men
"	Killarney	"	"	27	women
June, Oct.,	Londonderry	Saturday (full)	Mr. Forgrave	37	mixed
Mar.	Londonderry	Evening (Full)	"	17	"
"	Londonderry	"	"	17	"
"	Londonderry	Evening Part I	"	20	"
Nov.-March	Coleraine	"	"	27	"
"	Coleraine	"	"	22	"
"					

It was found that with all the changes it was necessary to train the teachers in new material as well as new teaching methods (heuristic methods).

'It was soon apparent that the five years plan for training all teachers was altogether inadequate for the project.'[99]

[98] 68th Report of the Commissioners of National Education, 1900-1901. P. 155

On training the teachers a number of problems were encountered:

1. The unavailability of accommodation for holding teacher training courses

   'An attempt was also made to start in Limerick and Galway, but, owing to the difficulties experienced in finding suitable accommodation for the work, I was unable to establish centres in these towns.'[100]

2. The time set aside for the training of the teachers had to be run during the evening or on Saturdays
3. Cost consideration: Three shillings were paid to teachers attending evening classes while six to seven pounds was paid to the teachers attending the Saturday classes. The day course proved to be far more efficient:

   'The efficiency, however, of the training on these day courses is greater than that obtained by evening instruction, such teachers, being free from the cares and worries of their schools, can give their individual attention to the work of the training classes. Such courses also would enable this particular branch of the New Programme to be spread more generally and uniformly over the country.'[101]

Another factor that would attribute to the failure of the 1900 programme was the training of the teachers in the Colleges. The training colleges were spending more time on instructing training teachers on subject matter rather than on the actuality of teaching itself.

'The great inequalities in the students entering the colleges necessitate much time being spent in teaching subject matter which should find no place in a Training College curriculum, and

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[99] Ibid., p.60
[100] 68th Report of the Commissioners of National Education in Ireland, Heller General Report on Science Instruction, 1901. P.155
[101] 68th Report of the Commissioners of National Education in Ireland, Heller General Report on Science Instruction, 1901. P.157-158

consequently less time can be devoted to the pedagogical aspects of the instruction than is desirable.'[102]

This was to be a major problem in the implementation of the new science programme. Newly qualified teachers would not be able to teach using a methodology that was unknown to them if they were taught in college in a didactic manner.

5.5 Teacher methodology and morale

In addition to this, Heller was aware of the difficulties teachers and pupils were having adapting to the new programme and its methods of instruction especially after the payments by results system. Heller found it easier to teach the younger children. The teachers tended to over –emphasise the written work and back away from the practical. This tendency would continue eventually killing Armstrong's heuristic approach to teaching Elementary Science.

'Generally speaking the teachers have not exhibited in any marked degree a spirit of self-help, nor was it expected in a subject and in methods so new to them.'[103]

He says of teachers and their lack of preparation for science lessons in his 1910 report:

'There is no one fact of my daily work which puzzles me more than the apparently conscientious belief on the part of many well meaning teachers that a subject comparatively new to them can be taught without previous preparation as to methods of introduction, illustration and application; didactic method is mistaken for teaching and science is regarded as a subject rather than a method

[102] 73rd Report of the Commissioners of National Education Ireland, Heller's General Report on Science instruction, 1906-1907. P. 174
[103] Heller's 1908-09 Geeral Report, p. 167

of, and instrument in, educating, the chief value in all non-literary studies is in the process, that is in the mental and sense activities aroused rather than in the facts and phrases learnt.'[104]

The teachers didn't seem to see the benefits of placing attention on the application of lessons to gain more thought and interest from the pupils.

'*...many of them are of the opinion that the thought and energy necessary for an interesting and useful lesson in science does not pay.*'[105]

5.6 Funding

Strain was inevitable and the Board was forced to modify its plans with the difficulties involved in training teachers in the new subjects. In 1904 modifications of the 1900 programme were being introduced after lack of funding for the re-training of teachers. There was also a lack of funds to provide the educational aids and materials necessary for its implementation.

In 1901, 300 free equipment grants were made to teachers who were deemed competent in using them.[106] Grants were supplied towards the initial supply and maintenance but they were in short supply. In 1907 the Commissioners introduced a system whereby free grants were given to schools whose managers kept apparatus in working condition. However, by 1910, the teachers themselves were expected to pay for the cost of renewal of apparatus. This was certainly not helping Heller implement the new Elementary Science programme.

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[104] Heller's 1909-1910 General Report, p. 197
[105] Heller's 1913-14 report, p. 144
[106] Heller's 1901 General Report, p. 160

'The up-keep of the equipment issued to schools is unsatisfactory, and the quality of the instruction suffers in consequence. The cost of renewals where made too often falls upon the teacher.'[107]

It would appear that Heller received a strict annual budget and it seems that he never asked for more. He planned that once the funds for teachers' travelling expenses dried up then him and his staff would visit and teach in the schools nationwide.

'It is much to be regretted that the Treasury has only been able to place sufficient funds at my disposal to keep my small staff occupied at these training classes during a portion of the present financial year. There is, however, an overwhelming amount of other exceedingly important work, such as visiting and teaching in school, to occupy them when the funds available for the payment of teacher's travelling expenses have been exhausted.'[108]

Heller's staff consisted of himself as Head Organiser, his assistant Mr. Ingold, Miss Maguire, Mr. Thompson, Mr. Hamiliton, Mr. Forgave and Mr. Connell. The programme started off well although the inspectors, Purser and Hynes, felt that too much training was being spent on just one area of the curriculum.

'As stated in former reports, the time spent at Elementary Science is out of proportion to its importance in the curriculum of the average National School.'[109]

By 1906, six of Heller's staff lost their positions due to the lack of funding. Mr. Ingold remained to assist Heller and oversee the Northern section including Belfast and Miss Maguire to assist and oversee the Southern section of about 700 equipped schools,

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[107] Heller's 1909-10 General Report, p.198

[108] Heller's 1901 General Report, p. 158

[109] 71st Report of the Commissioners of National Education, 1903-1904, p.8.

although she successfully concentrated her efforts on the training of teachers in convent schools.

Heller did try another idea to implement Science successfully. He proposed the initiation of summer schools in order to train or act as a follow up course for teachers in Elementary Science. These had been used in the United States and in England with great success. It was a workable, simple idea but was never to be acknowledged by the Commissioners.

> *'The system of summer schools now becoming general in England, Scotland, Canada and the United States, is doing much to stimulate thought as to methods and aims of school work and an experiment might with advantage be made for the benefit of Irish National teachers.'*[110]

5.7 Rural Science and Horticulture

It appears from the reports that Elementary Science never really got established in the majority of the rural schools. However there was one area of science in which interest had risen. A scheme of Nature Study was provided for rural schools in 1907. In 1912 officers from the Department of Agriculture and Technical Instruction began giving classes in Rural Science and this included the school garden. By 1913 there was great interest in school gardens.

> *'After the revisions of 1904, the revised Programme remained practically the same until 1922, although at this stage, Elementary Science was called Nature Study and school gardening was introduced into some schools in 1912 instead of Elementary Science.'*[111]

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[110] Heller's 1909-1910 General Report, p. 197

[111] Bennett. J., Curricula and Primary Education in Ireland, North and South, 1922-1999. Oideas, Government Publications Sale Office, Dublin. 2000. P. 9

The Commissioners set out Rules and regulations in 1915 for Rural Science and Horticulture in National Schools. Grants were made to teachers depending on the number of pupils enrolled and lessons spent on gardening.

> *'In any school in which there are at least ten boys enrolled in the fourth and higher standards who have received 50% of the total number of lessons in gardening in a school to which an approved school garden is attached and where the master possesses the necessary qualifications, a grant of £5 per annum may be made to the master.'*[112]

In addition to this, prizes of £5 each were awarded to teachers of the 30 schools with the best gardens. In order for teachers to be entitled to these grants they had to be qualified, have at the beginning at least a provisional certificate and after some years a full certificate. Teachers received higher certificates based on

a) *Efficiency:* For the five years preceding application for the award of a higher certificate, reports were written on the teacher's work by inspectors. Three out of the five reports had to be favourable.
b) *Scholarship:* The following qualifications were regarded as satisfying the conditions in the case of candidates for the higher certificate.[113]

1. An honours University degree
2. A pass University degree providing the candidate attended lectures and obtained at least one honour during the course
3. The Higher Diploma of the National University of Ireland.

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[112] Rules and Regulations of the Commissioners of National Education in Ireland. Alexander Thom & Co. Ltd. Dublin.1915-1916 p. 184
[113] Rules and Regulations of the Commissioners of National Education in Ireland. Alexander Thom & Co. Ltd. Dublin.1915-1916 p. 184

Rural Science and Horticulture had at least thirty lessons of one hour each that would be given to practical work and the same to theoretical work throughout the school year. The apparatus needed for a class of twelve pupils were 6 spades, 6 digging forks, 6 hoes, 2 draw hoes, 6 sprouting boxes, 1 watering can, 1 pruning knife, 1 budding knife, 1 garden line, 1 brass syringe, 18 large flower pots, 100 wooden labels, 1 measuring tape and 1 wooden measure 6 foot. [114] Grants were given for half the certified cost of the preliminary equipment and tools not exceeding £6.

The gender segregation can be clearly noticed at this time. There was a separate Elementary Science and Rural Science Programme (Rural Science was optional and included the school garden) for boys and girls. Even at this time Armstrong's' influence can be seen.

> *'Fair copy note books are not required, but a clear, concise, and accurate record of the instruction and of garden and laboratory work should be kept.'*[115]

Even with the success of the school garden, Heller was still displeased. There was little emphasis placed on the practical nature.

> *'We must look in these gardens for something more than the economic value of what is taught; like all other forms of manual instruction, gardening must be so conducted that it possesses and intellectual and training value also, and these latter purposes must not be left to chance in the bring hope that digging and weeding alone will turn out better brains and more effective workers.'*[116]

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[114] Rules and Regulations of the Commissioners of National Education in Ireland. Alexander Thom & Co. Ltd. Dublin.1915-1916 p. 187
[115] Rules and Regulations of the Commissioners of National Education in Ireland. Alexander Thom & Co. Ltd. Dublin.1915-1916 p. 198
[116] Heller's 1912-13 General Report, p. 121

The Belmore Programme, similar in content and structure to the 1971 Curriculum, failed because the teachers received inadequate re-training which was needed in the 'new methods' and because of the lack of educational equipment.

> '*While the aims of the new system were progressive, the completeness of the break between the new and the old and the different nature of the methods required by the curricula of the new system, placed a great strain on teachers who had been kept in leading strings for over a quarter of a century, and were in many respects unprepared to deal with the new subjects.*'[117]

This system stayed in place until the change of Government in 1922. In the next chapter the changes of the programme and its aims when it was taken over by the Provisional Government will be discussed. The chapter will provide an insight into Elementary Science as a subject with each national programme from 1922.

[117] Report of the Department of Education for the School Year 1924-25. Published by the Stationary Office. P. 19

Chapter 6

Implementation of National School Programmes from 1922

6.1 Introduction

This chapter provides an analysis of Elementary Science as a subject since the implementation of the first National School programme in 1922. This chapter will give detail on how the societal and political context was altered in Ireland after the advent of independence, the criticism of previous programmes and the removal of science as a compulsory subject in the primary programme. The state of the programme in 1926 will be looked at with the introduction of the Rural Science and the School Gardening course. These were synonymous terms incorporating Elementary Science and school gardening. This chapter will also highlight the gender differentiation through varying syllabi. The reports of inspections of schools will give an insight into the success and failures of the Rural Science and Nature Study course. The changes made to the state of the Rural Science and Nature Study programme throughout the years will be discussed, with it becoming an optional subject in 1934 and its use in later years in a child-centred programme to stimulate the minds of children.

6.2 Implementation of the First National School Programme 1922

> *'During the Anglo-Irish War, in January, 1921, began the work of a conference of educationalists which was to propose more important changes in the character of the Irish primary school.'*[118]

[118] Report of the Council of Education 1954, p. 64

The second curriculum to be examined related to the programme introduced in primary schools after the advent of independence in 1922. The societal and political context was altered from the situation in 1900.

> *'Ireland determined its own affairs politically, but was recovering from the War of Independence and the Civil War. The economy of the Irish Free State was largely agrarian based and was stagnant for decades after independence, leading to high unemployment and emigration. There was little emphasis placed on social provisions for children and families. The cultural movement, which was intricately linked to the military movement for independence, was particularly prominent at all levels of Irish society and played an important role in shaping the Free State.'*[119]

The previous programmes of instruction were the subjects of criticism and complaint generally under the following headings:

1. The programme contained too many obligatory subjects, was overloaded and the teachers had practically no freedom of the choice of subjects.
2. The vast majority of the Irish people wished for the Irish language to be taught to their children.

The Irish National Teachers' Organisation convened the First National Programme Conference in 1921. It introduced a much narrower curriculum than was previously in operation. It was to place adequate emphasis on the Irish Language, history and culture to transmit the cultural inheritance that had being denied from previous generations. Subjects such as Elementary Science were at this point omitted as compulsory subjects in the Primary Programme.

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[119] Walsh. T., A Historical Overview of Our Conceptualisation of Childhood in Ireland in the Twentieth Century. CECDE .2004 p. 5 (document)

'The most notable changes adopted are (1) the elimination of Drawing, Elementary Science, Cookery and Laundry, Needlework (in the lower standards) and Hygiene and Nature Science as formal obligatory subjects, the modification of the programme in History and Geography (which now constitutes but one subject), in singing and in Drill; (2) the raising of the status of the Irish language both as a school subject and as an instrument of instruction.'[120]

Very little attempt was made to justify the inclusion or exclusion of subjects, the main aim was to raise the status of the Irish language. [121] Considering the stage of the political development of Ireland in 1921-22[122] this emphasis on Irish is not surprising. This was the first time since the beginning of the National System that a programme of instruction for schools was constructed and promulgated by Irish Educationalists for Irish pupils. Previously the Commissioners of National Education or the inspectors prepared and published each programme but in this case the Commissioners were not even represented at the Conference.

Educational aims or principles did not promote the Programme that was drawn up but rather the spirit of nationalism. The programme was more ambitious than realistic since the majority of teachers were not sufficiently competent in Irish to carry out its proposals. The optional subjects were Drawing, Advanced Algebra, Advanced Geometry and Mensuration, French, Latin, Nature Study, Bookkeeping, Elementary Science (*where there was a suitable equipped laboratory*), Cookery, Rural Science and School Gardening (*in*

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[120] National Programme of primary Instruction issued by the National Programme Conference, The Educational Company of Ireland Ltd. Dublin. 1922, p. 4
[121] Bennett. J., Curricula and Primary Education in Ireland, North and South, 1922-1999. Oideas, Government Publications Sale Office, Dublin. 2000. P. 10
[122] Lyons, F.S.L. Ireland Since the Famine. London, Weidenfeld & Nicholson, 1971. P.624.

properly-equipped schools with gardens attached), Manual Instruction and Domestic Science. [123]

Even though they were no longer obligatory, subjects grants were still available. During the session 1921-22, 39 Elementary Evening Schools were in operation. Most of these were aided under the alternative rules for Evening Schools in large urban centres. In the financial year 1921-22, payments of £2,771 14s. 4d. were made in respect of Evening Schools.[124] 98 schools had recognised schools gardens attached in the school year 1922-23. 80 of these schools received grants amounting to £1,012 11s. 3d for instruction in Gardening in 1923-24. Equipment grants were also made amounting to £139 13s. 3d. in this year.[125] Nature Study could be taught from third standard upwards.[126] The pupils could observe and study flowers, seeds, trees, and the work of the river, weather, nature life cycles and insects.

From infants years to third standard, Nature Study, being a term covering Elementary Science, hygiene, plant life, school gardening and temperance, was taught informally and based on simple plant life and children's observations.[127]

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[123] National Programme of Primary Instruction, issued by the National Programme Conference, The educational Company of Ireland ltd, Dublin, 1922. P. 17
[124] An Roinn Oideachas, Statistics for National Education, 1921-22. Dublin. P. 16
[125] An Roinn Oideachas, Report and statistics relating to National education in Saorstat for the year 1923-24, The Stationary Office, Dublin, p. 27
[126] National Programme of primary Instruction issued by the National Programme Conference, The Educational Company of Ireland Ltd. Dublin. 1922, p. 18
[127] Social and Environmental Studies in Primary Education in Ireland, Current Issues and Concerns, an INTO Publication, Dublin. P. 22

Elementary Science could be taught from fourth standard upwards and included the topics of water, air, heating, weather, diets and food stuff, digestion, floatation, elementary mechanical and physical principles and their application.[128] As with the 1900 programme one of the first exercises covered in Elementary Science were practical exercises on length, area, volume and weight and the use of instruments for measuring volume and weight.

6.3 Rural Science and School Gardening

Rural Science and School Gardening consisted of a three-year course[129]. The course in the first year was divided into two sections. Section A1 dwelled on seeds, roots, leaves, flowers and plants. Section A2 focused on the care and use of garden implements, improving soil drainage, soil cultivation, nature of garden soil, simple experiments with sand, clay and humus and cropping a vegetable garden.

The first section B1of the second year course focused on life in the soil, animals of the garden, effects of cultivation, treatment of unhealthy plants suffering from insect and fungus attacks. Section B2 consisted of managing the school garden, raising and planting trees, cropping, cuttings, grafting, budding and practised use and preparation of spraying mixtures.

The first section of the final year C1 concentrated on the school in relation to its surroundings: atmosphere and weather, the hill slopes, frost and rain, river system, the

[128] National Programme of primary Instruction issued by the National Programme Conference, The Educational Company of Ireland Ltd. Dublin. 1922, p. 20
[129] National Programme of primary Instruction issued by the National Programme Conference, The Educational Company of Ireland Ltd. Dublin. 1922, p. 21

seashore and rocks. Work in section C2 was expected to be of higher quality than that in the first or second year. It included a revision of the previous two years work.

The state of Rural Science and the alternative courses called Nature Study at the beginning of 1926 was that it was not an obligatory subject in Primary schools. The time needed for the teaching of this subject was to be obtained by lessening the period for the formal teaching of the language used as the way of instruction in the subject. As this subject was not obligatory in either Primary or secondary schools it presented some difficulty for inspection especially in primary schools. The success of the teacher in arousing the pupil's interest and curiosity in nature judged the efficiency of teacher instruction more so than the amount of acquired knowledge.[130] In addition to this, experiments were not obligatory for any part of the course.

> *'No recondite or technical knowledge will be expected from the pupils. The efficiency of the instruction will be judged less by the amount of acquired knowledge than by the success of the teacher in arousing the children's curiosity and in stimulating their interest in the facts of nature. Experiments of a simple kind are recommended by way of illustrations of the courses of Rural Science or Nature Study, but are not obligatory for any given portion of the courses.'*[131]

Rural Science being an additional subject was taught in approximately 400 schools in the school year 1925-1926. In these schools a small school plot for a school garden was available. The Nature Study course for mixed schools and all boys' schools (those without

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[130] Social and Environmental Studies in Primary Education in Ireland, Current Issues and Concerns, an INTO Publication, Dublin. P. 22

[131] The National Programme Conference, Report and Programme to the Minister for education. Published by the Stationery Office, Dublin. 5th March 1926. P. 43

a school plot) was taught in about 500 schools. The Nature course for mixed schools taught under a mistress and all girls' schools was being taught in approximately 1,100 schools.[132]

6.4 The Second National programme 1926

There were changes made to the programme in July, 1926 .The aims behind this curriculum remained the same.

> *'The 1926 Conference affirmed its belief in the programme as a means of attaining the end which was stated to be an essential part of the educational aim of the Irish Government, namely, the strengthening of the national fibre by giving the language, history, music and tradition of Ireland their national place in the life of the Irish schools.'*[133]

Rural Science became a compulsory subject of the School Programme from 1st July 1926. Rural Science and Nature were considered synonymous terms incorporating Elementary Science and school gardening. Ireland was a farming country and thus The Programme Conference who decided on programme content stated that the case for the inclusion of Rural Science was very compelling.

> *'The Programme rejected allegations of Vocationalism but suggested that the subject would be of great indirect utility in making our children favourably disposed towards, and prepared for agriculture, the natural vocation of a large proportion of them. Accordingly, Rural Science became an obligatory subject.'*[134]

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[132] Report of the Department of Education for The School Years 1925-26, Published by the Stationery Office, Dublin. P. 49

[133] McElligot, J.J. Educational in Ireland, (qoating the Secetary of the Department of Education in a speech made in January 1922), published Institute of Public Administration, Dublin, 1966. P.18

[134] Bennett. J., Curricula and Primary Education in Ireland, North and South, 1922-1999. Oideas, Government Publications Sale Office, Dublin. 2000. P. 13

Attempts made by the INTO were unsuccessful to resist the inclusion of Rural Science as an obligatory subject. They argued that it was dangerous to include this subject on the curriculum, as it was a professional rather than cultural subject. [135]

There were some schools however that weren't required to teach the programme.

> *'it is only compulsory however in those schools in which at least one member of the school staff is qualified to give instruction in the prescribed programme. It is not compulsory in two teacher schools, in which one of the teachers is a Junior Assistant Mistress. It may, however, be taken in the schools, in which it is not compulsory, provided that a member of the school staff is suitably qualified.'*[136]

In order for Rural Science or Nature Study to be taught in a school it was to be taught by a teacher who was qualified to teach it. Syllabuses A and B of Rural Science and an outdoor syllabus were to be taught in all boys' schools or mixed schools where there was a school plot for demonstration purposes. The Nature Study syllabi were to be taught where no school plot was available and were to be taught in alternate years. The same applied to mixed schools under a master although girls spent one hour a week to the boys' 1 ½ hour. In mixed schools under a mistress or all girls' schools, the shorter syllabuses C and D of Nature Study were to be taught in alternate years.

> *'The term Rural Science is applied to a prescribed course in boys' schools or mixed schools under a master, where there is a school plot available for practical demonstration by the pupils. The term "Nature Study" is applied to a course for boys, where no school plot is available and also to a*

[135] Bennett. J., Curricula and Primary Education in Ireland, North and South, 1922-1999. Oideas, Government Publications Sale Office, Dublin. 2000. P. 13
[136] Report of the Department of education 1927-28, published by the stationery office, Dublin p. 38

course for girls' or mixed school under a mistress where no school plot is required. The object of these courses is purely educational. "[137]

Rural Science consisted of Syllabus A and syllabus B and an outdoor studies syllabus. More detail on syllabus A and B of Rural Science can be seen in Table 6.1. [138]

1. Syllabus A:

The main topics of syllabus A were solids, liquids, gases, air, water, the thermometer, the barometer, soil, manure, plant life, fruit and seeds, observation of birds and other animals.

2. Syllabus B

Syllabus B was made up of plant life, rules of health and habits, food, antiseptics and disinfectants, observation of wild birds and simple studies of local natural features. The syllabus of out-door studies was for illustration of the above courses.

Nature Study was divided into four syllabuses. More detail on each syllabus of Nature Study can be viewed in Table 6.2. [139]

1. Syllabus A

The main topics of syllabus A were similar to syllabus A in Rural Science but also included lighting and heating, fire, treatment of burns, scalds etc.

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[137] Report of the Department of Education for The School Years 1925-26, Published by the Stationery Office, Dublin. P. 49

[138] An Roinn Oideachas, Programme of Primary Instruction 1926, The Stationary Office, Dublin. p. 9

[139] An Roinn Oideachas, Programme of Primary Instruction 1926, The Stationary Office, Dublin. pp 10, 11

2. Syllabus B

Syllabus B again was made up of The story of the Human body (breathing, digesting etc.), different kinds of food and drink, alcohol, germinating seeds, flowers and insects, observation of birds and other animals, study of local natural features and revision of the study of air, ventilation, heating, lighting etc.

3. Syllabus C

Syllabus C included matter, air, heat, water, the thermometer, plant and animal life and local natural features as main topic areas.

4. Syllabus D

The final syllabus of Nature Study, syllabus D, had the main topic areas of air, heat, water, the simple story of the human body, hygiene, food, bacteria, the home and outdoor study of plant and animal life.

Programme of Rural Science instruction 1926		
	Syllabus A	**Syllabus B**
Rural Science	▪ Matter – as solid, liquid and gas ▪ Air – The part air plays in burning, effects of heat of air, distribution and movement of air, principal gases of the air ▪ Water –it's different states, uses of water in plant and animal life, sources of water, purification of water ▪ The thermometer, the barometer ▪ Soil – story of soil formation, air and water in the soil; living organisms in soil, soluble matter, vegetable and mineral matter in the soil, simple experiments with sand, clay and turf or foam to illustrate their chief characteristics. ▪ Manure – what it means and why it is applied to soil ▪ Plant life – General explanation of a typical plant (providing a specimen for each pupil)general structures and uses of roots, stem, leaf, bud and flower, conditions favourable for normal plant growth ▪ Fruits and seeds – natural devices for the scattering of fruits and seeds, germination of seeds, methods of food storage in plants ▪ Observation of birds and other animals. Simple general study of natural and other local features.	▪ Matter – as solid, liquid and gas. General study of air and water ▪ Plant life – General examination of a typical plant (providing specimen for each pupil); general structures and uses of roots, stem, leaf, bud and flower, Multiplication of plants by seed, runners, bulbs etc, study of trees and bushes, plant diseases, common insects, comparisons between cultivated plants and weeds ▪ rules of health and habits – breathing, perspiration, ventilation, clothing ▪ food – various types and uses of foods, milk a complete food, alcohol – pure alcohol a poison, alcoholic liquor harmful especially to young people, effects of alcoholic excess ▪ antiseptics and disinfectants ▪ observation of wild birds ▪ general study of local natural features

Table 6.1. Programme of Rural Science instruction 1926

Programme of Nature Study programme 1926				
	Syllabus A	**Syllabus B**	**Syllabus C**	**Syllabus D**
Nature Study	▪ Matter – as solid, liquid and gas ▪ Air – the part air plays in burning, effects of heat of air, distribution and movement of air, principal gases of the air ▪ Water –it's different states, uses of water in plant and animal life, sources of water, purification of water ▪ The thermometer, the barometer ▪ Plant life – general structures and uses of roots, stem, leaf, bud and flower, conditions favourable for normal plant growth ▪ Lighting and heating of rooms ▪ Dangers attendant on different systems of lighting and heating, outbreaks of fire, how to deal with them, treatment of burns, scalds etc, gas poisoning.	▪ observation of wild birds, and other animals ▪ general study of local natural features ▪ Revision of study of air, ventilation, heating, lighting etc. ▪ simple story of the human body - the framework, respiratory organs, danger of breathing vitiated air, pulmonary consumption, digestive organs, changing of food into blood, comparison with trees and plants ▪ different kinds of food and drink, their values, home-grown foods, drinking water, removal of waste from body, milk, butter, cocoa, tea, coffee ▪ alcohol, pure alcohol a poison, alcoholic liquor harmful, especially to young people, effects of alcoholic excess ▪ antiseptics and disinfectants ▪ germinating seeds ▪ garden flowers	▪ Matter – solid, liquid and gas ▪ Air – movement of air, moisture in air, air in relation to lie; rusting ▪ Heat – it's application to domestic uses, air in relation to fires ▪ Water – source, purification, pollution of water, water in relation to life, domestic uses ▪ The thermometer ▪ Life – plant and animal life, growth, general structures and uses of the parts of common plants. Flowers. Study of common insects, birds ▪ Study of local natural features.	▪ General study of air, heat and water ▪ The person – human body, chief organs, their function, body temperature, clothing ▪ Hygiene – breathing, perspiration, personal and domestic cleanliness. The teeth, cleaning agents ▪ Food – study of food, home produced food, alcohol, pure alcohol poison, alcoholic liquor harmful, especially to young people, effects of alcoholic excess. ▪ Bacteria- in relation to food, infection, contagion, antiseptics, disinfectants, sterilisation, sunlight ▪ The home – ventilation, cleanliness, beautifying ▪ Study of plant and animal life. Birds, local features.

Table 6.2. Programme of Nature Study programme 1926

To guide the teachers of Rural Science and Nature Study, a booklet was prepared by the Department of Education and issued to every school entitled, "*Regulations and Explanatory Notes for the Teaching of Rural Science and Nature Study in Primary Schools*". The Rural Science and Nature Study programme incorporated Elementary Science as can be seen from the various topics below. From this booklet it was clear that lessons that were not practically demonstrated were futile.

> *'Words alone, no matter how appropriately chosen, will not sustain attention or impress the mind of a child in the same way as if they are supported by a material demonstration. It is this practical association in the teaching of Rural Science between the theory of the subject and the presence of things that we can see and feel that constitutes its peculiar attraction and educational value.'*[140]

The object of this booklet was to outline lessons and demonstrations that might be used in the teaching of the appropriate syllabus of the programme. The demonstrations that were to be utilised in the teaching of Rural Science and Nature Study in primary schools are given in Table 6.3.

[140] Department of Education, 'Regulations and Explanatory Notes for the Teaching of Rural Science and Nature Study in Primary Schools.' The Stationary Office, Dublin. 1926 .p 3

Table 6.3. Demonstrations that were to be used in the teaching of Rural Science and Nature Study in primary schools.

Demonstrations that were to be used in the teaching of Rural Science and Nature Study
1. Recognition of matter by means of the senses 2. Weight, a property of matter 3. How to measure the property called weight 4. Matter occupies space 5. To show the existence of matter in the state of gas 6. To show that air occupies space, pressure and has weight 7. Preparation of other gases 8. Distinctive properties of matter in different states 9. Change of state of matter 10. Solution of solids in liquids 11. Hardness of water 12. Solution of liquids in liquids and of gases in liquids 13. To show that air is composed of at least two gases , that air contains carbon dioxide and water vapour 14. Study of burning and some of its products 15. To demonstrate the effect of heat on matter 16. To show that hot air is lighter than cold air, to show the movement of air 17. To show that water can exist on three states 18. To show how a thermometer is made and used 19. To make a simple barometer and to demonstrate the principles underlying it. 20. To demonstrate general composition and properties of soils 21. Examination of a complete plant 22. Structure development and functions of roots, stems, leaves, flowers, fruits and seeds 23. To demonstrate the conditions necessary for germination of seeds 24. To show how the percentage of purity and germination of seeds is determined 25. The storage and functions of food in plants 26. To study the effect of environment on plants 27. Bird study 28. Fungi and bacteria 29. Study of insect life 30. Hygiene 31. Study of foods and drinks 32. Outdoor studies

The following is an extract from the above-mentioned booklet. It was a suggested demonstration and lesson to show that *air occupies space:*

(a) Immerse an 'empty' inverted tumbler or glass jar in water. Note and explain results. Tilt to one side gradually. Note the escape of air and the entrance of water.

(b) Extend one end of a piece of rubber tubing up into the air in the tumbler through the water, thereby allowing some of the air to escape. Note what happens and explain.

(c) Displace the water from an inverted tumbler full of water and immerse in a vessel of water, by blowing air into it.

(d) Boil some water in a flask fitted with a delivery tube. Collect, over water, the air driven out by steam. Allow the flask to cool and note the sucking of water back into the flask. Did the steam drive out all the air? What occurs to the steam as it cools?

(e) Fit a flask with a two-holed stopper; place a funnel in one hole and a glass tube in the other. Close the tube with the finger and fill the funnel with water. Why does the water remain in the funnel? Remove the funnel for an instant and replace it again. Explain the results.[141]

This experiment was clearly quite scientific in nature involving practical work and discussion. Some of the demonstrations were extremely simple and could be set up and explained in a few minutes but were nevertheless important. It was recommended in the programme that for lessons that required preparation, that the pupils should assist the teacher in the preparation and working of the demonstrations and in many cases the pupils should perform the demonstrations themselves under teacher guidance. Any oral instruction in the subject of science required support by specimens and apparatus to be more intelligible to the pupils.[142]

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[141] Department of Education, 'Regulations and Explanatory Notes for the Teaching of Rural Science and Nature Study in Primary Schools.' The Stationary Office, Dublin. .p 6

[142] An Roinn oideachas, Programme of primary Instruction 1926, The Stationary Office, Dublin. P. 8

Even in the science programme the emphasis that was placed on Irish language at this time was evident:

> *'In all schools in which the teacher is qualified, and in which the pupils have attained to a reasonable standard of proficiency in Irish, the subject should be taught through the medium of Irish.'*[143]

When we compare the earlier mentioned numbers of schools in which Rural Science was taken up during the school year 1925-26 to the number of schools in the 1927-28 school year a substantial increase in the number of schools teaching Rural Science can be seen.

The Rural Science course was taught in approximately 420 schools in the school year 1927-1928. In these schools a small school plot was available for demonstration purposes. The Nature Study course for mixed schools and all boys' schools (those without a school plot) was taught in about 580 schools and the Nature course for mixed schools taught under a mistress and all girls' school was being taught in approximately 1,200 schools. 238 outdoor equipment sets were issued to schools during this school year. [144] Therefore 2200 schools were taking Rural Science or Nature Study at this time.

The number of schools taking up Rural Science were increasing due to the following:

1. The output of young teachers each year who had undertaken a two years' course in the subject

[143] Department of Education, 'Regulations and Explanatory Notes for the Teaching of Rural Science and Nature Study in Primary Schools.' The Stationary Office, Dublin. .p 4
[144] Report of the Department of education 1927-28, published by the Stationery Office, Dublin p. 39

2. The appointment of these young trained teachers in Rural Science to schools from which teachers were retiring on pension.[145]

Another reason why the number of schools teaching Rural Science was on an increase was due to the appointment of a substantial number of these young teachers as principals in schools in which the subject is not obligatory or their appointment to schools where the subject had not previously been taught. These young-trained teachers could also hold intensive short courses for teachers already in the service.

> *'An advanced course, conducted entirely in Irish, was being held in the summer of 1928 with the dual purpose of benefiting the work of the teachers concerned in their school and of providing the nucleus of a staff who could conduct or assist in the conduct of any future course that might be held.'*[146]

Table 6.4 [147] shows the number of National Schools in which special fees or grants were paid for instruction for the school year ended 30th June 1928 and the amounts paid within the financial year 1927-28.

[145] Report of the Department of education 1927-28, published by the Stationery Office, Dublin p. 39
[146] Report of the Department of education 1927-28, published by the Stationery Office, Dublin p. 40

Table 6.4. The number of National Schools in which special fees or grants were paid for instruction for the school year ended 30th June 1928

Branch	Number of schools paid Special Fees, etc., for School Year 1927-28	Amount paid (financial Year 1927-28)
		£ s. d.
Mathematics	372	6,194 13 0
Cookery	493	
Laundry Work	162	7,882 13 4
Domestic Economy	7	
Rural Science	86	1,036 1 4[148]

Scholarships from primary schools were given to pupils who were no older than 14 years. Candidates had to answer in the first four subjects of Irish, English, Arithmetic and History/ Geography which were giving 200 marks each. The pupils had to answer in two further subjects of 100 marks each. The subjects offered were Algebra, Geometry, Drawing, Nature Study and Needlework.

Scholarships were still available to primary pupils in 1927. The Nature Study programme for the scholarship exam was based on the primary Schools' Programme for 5th and higher standards.

[147] Report of the Department of education 1927-28, published by the Stationery Office, Dublin p. 120
[148] On the 1st July 1926 Rural Science became an obligatory subject. The teachers who had previously been teaching the subject in the school year 1925-1926 had taught the subject for fees and were permitted to continue doing this. This figure represents these fees paid within the financial school year 1927-28. However it was not to remain this way in following years and these extra fees were withdrawn.

The following is the examination paper set out in 1927 for Syllabus A and C of Nature Study. One hour was allowed for each syllabus. The first five questions answered were the ones that would be marked and all questions were of equal value. It was required wherever possible to use illustrations with answers. [149]

Table 6.5. The 1927 examination paper for Syllabus A of Nature Study

Examination paper for Syllabus A
1. State one distinguishing property of each of the following: - (a) solids; (b) liquids; (c) gases.
2. What are the different states in which water may exist? What causes change from one state to another?
3. What are the chief gases present in ordinary air? What portion of the air supports combustion?
4. State what you know about either the thermometer or the barometer.
5. What do you understand by ventilation? Why is ventilation necessary?
6. Sketch a flower, indicating its different parts.
7. Describe in general terms any plant you have examined.
8. What do you understand by vegetative multiplication? Give one example of vegetative multiplication.

[149] An Roinn Oideachais, Question Papers set at Examination for Scholarships form primary Schools, 1927. The Stationery Office, Dublin.

Table 6.6. The 1927 examination paper for Syllabus A of Nature Study

Examination paper for Syllabus C
1. State one distinguishing property of each of the following: -(a) solids; (b) liquids; (c) gases 2. Name three gases contained in ordinary air? Which one supports life? 3. What is the purpose of a lamp globe? What will happen if a piece of cardboard is placed on top of the globe of a lighted lamp? And why? 4. Which would you prefer for drinking purposes, the water from a deep well or from a shallow pool? And why? 5. Describe any thermometer you have examined. How does it act? 6. Describe with sketches the general structure of any flower you have examined. 7. Describe a natural feature that you have studied such as: - (a) the sea-shore; (b) a wood; (c) a bog; (d) a hill or valley. 8. Describe in general terms the ordinary characteristics of a common plant

By 1929 it was decided that there would be examinations of pupils based on the programme for 6th standard in Primary schools.

> *'The certificate is to testify to the successful completion by the pupil of standard VI Course of the School Programme and will be awarded, as the result of examination, to all pupils who attain a specified qualifying percentage of marks.'*[150]

The only necessary subjects to pass were Irish, English, Mathematics, History, Geography and Needlework (girls). [151]

[150] Report of the Department of Education 1928-29, Stationery Office, Dublin. P. 21

6.5 Inspections in schools

Notices of general inspection were given to teachers and reports written by the divisional inspectors on the work done in primary schools. References were made in most reports to the progress of Rural Science in the schools. Details of the divisional inspectors report in 1927-28 are given below.[152]

Division No. 1:

This division included Donegal, Sligo, Roscommon and portions of Mayo and Leitrim. The inspectors noted Nature Study was not usually taught in this division except in schools where it was obligatory. This was 35% of the schools in one district and 25% in another. The inspectors state that the teachers were earnest workers but that the teaching of this subject often took the form of lectures without any apparatus.

Division No. 2:

This division included Cavan, Monaghan and portions of Leitrim, Meath and Louth. Once again Rural Science and Nature Study were only being taught where conditions demanded it but there were signs that progress was steady and improving.

Division No. 3:

This division included portions of Galway, Westmeath, Roscommon, Mayo and Offaly. Here the inspectors commented on the nature plot. The schools didn't appear to view the cultural influence that beautifully kept surroundings would have on children:

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[151] Report of the Department of Education 1933-34, Stationery Office, Dublin. P. 25

[152] Report of the Department of education 1927-28, published by the stationery office, Dublin p. 23-38

'Flower and shrub culture in school plots are not met with as frequently as might be expected and the front plot and the walks are often left in an untrimmed condition.'[153]

In this division there were few numbers taking up Rural Science with few schools having plots suitable for practical work and little apparatus. Nature Study had generally being re-introduced however.

Division No. 7:

This division included Waterford, Fermoy, Bantry, Dunmanway and Cork. Here Irish was being used in many schools for teaching subjects including Nature Study and with good results. Of Rural Science the inspectors say:

'This subject has been adopted by some schools with great enthusiasm. There are only a few school gardens but they are kept in excellent condition.'[154]

The school year of 1927-28 was the first year that these districts came into being and not all schools were inspected. However it was found from these inspections that there was no deterioration in the schoolwork and that a large number of schools were attempting Rural Science. Table 6.5 displays a summary of the key-points of division inspections.

[153] Report of the Department of education 1927-28, published by the stationery office, Dublin p. 27
[154] Report of the Department of education 1927-28, published by the stationery office, Dublin p. 38

Table 6.7. Summary of key points of Division inspections

Division Inspected	**Inspectors results**
Division No. 1	▪ Nature Study mostly only taught in schools where it was obligatory ▪ Subject was taught without any apparatus and in the form of lectures
Division No. 2:	▪ Nature Study mostly only taught in schools where it was obligatory ▪ Progress was steady and improving
Division No. 3:	▪ The cultural influences on children were not viewed by the schools ▪ Few schools taking up Rural Science due to little apparatus and plots unsuitable for practical work ▪ Nature Study generally being introduced
Division No. 7:	▪ Irish was used in teaching Nature Study in many schools ▪ Only a few school gardens but in excellent condition

The results from the Departments report of the school year 1928-1929 highlight the further increase in the number of schools in which Rural Science was being taught. The Rural Science course was taught in approximately 425 schools in the school year 1928-29. In these schools a small school plot was available for demonstration purposes. The Nature Study course for mixed schools and all boys' schools (those without a school plot) was

taught in about 595 schools and the Nature course for mixed schools taught under a mistress and all girls' school was being taught in approximately 1,230 schools. 64 outdoor equipment sets and 190 indoor equipment sets were issued to schools during this school year. Packets containing 31 varieties of seeds etc. were also issues in small quantity to those schools undertaking the Rural Science programme.

We can further see the progression of Rural Science in the primary classroom by the school year 1932/33. Rural Science or Nature Study was being taught in about 3,273 schools in all. Rural Science was taught in approximately 661 schools and Nature Study in 2,612 schools.[155] As with other years, schools were equipped with indoor and outdoor sets. Packets containing 30 different seeds were again distributed to 415 schools in which Rural Science was being taught.

By the school year 1933-34 a further increase can be seen in the teaching of the subject of Rural Science with a decrease in those teaching Nature Study. Rural Science was taught in 679 schools where there was a school garden or school plot to be used for demonstration purposes. Nature Study was taught in 2,544 schools.[156]

The steady increase in the number of schools since the year 1925 teaching Rural Science in the Primary schools is displayed in Table 6.6. The Nature Study course shows an increase also but with a slight decline in the school year 1933-1934.

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[155] Report of the Department of Education 1932-33, The Stationery Office, Dublin. P. 31
[156] Report of the Department of Education 1933-34, The Stationery Office, Dublin. P. 24

Table 6.8. The number of schools since the year 1925 teaching Rural Science Nature Study

Subject of Rural Science (Nature Study)	School year **1925-1926**	School year **1927-1928**	School year **1928-1929**	School year **1932-1933**	School year **1933-1934**
Rural Science course	400	420	425	661	679
Nature Study course	1,600	1,780	1,825	2,612	2,544
Total number of schools with Science	2000	2,200	2250	3273	3223

Rural Science was being taught in all five training Colleges by 1932. It was also being included in the course for preparatory colleges and could be taken as a subject for Intermediate and Leaving certificate courses in secondary schools from 1928. By 1932 nearly three thousand schools were equipped with practical appliances for teaching this subject and booklets as mentioned issued to teachers for help and guidance. Rural Science had the potential to be a great success. It was an opportunity where primary schools could be directly associated with the ordinary circumstances surrounding pupils' lives. It provided a medium for the establishment of a direct practical connection between abstract and concrete teaching. What Armstrong had envisioned and Heller tried so hard to implement was a method of teaching science that would educate children in many ways and not in an abstract way. The opportunity had arisen again in Rural Science and Nature Study for hands-on education but unfortunately the teaching of the subject had not been effective

mostly owing to the fact that many teachers allowed their teaching lessons to become abstract. As the explanatory notes prepared by the Department say:

> '*Words alone, no matter how appropriately chosen, will not sustain attention or impress the mind of a child in the same way as if they are supported by a material demonstration.*'[157]

6.6 The Revised programme of Instruction, 1934

The programme of Rural Science as an obligatory subject was short lived. A revised programme of Primary Instruction was issued on 1st October 1934. The teaching of Rural Science and its alternative subject, Nature Study, became optional in all schools. [158]

The main reason for the changes in the curriculum was to place greater emphasis on the Irish Language. There were those who criticised the lack of progress in the policy of Gaelicisation.

> *'The lightening of the programme, though the omission of Rural Science (Or Nature Study) as a compulsory subject, and of Mathematics in many schools, as well as the less ambitious scope of the Programme in English, will, it is expected, make for more rapid progress and more effective work in the teaching of Irish and in the development of teaching though Irish.* '[159]

There were also those who argued that there had been a decline in the standards with the amount of obligatory subjects. A Committee on the Inspection of Schools

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[157] cited in Report of the Department of Education 1932-33, The Stationery Office, Dublin. P. 31
[158] Report of the Council of Education 1954. P. 70
[159] Department of Education, Revised Programme of Primary Instruction, 1934. P. 3

addressed this and it recommended the introduction of a Primary Certificate examination[160] based on Irish, English, Mathematics, History and Geography for all sixth class pupils.[161]

The revised curriculum came into immediate effect in 1934 and Rural Science ceased to be a compulsory subject. The teachers and Government agreed that the programme should be limited to essentials.

> *'Rural Science or Nature Study is optional in all Schools. Special readers, in English for the present, are to be prepared for the Senior Standards, dealing with the main features of rural life, two such readers will be prepared, one for Standard V and one for standard VI, or to be used in alternate years in Schools where Standards V and VI are grouped.'*[162]

Once again Rural Science or Nature Study was regarded as an optional subject and could be taught as a school subject inside or outside ordinary school time. With this change in the curriculum came the decline in the number of schools taking Rural Science. However the schools which retained the subject were those who were confident in their teaching of the subject and taught it effectively compared to those schools who dropped the subject due to lack of knowledge and interest. [163]

In the years following the abolition of Rural Science as a compulsory subject, some schools began to introduce it. In the schools year 1935-36 twelve schools ceased to teach the subject and 14 re-introduced it. [164] In the school year 1936-37, thirteen schools

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[160] Primary Certification examination: This examination became compulsory from 1943 onwards and the number of subjects was reduced to Irish, English and arithmetic. It was abolished in 1967.
[161] Bennett. J., Curricula and Primary Education in Ireland, North and South, 1922-1999. Oideas, Government Publications Sale Office, Dublin. 2000. P. 15
[162] Department of Education, Revised Programme of Primary Instruction, 1934. P. 3
[163] Report of The Department of Education1934 –35, Government publications Sale Office, Dublin. P. 27
[164] Report of the Department of Education 1935-36

discontinued while 17 re-introduced it. Equipment that wasn't going to be used in other schools not teaching Rural Science or Nature Study and unlikely to in the future was removed and put in schools teaching the subject. [165]

School Requisites and Rural Science Equipment:

In 1946 Rules and Regulations were sent from the Department of Education to primary schools detailing grants available for new schools teaching the subject of Rural Science or Nature Study. These are displayed in Table 6.7. Each school had to take care of books and apparatus.

Table 6.9. Regulations for primary school grants available to new schools teaching Rural Science or Nature Study.

Average Daily Attendance	Amount of Free Grant		
	(£) pounds	(s.)shillings	(d.)pence
50 or under	4	0	0
51-75	1	10	0
76-100	5	0	0
An additional grant of 10 shillings for each additional 25 units of average attendance			

The outdoor equipment supplied to those schools in which instruction in Rural Science took place was as follows: 5 light spades, 5 light digging forks, 5 hand garden trowels, 5 hand weeding forks, 3 garden hoes, 2 garden rakes and 2 shovels. Indoor

[165] Report of the Department of Education 1936-37

equipment that comprised the essentials for teaching the course of Rural Science or Nature Study was supplied to each school in which instruction in this subject took place. An assorted set of garden seeds was supplied to each of these schools annually. [166]

However, the emphasis in the curriculum in this period was on linguistic and cultural revival and on a literary and moralistic content, leading to a narrowing of the wide curriculum that had been in use from 1900-1922. Little regard was given to the needs, interests or abilities of the individual child in the curriculum while there was strong emphasis placed on didactic teaching and punishment. While there were attempts to keep Science in schools and the actual number of schools taking the subject was static there were still very few schools in the country teaching it. This was due to it being an optional subject and teachers not having sufficient knowledge of the subject area. This was a large move from the teaching beliefs of Armstrong.

6.7 1948-1971: Working towards a child-centred curriculum

In the General Election of 1948, Fianna Fail was defeated and General Richard Mulcahy succeeded as Minister of Education

> *'It was the function of the Minister to watch out for causes of irritation, and having found them to go round with the oil can... he had found no tool as useful as the oil can.'*[167]

Mulcahy could see that the rules for the teaching of Irish placed by the Department of Education were causing difficulties for both teachers and children that they were only

[166] Rules and Regulations for National Schools under the Department of Education, The Stationery Office, Dublin, 1946, p. 27-28

[167] Bennett. J., Curricula and Primary Education in Ireland, North and South, 1922-1999. Oideas, Government Publications Sale Office, Dublin. 2000. P. 15

being implemented in few schools. The introduction of a special programme, An Nái-scoil, for Infant classes on 1st July, 1948 departed somewhat from the hard-line nationalist existing programme.

> *'The purpose of the Infant school is to provide for young children the environment, opportunities and activities most favourable to their full development. Infant teaching, if it is to be successful, must be based on the young child's instinctive urge to play, to talk, to imitate, to manipulate materials, to make and do things.'*[168]

The Revised Infant programme referred to the importance which should be ascribed to the needs and interests of the child.[169] Teachers once again were advised to use heuristic methods, to cater for the individual needs of the children, to reduce the amount of repetitive and mechanical learning and to encourage.

From the teachers' notes of 1948, Nature Study was to be taught in the infant classroom as a series of informal activities. These were to:

> *'Stimulate the child, arouse his curiosity and wonder, interest him in the world around him and make him want to experiment and discover things for himself.'*[170]

In rural schools the children's attention was directed to the seasonal changes and what could be seen during each different season. These included trees, fields, hedges, buds, flowers, leaves, ploughing, sowing, crops as they grow, reaping, haymaking, threshing, potato digging etc. Children in the urban schools did not have the same opportunities and so a school garden was encouraged for digging and planting and failing this, a window box. It

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[168] An Roinn Oideachas, An Nái-Scoil, Dublin, Rialtas na hÉireann, 1951. Introduction, p.3
[169] Department of Education, revised programme for Infants, Stationery Office, Dublin, 1948, p.5.
[170] Department of Education, Notes for Teachers 1948, p. 55

was intended that there would be class visits to the park, the seaside or the country taken each term. Table 6.8 displays a proposed scheme of the nature activities a teacher could deal with during the year depending on the children's' environment.[171]

Table 6.10. Proposed yearly scheme of nature activities

Months	**Proposed scheme of work**
July and August	▪ Trees in leaf: hawthorn, beech, oak, sycamore and Horse-chestnut ▪ The sea-side: sand, water, crabs, jellyfish, seaweed
September and October	▪ Harvesting, bird migration, planting bulbs the fall of the leaves
November and December	▪ Clouds and rain, Hibernation, ploughing
January and February	▪ Frost and snow, evergreens, the robin and the wren, twigs
March and April	▪ The wind, planting seeds, the earlier planted bulbs should be blooming, a school aquarium, birds
May and June	▪ The sun, the garden, the cuckoo, the frog, the butterfly, bees, pollination

In addition to these activities weather charts were to be kept all year round and filled by the children themselves who would take turns daily and the teacher should initiate informal conversation about the weather during these activities.

We can see from the 1956 Programme of Primary Instruction that little had changed in the programme subject matter. Rural Science or Nature Study was still an optional subject. It was decided that this subject area in order to be taught efficiently required a greater amount of practical work unlike other subjects and couldn't be taught adequately without a suitable sized garden and scientific equipment. It was believed to be an

[171] Department of Education, Notes for Teachers 1948, p. 56

impossible subject to teach in a mixed school. Why? Because it demanded a high degree of mental maturity which one sex lacked and was a subject which should be studied at an older age.[172] They didn't believe that Elementary Science was suitable at this age either:

> *'We do not believe that such subjects as book-keeping, business methods, electricity, woodwork, metalwork, leatherwork, agriculture or agriculture science, Elementary Science, biology and botany are suitable subjects for primary school pupils. The successful study of them demands a degree of mental development and power of concentration and, in some cases, of physical dexterity which the average pupil of the primary school is not likely to have reached before the end of Standard VI.'*[173]

The Council Report in 1954 stated that there would no longer be any optional subjects. Their recommendations of the subjects to be adopted as the standard curriculum are given in Table 6.9 below.

Table 6.11. The subjects to be adopted as the standard curriculum in schools from 1954

Standard curriculum subjects[174]	
1. Religious Instruction	7. Physical Training
2. Irish	8. Nature Study
3. English	9. Geography
4. Arithmetic	10. Drawing
5. History	11. Needlework (for girls).
6. Music	

[172] Report of the Council of Education 1954, p. 122
[173] Report of the Council of Education 1954, p. 122
[174] Report of the Council of Education 1954, p. 120

The Council proposed this as they considered that the curriculum mentioned above would meet both minimum and maximum requirements of all schools and also because few schools actually included any of the optional subjects prescribed. By deeming a subject as optional it also suggested that this subject was of less importance. However while there were no longer optional subjects the teachers could use their discretion in different areas. Where a school manager wished to include another subject that was of satisfactory practical and educational value like Domestic Economy or Rural Science in the curriculum in his school, he could substitute such a subject in place of drawing or Nature Study after the approval of the Department. However while these recommendations were quite sound they were never fully implemented. [175]

The syllabus for Rural Science although not taught in many schools remained the same as the 1926 syllabus. The nature and aims of teaching had changed to become more child-centred. The aims of Nature Study were to stimulate the interest of the child and give him a minimum understanding and appreciation of his surroundings. The object of the teaching was to lead children:

1. To love and admire Nature and to appreciate it as the work of God
2. To observe and inquire into their surroundings
3. To be kind to animals and birds
4. To abhor the destruction of plant life and assist in their preservation
5. To use trees and flowers to beautify the home

[175] Oideas 24 1980: Social and Environmental Studies, p. 32

6. To understand the value of food and know the origin of ordinary home-produced foods.[176]

Nature Study was now considered an important subject for the education of pupils:

> *'The highest form of aesthetic training for the child is provided by the study of nature, the divine creation untouched by the hand of man. In it he will find art, music and drama incomparably greater and more beautiful than the most perfect creations of human genius. It is, moreover, the source from which he can draw an ordered idea of the world around him, a world about which he was curious even at an age when he was unable to give expression to his questioning. It gives him an appreciation and understanding of those surroundings in which he moves and acts, trains him to value and admire his immediate neighbourhood, teaches him to observe and to use that power of observation for his further education.'*[177]

It was hoped that half an hour weekly would be allocated to this subject in each of the standards above Standard II.

The programme was to be taught under the following headings: [178]

Standards III-IV

I. Observation and recognition of and kindness to birds and animals

II. Study of local natural features-trees, rivers, lakes, wells, bogs, hills and seashore (where appropriate)

III. Recognition of trees; garden and/or wild flowers, insects and flowers, life story of a butterfly

IV. Seed germination- growing of bulb in water

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[176] Report of the Council of Education 1954, p. 194
[177] Report of the Council of Education 1954, p. 100
[178] Report of the Council of Education 1954, p. 194

Standards V-VI

I. Further development of the course for standards III-IV

II. Plant life: structure and functions of the parts, conditions necessary for plant growth, food storage and multiplication of plants

III. Weather observations

IV. Water

V. Elementary knowledge of the part air plays in burning

VI. Ventilation, effects of breathing bad air

VII. The home: ventilation, cleanliness, beautifying

VIII. Food –value of home produced foods, bread, fruit and vegetables

Practical work was considered important in order to make the subject worth while. The children could take part in the work, collecting specimens of plants, keep a nature chart, take nature walks and record their observations and discuss. Flowerpots were to be on each window to demonstrate the growth and development of plants and flowers. There was no longer any difference made between the course for rural and urban schools. No child was so far removed from rural life that the wonders of nature weren't around them or couldn't be brought to their attention.[179] The emphasis was placed on the child as an individual and the main function of curriculum was to cater for the full and harmonious development of each child.[180] It was unfortunate that not many schools undertook this emphasis.

[179] Report of the Council of Education 1954, p. 198

[180] Bennett. J., Curricula and Primary Education in Ireland, North and South, 1922-1999. Oideas, Government Publications Sale Office, Dublin. 2000. P. 15-16

In their book *The Logic of Education*, Hirst and Peters[181] offer a description in their view of child-centred education.

> *'The teacher should find this situation disturbing, for the staff-room may be divided into factions and generate a constant pressure on him to identify himself with one group or the other. Roughly speaking, he is likely to find the traditional, more tough-minded point of view and the progressive more tender-minded point of view. The former will stress the importance of knowledge and skill, traditional subject divisions and the crucial role of examinations; the latter will protest that learning to learn is more important than the actual acquisition of knowledge, that the curriculum should reflect the child's interests and needs, the traditional subject divisions being artificial impediments to the child's natural curiosity, and that examinations are the elitist device whose main function is to encourage a sense of rejection and failure. The former will favour formal class instruction as a teaching method and will not be averse to using punishment to maintain discipline; whereas the latter will favour group projects and individual activity methods and will regard punishment as an unjustifiable expression of the teacher's sadism[182].'*[183]

Similarly these main characterises of child-centred education can be seen in the Plowden Report in the 1960s. The Plowden Report provided comprehensive answers using reliable information based on school experience and on educational research when critical questions concerning Primary education in England were posed during the 1960s. Like the architects of the 1900 curriculum, this committee visited many schools abroad. The basic summaries of the Plowden Report were that schools had to transmit values and attitudes in the right environment for children. They had to develop at a pace appropriate to them and be allowed to be themselves. The results of the Plowden Report stress individual discovery, creative

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[181] Hirst, P.H., and Peters, R.S. The Logic of Education. Routledge & Kegan Paul, 1970

[182] Sadism: Deliberate cruelty, where some teachers derived pleasure from inflicting pain, suffering or humiliation on pupils.

[183] Hirst & Peters, op.cit., p.1.

work and hands-on experience. Both Plowden and Hirst & Peters mention these main characteristics of a child-centred philosophy of education. One should also not forget the earlier mentioned Armstrong and Heller whose beliefs are also contained in the 1971 curriculum for Irish schools- the belief that children learn best by discovery and activity, catering for individual needs and basing the school curriculum on the pupils' environment. This will be discussed in more detail in Chapter seven where the reasoning behind the need for the new 1971 curriculum, its content and how it was implemented will be analysed.

Chapter 7

1971-1999 curriculum

7.1 Introduction

In this chapter the need for the new 1971 curriculum will be discussed, how the launching of Sputnik influenced new interest in science education and the move towards a more integrated curriculum to aid the full development of each child. The fear that the new integrated teaching methods would not be successfully implemented, as in the 1900 programme will be discussed and how the 1971 curriculum succeeded. This chapter will give detail of the Elementary Science syllabus, the class organisation of progress reports, reading material, preparation, group and individual activities. Finally the implementation of the 1971 curriculum and its success in the primary school will be discussed.

7.2 Why the need for a new curriculum?

Primary education prior to the 1970s had to serve as the sole basis of formal education of a large number of Irish people. A school would equip children as fully as possible to meet the demands of the wider world. To succeed or fail in the wider world was dependent on basic skills such as reading, writing and computation. As seen earlier attempts had been made to widen the programme of instruction and the methods of teaching each subject, however;

> '*The imparting of knowledge by the teacher to his pupils continued to be accepted as one of the main functions of the school. In order to maintain a general standard of efficiency and to create an*

objective yardstick of assessment, the central authority took upon itself the duty of defining a syllabus of instruction in each subject for each class.'[184]

In the 1960s there was a shift in the emphasis on education as being a social expenditure to one of investment on the individual and society as a whole. Along with the economic boom came interest in education, increased contact with the UN, UNESCO and the OEDC. This contact removed the insularity that had characterised Irish education since the 1920s.

'*There was a growing realisation of the need to invest in education for Ireland to compete on an increasingly international stage. Education was perceived as a ladder for social mobility and there were increased aims to attain equality of educational opportunity.*'[185]

Between 17th January 1967 and 28th February 1967 a request for a white paper on Primary Education was made by the Minister of Education, Donagh O' Malley. The White Paper never came to fruition but the section dealing with curriculum became the basis for the draft curriculum drawn up by the Department's Primary Inspectorate.[186] This was put before the various branches of the teaching profession, the staffs of training colleges and other educational representatives on 11th October 1968.

Many asked "why the need for a new curriculum?" In answer to this question the assistant secretary of the Department of Education, Tomás O' Flionn replied:

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[184] Department of Education. (1971) Primary School Curriculum: Teacher's Handbooks (Volume 1). Dublin: The stationery Office.p. 15
[185] Coolahan,J. *Irish Education –History and Structure,* Dublin: Institute of Public Administration. 1981
[186] Bennett. J., Curricula and Primary Education in Ireland, North and South, 1922-1999. Oideas 47, Government Publications Sale Office, Dublin. 2000. P. 16

'In the post World War II period especially, the enormous advances in all branches of knowledge and science and more particularly the result of research into child psychology and the learning process, produced a revolution in the entire educational approach in many countries. Our contacts with the world outside, with the United Nations and the Council of Europe in that period have forced us into a comparison of our more or less static educational system with the dynamic changes which have occurred and which are occurring in the United States, in Britain and in the Western European countries.'[187]

In addition to this, the launching of Sputnik by the Russians in 1957 also influenced the new era in science education. The U.S.A designed a new science curriculum. This curriculum concentrated on updating content and applying the scientific method of teaching which was to avoid mechanical assimilation and memorisation of facts.[188] The influence of the Americans spread to other countries and to Britain. In addition to the influence from the United States there was an increasing awareness in science by other countries like West Germany and the U.S.S.R. The aims of the British curriculum were to develop materials that would enable teachers to present science in a lively, exciting and intelligible way. The new curriculum was to place less emphasis on the teaching of science and more on the learning. Pupils' investigation and experimentation were central parts of lessons. [189]

By the middle of the sixties the emphasis was moving towards an integrated approach to science as earlier projects mentioned involved a high degree of specialisation and fractionation. To introduce these changes, curriculum projects were organised in many

[187] O'Floinn, T. An Múinteoir Náisiúnta, Vol. 14, No. 6, January 1970, p. 5
[188] Pádraig Ó Loingsigh 'Curriculum Development in Science' Oideas, iona Print Ltd., Dublin. 1975. P. 62-63
[189] Pádraig Ó Loingsigh 'Curriculum Development in Science' Oideas, iona Print Ltd., Dublin. 1975. P. 64-65

countries. One such project was started in Ireland in the early 1970s. The Integrated Science Curriculum Innovation Project.[190] It had the following aims:

1. To stimulate the development of the student' natural interests and aptitude.
2. To develop the ability of critical thinking and analysis
3. To provide the student with some understanding of the meaning and nature of science and technology and its relationship to the quality of life in modern society.

The ISCIP course was a second-level course and was carried out in a minority of schools. While a move towards a more integrated curriculum at primary level was successful the move to such an integrated approach at second level was not implemented and thus biology, chemistry and physics have remained as separate components of science at second level.

7.3 The introduction of the 1971 curriculum

It was decided to construct an integrated curriculum, as the traditional method had been to separate the curriculum into different subjects. With this method subjects were treated as if they were completely unrelated to each other did not make sufficient cognizance of the manner in which a child learned. In addition to this the child is not conscious of subject barriers, their thinking can not conveniently be divided into neat subject compartments and so the curriculum was to be seen as an integral whole.[191] The old programme also laid more emphasis on *what* the child learned rather than on *how* he or she was taught and on subject matter rather than the children themselves. [192]

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[190] K. Bridges et al., *I.S.C.I.P.: Irish Science Curriculum Innovation Project*, Compass, October, 1972, pp.18-23

[191] Bennett. J., Curricula and Primary Education in Ireland, North and South, 1922-1999. Oideas, Government Publications Sale Office, Dublin. 2000. P. 16

[192] 'All Our Children' Department of Education, Hely Thom Limited, Dublin. 1969. p.9-10

As Pádraig Ó Loinsigh (1975) stated, there are three sentences that describe science:

1. Science involves enquiry and method;
2. This enquiry results in an evolving body of knowledge and revelation of underlying and unifying patterns of knowledge;
3. This knowledge encompasses man and the environment around him and enables changes to be made in their relationships. Science is a social force therefore.

Good science teaching in his opinion would develop the skills of the pupils and enable them to be active participants in the learning process.

The curriculum was introduced in 1971 after pilot implementation and revisions. This curriculum returned once again to child-centred principles whereas previously:

> *Education was 'curriculum-centred' rather than 'child-centred', and the teacher's function in many cases, was that of a medium through whom knowledge was merely transferred to his pupils.'* [193]

All the aims of The Integrated Science Curriculum Innovation Project were reflected in the 1971 science Curriculum for Primary Schools. The academic year 1972-1973 was a feasibility year, in which organisation and materials were pre-tested prior to setting up a full-scale pilot scheme. An attempt was underway to re-introduce Elementary Science once again into the primary school system in Ireland.

[193] Department of Education. (1971) Primary School Curriculum: Teacher's Handbooks (Volume 1). Dublin: The stationery Office.p. 15

The aims of the 1971 curriculum seen in Table 7.1 were to facilitate the full development of the child and adapt to individual needs and abilities. Subjects were to be taught in an integrated manner and a focus was placed on making school an enjoyable place to be where learning was relevant to the interests of the child. One further important element in the new approach as the white paper on Educational Development (1980, p. 25) put it

> '*The child's environment provides the most congenial ground in which the seeds of knowledge may be sown and its organic growth fostered.*'

Table 7.1. 1971 Department of Education, The aims of Primary education

The aims of primary education (Department of Education. 1971)	
1.	To enable the child to live a full life as a child
Relevant factors to take into account	a) All children are complex human beings with physical, emotional, intellectual and spiritual needs and potentialities b) Because each child is an individual, he deserves to be valued for himself and to be provided with the kind and variety of opportunities towards stimulation and fulfilment which enable him to develop his natural powers at his own rate to his fullest capacity.
2.	To equip him to avail himself of further education so that he may go on to live a full and useful life as an adult in society

With the 1971 curriculum came group and individual learning. Basic skills were not so much acquired through class teaching but through individual and group activity. The children played a more active role in their education displaying more self-reliance, confidence and flexibility of mind when tackling new challenges presented to them.

It had been feared that the different teaching methods might not be successfully implemented as happened in the 1900 programme. However the knowledge and appliance of the group-teaching methods increased significantly due to the training colleges. Credit was given to school authorities that had the courage to adopt the new methods.

In 1967 the Primary Certificate Examination, which all children were obliged to take on completion of their primary course was removed. The 1971 programme hoped that the new curriculum;

> *'Which allows a very wide measure of freedom to both the individual child and the individual teacher, will further advance educational development.'*[194]

The curriculum was separated into two curriculum handbooks. Three new subjects were introduced –Art and Craft, Physical Education and Social and Environmental Studies.[195] Although the Curriculum was to be regarded as an integrated entity, involving linguistic, mathematical and artistic organisation of the child's knowledge and experience, various aspects were arranged under the headings as in Table 7.2.

[194] Department of Education. (1971) Primary School Curriculum: Teacher's Handbooks (Volume 1). Dublin: The stationery Office.p. 17

Table 7.2. Headings of the 1971 Primary Curriculum

Headings of the 1971 Primary Curriculum
▪ Religion
▪ Language (English and Irish)
▪ Mathematics
▪ Social and Environmental Studies
▪ Art and Craft Activities
▪ Music
▪ Physical Education

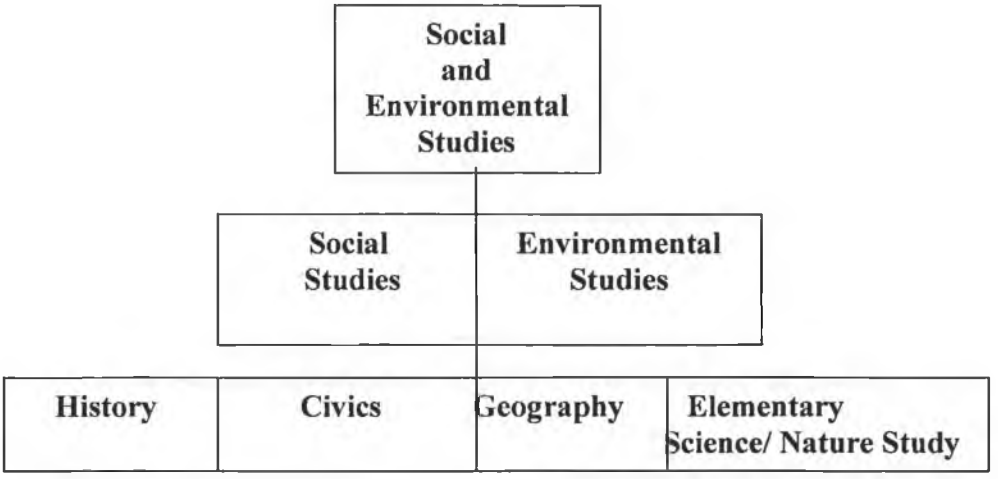
7.4 Social and Environmental Studies

Social and Environmental Studies was primarily concerned with human activity, the child's surroundings and natural phenomena with which they are familiar. The 1971 curriculum states that good education practice is to direct the natural curiosity of children to organise knowledge and form a concept of the environment. A child enjoys exploring his surroundings from infancy and is interested in people and human activity. Children enjoy observing, investigating and collecting and so Social and Environmental Studies is designed to help children in their exploration of the human and surrounding world through guidance in observing, investigating, collecting, discussing and recording. [196] This lead naturally to the study of Elementary Science in the senior classes. History, Civics, Geography and Elementary Science were seen as a natural development of Social and

[195] Bennett. J., Curricula and Primary Education in Ireland, North and South, 1922-1999. Oideas, Government Publications Sale Office, Dublin. 2000. P. 17
[196] 'All Our Children' Department of Education, Hely Thom Limited, Dublin. 1969. p.10

Environmental Studies. This is illustrated as follows by the Department of Education in Figure 7.1. [197]

Figure 7.1. History, Civics, Geography and Elementary Science as a development of Social and Environmental Studies



The study of plant and animal life, natural phenomena and basic science formed the core of the Elementary Science and Nature Study programme. Curriculum guidelines written for teachers came under the general heading of Social and Environmental Studies rather than as a separate subject like history and geography. [198]

> A primary aim of the science curriculum was to:
>
> *'Stimulate and foster in the child an interest in the world around him and to answer in a natural way many of the questions he may ask about things which confront him in everyday life.* '[199]

This was certainly a change from the syllabus-oriented Nature Study/ Rural Science programmes of the 1920's. At this time the approach to the study of nature in the primary

[197] Department of Education. (1971) Primary School Curriculum: Teacher's Handbooks (Volume 2). Dublin: The stationery Office.p. 11
[198] An INTO publicarion, Social and Environmental Studies in Primary Education in Ireland, Current Issues and concerns, P. 21
[199] Department of Education. (1971) Primary School Curriculum: Teacher's Handbooks (Volume 2). Dublin: The stationery Office.p. 11

school was mainly scientific and academic. The emphasis was entirely on the scientific approach with the children participating in experiments and demonstrations, post-mortems on flowers and investigating the structure, development and function of roots, stems, leaves, blossoms and seeds. From a scientific point of view it was admirably logical but yet not scientific enough as sufficient emphasis and attention was not placed on the children and their reactions to the various investigations and experiments. The study of nature was merely memorisation of details and formulas with '*about as much intrinsic interest for children as spellings or tables.*'[200] When Nature Study and Elementary Science were no longer obligatory subjects in the 1940's curriculum, teachers were encouraged to select reading material for their classes that covered health and nature topics.[201] With the 1971 curriculum came freedom, the teachers were free now to devise their own programmes taking into account the environment around them. The whole syllabus in Elementary Science wasn't to be covered but topics were to be selected to reflect pupils' interests and which were interrelated with other areas of the curriculum.[202] This highlights the freedom that the teachers had in choosing their syllabus for each year.

The curriculum states;

> *'The essential basis for much of the knowledge gained must be the child's own observations, and therefore, a wide range of opportunities in provided for activity, exploration and discovery. This will lead to a sharpening of his powers of accurate perception, thinking and recording and gradually a firm basis is laid for intelligent action and independent enquiry.'*[203]

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[200] Oideas 7 'An Approach to Nature Study in the School' by Tim Cromin p. 5 Rialtas na Heireann 1971
[201] INTO Publication. 'Social and Environmental Studies in Primary Education in Ireland'. No. 18/92 Dublin p.3
[202] An INTO publication, Social and Environmental Studies in Primary Education in Ireland, Current Issues and concerns, P. 24
[203] Department of Education. (1971) Primary School Curriculum: Teacher's Handbooks (Volume 2). Dublin: The stationery Office.p. 11-12

The teaching methods had been altered to place much more emphasis on inquiry. Instead of the children just learning the results of investigations, they now did the investigations for themselves. It was quite similar to the 1900 programme though to be more successful this time.

'A feeling of scientific method may develop with experience as problems are recognised, hypotheses set up, experiments worked out, and further inquiries suggested. Interest and enthusiasm increase when the problems being tackled arise from the pupils' own work.'[204]

7. 5 Content and approach of the Social and Environmental Studies Syllabus 1971

The study of animal life, plant life, natural phenomena and basic science form the core of the Nature Study and Elementary Science programme. Illustration 7.1 shows a group of children equipping a lighthouse. Elements of electricity from the Elementary Science programme were required in doing this. Table 7.3 illustrates the Elementary Science programme of the Social and Environmental Studies Syllabus of 1971. One can see from the table that Elementary Science didn't begin until classes V-VI.

Illustration 7.1. Equipping a lighthouse (1971 curriculum)

[204] Schools Council Curriculum Bulletin 3, Changes in School Science teaching , London, Evans bros. Ltd., and Methuen Educational, 1970

Table 7.3. Social and Environmental Studies Syllabus (Department of Education 1971)

Social and Environmental Studies Syllabus (Department of Education 1971)			
Infants	I and II	III and IV	V and VI
1) Human Environment ▪ Home background ▪ School life ▪ Journey to school, people and things ▪ Dangers at home 2) Animal Life ▪ Familiar animals ▪ Bird table ▪ School or class aquarium 3) Plant life ▪ Seasonal changes ▪ Nature table ▪ Indoor gardening 4) Nature walks 5) Language Development and Recording ▪ Nature stories ▪ Recording ▪ Art and craft activities	1) Human Environment ▪ Cultivation of good habits: honesty etc. ▪ Awareness of public signs & notices ▪ People who help us/ machines useful to man 2) Animal Life ▪ Farm animals and birds ▪ Animals, birds and insects of the countryside ▪ Pets 3) Plant life ▪ Seasonal changes and their effects ▪ Trees and wild flowers ▪ Growing plants 4) Nature walks ▪ To farm, woodland, park, seashore, stream 5) Natural Phenomena ▪ Earth, sky, sun, moon, stars, rainbow ▪ Weather 6) Language Development and Recording ▪ Nature stories ▪ Class record charts and nature books ▪ Bark rubbing, leaf pressing ▪ Drawings paintings etc. ▪ Weather chart ▪ Block graphs (pets, weather)	1) Human Environment ▪ Human needs ▪ Rules of the road 2) Animal Life ▪ Animals useful to man, hibernation ▪ Wild birds ▪ Life story of butterfly ▪ Life story of frog 3) Plant life ▪ Plants that provide food, clothing etc ▪ Leaf, fruit and twig collecting 4) Nature expeditions 5) Investigation Table ▪ Use of magnifying glass ▪ Experimenting with mirrors, magnets, electric battery, compass, flints, thermometer, springs and levers 6) Natural Phenomena ▪ The Plough and Pole star, Moon, planets, space, bodies in space ▪ Water, Cold, heat, thermometer ▪ Making a rain gauge, wind rose 7) Language Development and Recording ▪ Individual Nature Books, Diaries and Calendars ▪ Scrapbooks ▪ Project work ▪ Nature stories	1) Human Environment ▪ Conservation 2) Animal Life ▪ Birds and animals in distant countries, fish, sea-mammals 3) Plant life ▪ Parts of a flower, pollination, germination, trees, soils, fertilisers, fungi, bacteria, weeds ▪ School garden ▪ Experiments with germination of seeds 4) Nature expeditions and Natural Phenomena 5) Elementary Science ▪ Air ▪ Water ▪ Heat ▪ Sound and Light ▪ Gravity and levers ▪ Simple experimental study of bicycle pump, vacuum cleaner, flashlight battery. 6) Language Development and Recording ▪ Project work ▪ Records and Nature diaries ▪ Stories and lives of great scientists. Importance of discoveries to man

The following topics could to be selected from additional guidelines under the heading Elementary Science in 5th and 6th classes.[205]

1. **Air:**

Simple experiments were carried out to prove that air exists, that it occupied space and has weight. The principal gases and their importance for plants and animals were studied. The pupils looked at breathing, the oxygen cycle and the necessity for ventilation. Simple experiments were carried out dealing with expansion, burning, rusting, and pressure. The barometer was also used.

2. **Water:**

The different forms of water were looked at, the sources and uses, the importance for animals and plants. Simple experiments solids dissolving in water were tested. Discussions took place based on water being a form of energy, the dangers of water with electricity and household appliances.

3. **Heat:**

Simple examples of conduction, convection, expansion and contraction were discussed in addition to the topic of Heat and light in our homes, Energy from the sun in food, wood, turf, coal, oil, water and insulation.

[205] Department of Education. (1971) Primary School Curriculum: Teacher's Handbooks (Volume 2). Dublin: The stationery Office.p. 58-59

4. **Sound and Light**: telephone, radio, television, and communication satellites. Illustration 7.2 shows a science group investigating light.

5. **Gravity and levers**-simple experiments

6. Simple experimental study of bicycle pump, vacuum cleaner and flashlight battery.

Illustration 7.2. Investigating light (1971 curriculum)

These were the same topics that were covered in the 1920's programme. The topics then were matter, air, water, temperature, soil, plant life, animal life, food, hygiene and temperance. The topics mentioned here that are not covered by the 1971 Elementary Science and Nature Study programme are covered in the Health Education, Civics and geography subjects. Nature Study and Rural Science had been combined as the one subject

since early century. The study of Nature Study naturally encompassed Elementary Science so children were encouraged and inspired to become true seekers of knowledge. [206]

The main emphasis in the programme on Nature Study and Elementary Science was on the study of biology and botany. Guidelines in other aspects of science of physics and chemistry under the heading of Natural Phenomena entailing the solar system, the study of space, water, air, sound, light, gravity, temperature and weather were not as comprehensive as the guidelines provided under botany and biology. It is clearly stated in the Teachers' Handbook that it was not the intention for teachers to cover all aspects of the syllabus in Elementary Science but to select topics to reflect pupils' interests. [207] The content therefore in the 1971 Elementary Science programme was left to individual teachers to devise.

7.6 Class organisation

Social Environmental studies involved class, group and individual activities. The whole class were involved in discussion on informal talks such as seasonal changes, farm work, animals, birds and insects while group work would be used in areas such as recording and carrying out experiments in Elementary Science and project work. Different forms of activities could be taking place at the same time:

> *'One group may be doing some practical work such as setting up a simple circuit using a dry battery, a bulb and two pieces of covered copper wire; another group may be recording the results of investigations made with magnets; while a third group may be consulting simple reference books*

[206] An INTO publication, Social and Environmental Studies in Primary Education in Ireland, Current Issues and concerns, 1989. P. 23
[207] An INTO publication, Social and Environmental Studies in Primary Education in Ireland, Current Issues and concerns, 1989. P. 23-25

dealing with magnetism, light and colour. The groups doing practical work will be encouraged to report their results.'[208]

Individual differences were made through allowing pupils to carry out their own investigations. Pupils were also encouraged to make individual records in diaries and scrapbooks.

Preparation on the part of the class teacher entailed the following as seen in the 1971 Primary Curriculum p. 80-81

1. Acquiring all necessary information from the reading of suitable reference books and textbooks
2. Deciding on the best means of presentation so as to ensure maximum pupil participation
3. First-hand observation of particular aspects of the environment;
4. Collection of equipment such as maps, pictures, charts, and materials for recording and the selection of apparatus for the Investigation Table and for experiments in Elementary Science;
5. Preparation of lesson notes to cover the work being done over a period of a week or two.

Progress records were used to give an effective account of work completed by the pupils over a period. These were the actual recordings made by the pupils themselves. Workbooks were provided in which the pupils recorded information of various aspects of

[208] Department of Education. (1971) Primary School Curriculum: Teacher's Handbooks (Volume 2). Dublin: The stationery Office.p. 80

work.[209] Teachers had to make note of any difficulties experienced by pupils in particular sections of the syllabus. Progress records were used to assist principals in ensuring continuity of work throughout the school and helped avoid unnecessary duplication.

It was hoped that a wide variety of reading materials would be made available to pupils not only for identification of plants and animal life but to check conclusions, to find answers and to help solve problems. Reference books were important in the 1971 curriculum to *supplement* the pupils' observations and discoveries but not exclude practical activities;

> *'Care should be taken, however, least undue emphasis be given to reading to the exclusion of all other activities, such as observations, visits, etc.*[210]

The range of books[211] was to include:

1. Nature:

Birds, Flowers, Insects, Familiar and strange animals; Pamphlets on gardening and on care of pets; Periodicals and books dealing with space travel and the solar system; Biographies of the great scientists.

2. Imaginative reading
3. Poetry
4. Hobbies of particular children

[209] Oideas 24 (1980) Social and Environmental Studies, p. 35
[210] Department of Education. (1971) Primary School Curriculum: Teacher's Handbooks (Volume 2). Dublin: The stationery Office.p. 81

7.7 Implementation of the 1971 curriculum and its success in the primary schools

In order to implement this curriculum in the primary schools, Curriculum centres in every Inspection district were established in 1970/71. The teachers in these centres promoted the principles of the curriculum and assisted teachers from other schools who visited the centres. In-service courses were organised by the Department of Education at Maynooth College from 1972 to 1975. Teachers from every county were there at residential courses, which lasted for three two-week periods at first. From 1977 the Department of Education ran summer courses on a regular basis at various centres throughout the country. A special sub-committee of Inspectors from the Primary Branch of the Department was set up by the Audio-visual Aids Section to provide filmstrips and notes for teachers on the different aspects of Social and Environmental Studies. These strips provided material, which pertained with the surrounding Irish environment, e.g. Trees of Ireland, Birds of Ireland, Wild Flowers, Irish Mammals, Our Natural Environment etc. Nature calendars, charts and pictures were produced and reference and workbooks produced by Irish Publishers.[212]

The success of the Social and Environmental programme of the 1971 curriculum was measured in various surveys carried out by the INTO (1985), An Roinn Oideachais (1983), The Conference of Primary Teaching Sisters and the Review Body on the Primary Curriculum. From these surveys there came an increased heightened awareness of the importance of Social and Environmental Studies in the curriculum in the schools.[213] According to the surveys carried out, Nature Study was quite successfully being taught in

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[211] Department of Education. (1971) Primary School Curriculum: Teacher's Handbooks (Volume 2). Dublin: The stationery Office.p. 81-82

[212] Oideas 24 (1980), Social and Environmental Studies. P. 32-35

[213] An INTO Publication: Social and Environmental Studies in primary Education in Ireland, Current Issues and concerns, 1989. P.6

schools. 87% of teachers were surveyed and they were reported having a nature table in their classrooms. However, only half of the respondents taught Elementary Science in their programmes and only 31% had pupils undertaking simple scientific experiments. [214]

From these surveys it is evident that teachers needed a clear understanding and working knowledge of science and scientific investigation, they also required guidelines, in-service education and adequate materials and resources in order to implement the Elementary Science aspect of the Social and Environmental Studies programme successfully. With the lack of Guidelines and the small amount of in-service in the teaching of science it resulted in a concentration on Nature Study in the primary school. Skills of observation, recording, identification and investigation may have been developed but the children had not been engaged in a scientific approach.[215] The Review Body recommended after these surveys that the then existing Nature Study and Elementary Science programme i.e. the Social and Environmental Studies programme, be reformed and integrated to create a new science programme.

These recommendations were to be undertaken in 1999 after a detailed review of the 1971 curriculum. This will be discussed further in the next chapter along with the detailed structure and content of the revised 1999 curriculum.

[214] An INTO Publication: Social and Environmental Studies in primary Education in Ireland, Current Issues and concerns, 1989. P.25
[215] An INTO publication, Social and Environmental Studies in Primary Education in Ireland, Current Issues and concerns, 1989. P. 24

Chapter 8

The 1999 Curriculum

8.1 Introduction

In this chapter an outline will be given on the reasoning behind the review of the 1971 curriculum and the implications of the results to revise its aims, scope and content. The chapter will detail the revised 1999 curriculum, its activity and discovery methods continued from the 1971 curriculum and the content. Skills developed through working scientifically will be discussed as will the science of design and make which is to encourage imaginative and creative aspects of the scientific process. Finally teacher organisation in planning units of work, assessing pupils, recording lessons and the use of ICT in science will be analysed.

8.2 The review of the 1971 curriculum

The introduction of the Primary Curriculum in 1971 was simply the start of a process to reform primary education. The recommendations of the review body on the primary curriculum that the 1971 Nature Study and Elementary Science programme be reformed and integrated to create a new science programme were to be undertaken in later years. The authors of the 1971 Primary School Curriculum emphasised that the changes proposed were neither final nor definitive and that further research and regular evaluation would be necessary to keep the curriculum up to date with the changing conditions.[216] In 1986 the Fianna Fail election manifesto contained a commitment that the 1971 Primary School

[216] Department of Education, Primary School Curriculum, 1999. p.20

Curriculum would be reviewed. The National Council for Curriculum and Assessment (NCCA) was established in 1987 and it was to focus on primary and secondary curricula and assessment. The then Minister for Education, Mary O' Rourke appointed a Review Body on the primary Curriculum. The Review Body on the Primary Curriculum was set up in October 1987 and reported in May 1990. [217] The INTO survey saw a percentage drop from 85.5% in the 1975 INTO survey who agreed that an integrated curriculum was more meaningful to 55% in the 1986 survey. It was believed that an over dependence on textbooks was a contributing factor to this.[218] Integration in Social and Environmental Studies and the broader curriculum should be a natural element of the curriculum and it wasn't being achieved. It was concluded that the curriculum needed revision and reformation in its aims, scope and content. [219]

8.3 The introduction of the 1999 Curriculum

In 1991, the NCCA were invited by the Minister of Education to review the primary curriculum, which was published on 9th September 1999. The curriculum areas are language (comprising Irish and English), mathematics, Social Environmental and Scientific Education (SESE comprising History, Geography and Science), Arts Education (comprising Visual Arts, Music and Drama) Physical Education, Social Personal and Health Education and Religious Education. [220]

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[217] Primary Review (Information Bulletin), Published by the Review Body on the primary Curriculum, Dublin, November 1987

[218] An INTO Publication: Social and Environmental Studies in primary Education in Ireland, Current Issues and concerns, 1989. P.49

[219] Primary Curriculum Review Body, report of the Review Body on the Primary Curriculum , Dublin Stationery Office, 1990, pp 97-100

[220] Bennett. J., Curricula and Primary Education in Ireland, North and South, 1922-1999. Oideas, Government Publications Sale Office, Dublin. 2000. P. 18

The 1999 Primary School Curriculum celebrates the individuality of each child and aims to cater for his or her needs from day to day. The overall vision of the curriculum is to enable the children to meet the demands of life both now and in the future with self-confidence and assurance.[221] There are basically three aims of this curriculum;[222]

1. To enable the child to realise he/she is unique and live their full life as a child;
2. To enable the child to develop socially with others and contribute to the good of society;
3. To prepare the child for future learning and education.

A key principle of the curriculum that continued from the 1971 curriculum is the importance of activity and discovery methods. Another two principles from the previous curriculum are environment-based learning and an integrated curriculum. These principles have been expanded to the following:[223]

1. The child's sense of wonder and natural curiosity is a primary factor in learning;
2. The child is active in his or her learning;
3. The child's existing knowledge and experience form a basis for learning;
4. The context for learning is provided by the child's immediate environment;
5. Learning is to involve guided activity and discovery methods.

All of the above are echoes of Armstrong's' beliefs in the teaching of Science. The heuristic methods of letting the child discover under guidance.

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[221] Primary School Curriculum Introduction, The Stationery Office, Dublin 1999. P. 6
[222] Primary School Curriculum Introduction, The Stationery Office, Dublin 1999. P. 7
[223] Primary School Curriculum Introduction, The Stationery Office, Dublin 1999. P. 8-9

There are two books assigned by the Government for the teaching of Science in the Primary School Curriculum. One book is the Primary School Science Curriculum 1999 and it contains the content of the science programme for each class level. The second book is the Primary Curriculum Science Teacher Guidelines 1999 which gives teachers' guidelines to the teaching of the subject.

Science is concerned with a knowledge and understanding of the world. It is one of the key issues in primary Education today alongside quality, literacy and numeracy, a sense of Irish identify, the Irish Language, the Spiritual dimension, The European and Global dimensions, partnership, ICT, Equality and fairness of access, children with special needs, early children hood education, transition from primary to post-primary and lifelong learning.[224] A broad and balanced range of skills and knowledge is provided by the science curriculum.

> *'A basic understanding of scientific principles and the scientific explanation of natural phenomena, together with an appreciation of the process of designing and making, can make a significant contribution to children's understanding of the world. The curriculum provides a foundation of knowledge and concepts in the domains of physics, chemistry, biology and botany and seeks to foster an appreciation of scientific methods and a facility in using them.'*[225]

8.4 SESE: Science Curriculum

The development of children's ideas is central to science education. [226]It is emphasised in the curriculum to begin with the children's initial ideas in order to develop and modify

[224] Primary School Curriculum, Introduction, The Stationery Office, Dublin, 1999.p26-31
[225] Primary School Curriculum, Introduction, The Stationery Office, Dublin, 1999.p.29
[226] Primary School Curriculum, Science. The Stationery Office, Dublin 1999. p. 7

them to gain more scientific understanding.[227] The curriculum is presented in two sections: a content section and a skills section. Each of these will now be discussed.

8.4.1 Content

Four main strands are detailed in the curriculum due to their relevance to children's immediate everyday experiences and they reflect on major areas of scientific investigations. These are displayed in Table 8.1.

Table 8.1. Strands and strand units of the 1999 Primary Science curriculum

Strands	**Infant classes Strand units**	**1st and 2nd classes strand units**	**3rd and 4th classes strand units**	**5th and 6th classes strand units**
Living things	-Myself -Plants and animals	-Myself -Plants and animals	-Human life -Plants and animals	-Human life -Plants and animals
Energy and forces	-Light -Sound -Heat -Magnetism and electricity -Forces	-Light -Sound -Heat -Magnetism and electricity -Forces	Light -Sound -Heat -Magnetism and electricity -Forces	Light -Sound -Heat -Magnetism and electricity -Forces
Materials	-Properties and characteristics of materials -Materials and change	-Properties and characteristics of materials -Materials and change	-Properties and characteristics of materials -Materials and change	-Properties and characteristics of materials -Materials and change
Environmental awareness and care	-Caring for my locality	-Caring for my locality	-Environmental awareness -Science and the environment -Caring for my locality	-Environmental awareness -Science and the environment -Caring for my locality

A continuous programme is carried out throughout the primary school under the same topic headings with some additional areas being added in the older classes. With a topic being

[227] Primary School Curriculum, Introduction, The Stationery Office, Dublin, 1999.p.51

covered from early years in the school, the child can build upon their knowledge from the previous years.

Living Things:

The major themes covered in this strand include living organisms (animals and plants), the life processes of nutrition, growth and reproduction of plants and animals and the structure and function of the human body.

Energy and forces:

The children should be able to identify forms of energy such as light, sound, heat and electricity. In infant and junior classes the children will develop an understanding of forces. This involves pushing and pulling, floating and sinking. In the middle and senior classes the pupils will investigate friction on a solid surface and then become aware that friction exists between a moving solid and a liquid and between a solid and a gas. Falling objects are another feature of work to be investigated, a result of the force of gravity.

Materials:

Materials such as food, metal, rocks, plastic, glass, wood, paper and textiles will be introduced to children in infant and junior classes. The children should become aware that each materials has its own properties and this will be realised through design and make activities and through the investigation of materials. By middle and senior classes children will group materials according to how they are used in the environment and be aware that some materials occur naturally like wood, sand and water while others are manufactured.

Environmental awareness and care:

This strand is integrated with many of the aims of the geography curriculum. In the infant and junior classrooms the children will be focusing on the one strand unit 'Caring for my locality' and become aware of the natural features to be found in the environment and what their functions are for plants and animals. Care for our surroundings are encouraged and this begins in the classroom with simple activities like caring for plants and animals, keeping the classroom and schoolyard tidy.

A second strand unit of 'Environmental awareness' is introduced in the middle and senior classes whereby the children study environments in Ireland and different parts of the world and examine the interdependence and systems that exist there. They will develop an understanding of plants and animals in the environment and the relationships between them and that the ecosystem is made up of other species and non-living surroundings.

8.4.2 Skills

The science curriculum supports children in working scientifically and in developing designing and making skills.

One of the main features of this science curriculum is the emphasis on the development of scientific skills such as the skills developed when working scientifically: [228]

- Questioning
- Observing
- Predicting

- Investigating and experimenting
- Estimating and measuring
- Analysing
- Sorting and classifying
- Recognising patterns
- Interpreting
- Recording and communicating

These skills are developed as work is completed on the strands and strand units laid out in the curriculum. Science is a subject where pupils can develop these skills through observations, hypothesising, predicting and carrying out investigations, planning fair tests and analysing the results of the tests and investigations. This is called the scientific approach.[229] In order to develop cognitively these skills are crucial to children's development. Through hands-on investigations young children learn science and this equips them to provide their own answers to problems.

It is intended that the children will be provided with an understanding of technological process through developing their 'designing and make' skills. It is hoped that this section will help develop the skills and attitudes required for undertaking practical tasks. Designing and making encourages the imaginative and creative aspects of the scientific process. Skills[230] of

i. Exploring
ii. Planning

[228] Primary School Curriculum, Science. The Stationery Office, Dublin 1999. P. 73
[229] Primary School Curriculum, Science Teacher Guidelines, The Stationery Office, Dublin 1999. p. 2
[230] Primary School Curriculum, Science Teacher Guidelines, The Stationery Office, Dublin 1999. p. 21,22

iii. Designing and making enable children to apply their scientific knowledge and understanding to devise a method, carrying it out practically and

iv. Evaluating the final result.

How each skill is developed within the curriculum is given below.

i. Exploring:

From infant to second class children will handle and manipulate materials. Through this they will develop an understanding of how materials are used in making objects. The pupils will make various models using Duplo, building blocks, plastic straws and many other materials. They will explore how structures can be changed by the use of different colours, textures, shape and choice of material. An important aspect of this work is discussion. In middle and senior classes children design and make models of their own choice taking into consideration how structures can be improved and adapted. The children freely explore materials, objects and construction toy models and kits.

ii. Planning:

The children are encouraged to work in groups and share ideas at all class levels. In the infant to first and second classes the children make simple drawings and plan choice of materials with the guidance of the teacher. In third and fourth and in fifth and sixth classes the children will assess designs and undertake different design proposals through discussion.

iii. Making

This part of the design and make process involves the children in making the product. Skills such as cutting, joining, fastening, weaving and linking are important here. The range of tools is limited in the junior classes but in senior classes a more diverse range of materials is provided such as wood and plastic and a wider range of tools.

iv. Evaluating:

Through evaluating models, solutions to practical problems can be discussed. Children should suggest other ideas for designs and be encouraged to try these other proposals. Designing and making involves pupils using and applying these scientific skills and knowledge to practical tasks. As the Primary Curriculum introduction (1999 p. 51) states of design and make:

> *"Through investigating a range of topics, and through solving open-ended problems in familiar contexts, children's practical, aesthetic and imaginative capacities, sensitivity to design and awareness of scientific ideas and concepts are fostered".*

The teachers are actively involved in encouraging the children to make models. They can use their knowledge and skills to help children by asking questions as laid out in the science teacher guidelines (1999. P. 133), such as:

Why is this object used?

Why has it been made this way?

Are these objects always made from the same materials?

Can other materials be used to make these objects?

Have these objects always been made in this way?

If not, why not? If yes, why?

The science curriculum of 1999 is a subject that can be learnt through guided activity and discovery. It is important that while doing this that the children experience a variety of classroom organisational frameworks as working collaboratively provides learning opportunities with many advantages. '*Working as the child's partner is a useful way of building their confidence and installing good practice*' (Janet Bailey, 2002. p. 20). Collaborative learning in science facilitates the children's social and personal development while exposing them to perceptions of other children. [231]

8.5 Teacher organisation in teaching science

All science lessons are usually recorded in one form or another, posters, copy, activity sheets, colouring in, word searches, cloze exercises etc. As previously with Armstrong, it is encouraged that science lessons are not work card or textbook based. Books can be used during science lessons to support investigative work or teachers can select various activities from books to assist children undertaking open-ended tasks. [232]

Assessment is an integral part of teaching and learning science. Through assessment one can indicate areas of difficulty encountered by the child. It can assist in planning and supporting future learning for the pupils. Assessment in science can take the form of [233]

- Teacher observation

[231] Primary School Curriculum introduction , The Stationery Office, Dublin 1999. p. 17
[232] Primary school Curriculum , Science teacher guidelines, The Stationery Office, Dublin 1999. p. 27
[233] Primary school curriculum, Science, The Stationery Office, Dublin 1999. p. 99-107

- Teacher-designed tasks and tests
- Concept mapping:

  Concept maps are where a list of concept words that are known to the children are drawn up and the children are asked to draw lines and write joining words between the different concept words
- Work samples, portfolios and projects
- Curriculum profiles

  These profiles consist of descriptions of the range of knowledge, skills and attitudes that may be expected of children at certain stages of development.

From the many resources that are now available in schools it is hoped by the Department of Education that information and communication technologies will be used as a resource in teaching and learning about science. ICT can be used in the following ways:

1. Interactive programmes based on scientific topics.
2. The internet to assess a range of sources of scientific and technological information.
3. The Internet to share projects and investigations with other schools.
4. Sensors attached to computer can detect and measure temperature, light, sound, position, humidity or pressure and display the data on screen.
5. Word-processing and drawing programmes as a means of communicating and presenting scientific information and findings.

Wynne Harlen and Anne Qualter say of ICT in the teaching of science in primary schools

'There is an increasing role for ICT in the provision of continuing professional development for teachers. Used well it promises to support learning, planning and the sharing of ideas.'[234]

When planning a unit of work teachers are expected to:[235]

1. Be aware of the children's past learning experiences;
2. Select from the strands and strand units outlined in the school plan for science and in the curriculum;
3. Clarify and identify the detailed content that is to be covered in the unit of work;
4. Identify the learning outcomes to be achieved;
5. Specify the methods of assessment to be used;
6. Outline the science activities that the children will undertake;
7. Consider the teaching approaches that can be employed;
8. Provide for individual differences;
9. Identify the resources required for the topic and the equipment in the school;
10. Plan for the communication and recordings of work and findings.

The 1999 Science Curriculum Teacher Guidelines are an excellent resource which teachers can use to aid in teacher's planning, planning a unit of work and integrated learning in all strand areas of the curriculum. Forty-five detailed exemplars are laid out based on the various strands and also in 'design and make'.

[234] Harlen, W. and Qualter, A., The Teaching of Science in primary Schools, David Fulton publishers, London, 2004. P. 231
[235] Primary School Curriculum, Science, The Stationery Office, Dublin 1999. p. 36, 37

Through following this scheme of work teachers aren't provided with the same freedom as they had when teaching under the 1971 curriculum. Then it was clearly stated in the Teachers' Handbook that it was not the intention for teachers to cover *all* aspects of the syllabus in Elementary Science but to select topics to reflect pupils' interests. [236] The content therefore in the 1971 Elementary Science programme was left to individual teachers to devise. However, under the 1999 curriculum it is intended that by experiencing topics from each strand every year that by the end of a two-year period all strand units from each strand should be covered. [237] Through doing this with adequate materials and resources, and an understanding and working knowledge of science and of scientific investigation from in-service education it is hoped that the 1999 curriculum will be successful in implementing Elementary Science in the primary school programme.

8.6 Current Status

National in-service for SESE science took place in the 2002/2003 school year. This was followed by formal implementation of the Science Curriculum by teachers in primary schools in 2003/2004. The Primary Curriculum Support Programme (PCSP) provides the Cuiditheoireacht service, which continues to support teachers and principals in the implementation of science. Cuiditheoirí operate at local and regional levels in co-operation with the Education Centre Network and provide school visits, drop-in sessions and afternoon/ evening workshops in Education Centres countrywide. In the 2006/2007 school

[236] An INTO publication, Social and Environmental Studies in Primary Education in Ireland, Current Issues and concerns, 1989, P. 23-25
[237] Primary School Curriculum, Science Teacher Guidelines, The Stationery Office, Dublin 1999. p. 28

year, a day of national in-service on integration through SESE (History, Geography and Science) was provided for teachers. [238]

Chapter nine will provide further details about science education in Irish classrooms from interviews of primary teachers. These interviews will help give a clear insight into the reality of science teaching during the 1900s.

[238] Regional Curriculum Support Service (RCSS) http://www.pcsp.ie/html/cuid.php 19/08/06

Chapter 9

Teacher interviews and results

9.1 Introduction

The history of Science education from the late 1800s in the Irish classroom has been detailed in the previous chapters. This chapter provides details on the interviews of various Irish Primary school teachers, on what it was like for teachers implementing the teaching of science. Interviews were used as a data collection method rather than any other format as an interview can be adapted to elicit more information from a participant on any particular aspect. These interviews were a further method used in researching the issue of science in primary education since the late 1800s. The researcher choose to interview teachers who have been teaching for different lengths of time to help gain an insight into the reality of science teaching in the classrooms during the 1900s.

The following information on the interviews is presented in this chapter: Interview techniques, information on the participants and procedures, the development of the interview questions and the results found from the interviews of Retired Primary school teachers, currently teaching experienced primary school teachers and recently qualified primary school teachers.

For the purpose of confidentiality the teachers will be referred to as teacher 1, teacher 2 etc.

9.2 Interview techniques

Interviews were used as the primary method to obtain information from the teachers in association with science in the primary classroom. Convergent interviewing was used as

one method of data collection as, according to Dick (2002), it is a research technique that is systematic enough that it can be described easily, but flexible enough that it can be used in difficult situations. Dick (2002) suggested that in making out an interview one should interview ones self first. The following four features of interviewing respond well to practise, according to Dick (2002).

- Building rapport through giving the informant all of your attention;
- Keeping the informant talking by using a variety of natural 'minimal encourages'; nod, smile, say 'Mmhmm', Pause, look expectant/ repeat their last word or phrase with a questioning intonation/ say 'Tell me more'/ 'You mentioned' etc.
- Taking key word notes without losing eye contact;
- Devising probe questions.

Five stages in interviews are outlined in Dick (2002) Action Research and Evaluation on line: Convergent Interviewing, and these were implemented in the current interviews

1. **Rapport:** who I am, what I am doing, who gets given any information, what the purpose of the interview was
2. **Ask the opening question.** According to McCracken (1988) the opening question defines the general area without being more specific. It is a question that is almost free of content. E.g. I am interested in …What do you like and what do you dislike about…?
3. **Keeping the teachers talking:** using 'minimal encourages' as mentioned above
4. **Probe questions**
5. **Summary**: The teachers were asked at the end to give a summary of what they think about what they have mentioned. All of the participants were then thanked and the results of the interview were written up while it is still fresh.

The aim of the researcher in the interviews was to develop empathy with the interviewees and win their confidence, to be unobtrusive, in order not to impose influence on the interviewee. The technique used was a semi-structured interview as suggested by Drever (1995). Ideas were formed about the topics of the interview as outlined in Dick (2002). Bell (1999 p139) issues caution when conducting interviews.

> *"There is always the danger of bias creeping into interviews, as Selltiz et al. (1962:583) points out, 'interviewers are human beings and not machines', and their manner may have an effect on the respondents."*

The aim of the researcher was to appear natural, not someone with a special role but one, who engages with interviewees on a person to person basis. Here leading questions would be avoided and allow more scope for open-ended answers. Some predetermined questions were decided however e.g. if science was in the classrooms, when and in what way. The aim with a semi-structured interview was to have some pre-set questions but allow more scope for open-ended answers.

9.3 Methodology

Eleven teachers who had taught or were currently teaching in the local area were recruited to participate in this study. Teachers who met the following criteria were selected:

a) Retired Primary school teachers (RT),

b) Currently teaching experienced primary school teachers (CT) who have been teaching at least ten years and more, and

c) Recently qualified primary school teachers (RQT) trained under the 1999 curriculum and teaching less than four years.

The teachers interviewed consisted of **five** Retired Primary school teachers, **three** currently teaching experienced primary school teachers and **three** recently qualified primary school teachers.

Data collection procedures included the recruitment of participants, developing interview questions and the undertaking and recordings of these interviews. The primary method for recruiting participants was through the assistance of principals, the investigator's colleagues, and personal contacts.

A consent letter was first sent to teachers, explaining the nature of the research project on science in Primary school education and requesting their assistance. In this letter teachers were assures of confidentiality as suggested by Hannon (2004).[239] On receiving his or her consent, dates and times were agreed for interview to suit each teacher. Interviews commenced in March 2006 and concluded in June 2006. Most of the interviews took place in the home of the interviewed teacher. According to Hannan (2004 p. 4) one needs to consider the different situations to hold an interview in, as they can affect ones perspectives - such as the formal circumstances of a teacher's classroom, the informal ambience of a pub or the personal stronghold of home. Other interviews took place in St. Mary's N.S, in the investigator's school, after school with the consent of the Principal. Open questioning was used in the majority of questions in the interview to elicit information from the teachers in regard to science in the classroom. The interviews differed as each teacher had different experiences depending on their age and classes taught. While

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[239] Hannon, A. Interviews in Education research, Faculty of Education of Plymouth, 2004. p. 5

interviewing fellow teachers, the teachers were either eager to help or hesitant. Care had to be taken not to ask questions in such a way that would lead respondents into providing confirmation of researcher's own views rather than eliciting theirs. The following are examples of questions put to the teachers in their interviews.

- What subjects were you taught at school as a pupil?
- Do you remember if you were taught science in Primary school or taken for nature walks as a pupil?
- Did you ever carry out any experiments in your classroom as a pupil? Did you construct anything? Study electricity, light, sound, materials etc.
- As a pupil did you ever see any science equipment in primary school? How was this equipment used?
- Did you receive training of any sort in science? Was science a subject you had in training college?
- Were you prepared on how to teach the science topics in training college? How were you prepared?
- What did a science lecture in training college entail? How often did you have science lectures/ workshops?
- How long have you been teaching?
- What are the subjects you teach with your class?
- As a teacher do you ever take your pupils for nature walks?
- What topics do you teach in Science?
- Which topics are favourites with your pupils and why?
- In Materials for example, what sort of lessons have you taught?

- What is your attitude to science as a subject in primary schools? How do/did you feel teaching this subject?

Each interview took approximately twenty to thirty minutes. Each teacher signed a consent form and attended the interviews. The decision was to record the interviews with the permission of the interviewees. Reliance wasn't placed on the tape recorder alone in case of the batteries going flat, the volume being too low or not switched on properly and so various notes were written while the interview was taking place. Through having both tape and notes when transcribing it was less time consuming as the researcher could listen for specific areas.

9.4 Results

Details on the teachers interviewed will be given before the results of the interviews. The results will each be given under three areas of a) their experience of science as a student in school, b) Experience of science in training college and c) experience of teaching science now and in the past.

The three recently qualified teachers were the first to be interviewed. They each were trained in different training colleges and are currently teaching in Co. Donegal. Table 9.1 shows some details on the Recently Qualified Teachers.

Table 9.1 Information on Recently Qualified Teachers interviewed

Teacher	Sex	No. of years teaching
RQT1	Female	3
RQT2	Male	2
RQT3	Female	4

Following the interviews of the recently qualified teachers, five retired teachers were interviewed. All five teachers taught in various schools in Inishowen, Co. Donegal, the most northerly peninsula of Ireland. Table 9.2 shows what years these teachers were teaching and how long they have been retired. RT1 had to stop teaching in 1956 as she got married. The law at this time was that female teachers had to stop teaching once they got married. This law was abolished in 1958 and RT1 returned to teaching in 1960. RT2 took a break in 1971 before returning to teaching in 1975 as a principal.

Table 9.2 Information on the Retired Teachers interviewed

Teacher	Sex	Years teaching	No. of years retired
RT1	Female	1948-1956 1960-1980 Taught 32 years	26
RT2	Male	1956-1971 1975-1997 Taught 38 years	9
RT3	Male	1952-1992 Taught 40 years	19
RT4	Male	1946-1987 Taught 41 years	26

Finally three currently teaching experienced primary school teachers with experience of both the 1971 and 1999 curricula were then interviewed. The teachers are currently teaching in Inishowen, Co. Donegal in different schools though have had experience teaching in other parts of the country. Table 9.4 gives further detail on the teachers interviewed.

Table 9.3. Information on the currently teaching experienced teachers interviewed

Teacher	Sex	No. of years teaching
CT1	Female	20
CT2	Female	11
CT3	Male	21

9.4.1 Teachers experience of science as a student in school

Recently qualified teachers interviewed

All three of the recently qualified teachers interviewed were in primary school in the 1980s and never realised that science was a subject that was in the 1971 curriculum. The researcher questioned the teachers on their memories of being taught science as pupils when in primary school. Only RQT 1 had memories of science being taught in her school.

> *"I think the boys in school did some Nature Study while we (girls) were taught singing and sewing. It wasn't experimental science with test tubes just talking about nature and birds. Our master was all into birds and brock watching"!*

Retired teachers interviewed

RT3 never taught science or cared for a school garden when he taught but he gave me an insight into schools in the 1920s when his father was a teacher.

> *"There was a garden but it was just wild! When my father was teaching he wanted us to know how to grow trees, crops and getting things to grow. It was very important then for boys to learn how to cultivate potatoes and carrots."*

Many of the other RT interviewed could remember back to their primary school days and what was taught. The school garden seemed to be of big importance and they were taught how to look after and cultivate plants. As RT recalled from nature lessons as a boy:

> *"Anyone who was to grow fruit trees for example, apple trees, wouldn't have access to a nursery to buy them there but they might have another plant like a tree or something and the base of this would provide the food for the new plant. We would cut it across about three feet up from the ground and then slice a little bit down through the stem. It was very important that we would keep the outer skin of the tree in line with the outer skin of the new plant we were putting in."*

RT2 spoke of it being a common thing for school to have a plot of ground in the 1920s and 30s.

> *"In the earlier days when my father was teaching it was common to have a plot of ground. This was for gardening and if it had any official name it was Rural Science... In Cockhill school where I went to teach there was a plot of ground at the back of the school. It was well trampled down in my time but it used to be a garden for the pupils. Well not for the girls, they did sewing and the boys worked in the garden. The boys would dig up the ground and plant it. This would have been done in schools in the 30s but I never heard it been done anywhere in the 50s."*

Other RT's could remember seeing science equipment in the schools when they were pupils. RT3 mentioned

> *"I was in primary school in the 1930s and I remember seeing science equipment in the Infants room in a glass cupboard. Weighing scales, test tubes in all different sizes but we never used them and I never seen them used with any other class."*

The previous RT had mentioned similar information;

> *"Then when I went out to teach there was some science equipment there which my predecessors must have used. There was a scales set and a set of weights, but they were falling to bits at this stage so there must have been some form of science been done. I found a beaker in a cupboard too and some test tubes."*

From these interviews we can understand that science was taught in some schools, as was the care of the school garden in the 1920s and 1930s.

From these interviews it is clear that science was being taught in some schools around the 1920s and 1930s with evidence of scientific equipment and care of the school gardens.

Current teaching experienced teachers

All of the current teaching experienced teachers had little to say on their memories of science or nature being taught in their schools when young. CT2 and CT3 remember a few nature walks. CT3 had detailed nature walks and learned a lot about the different trees, their fruits and flowers. She also remembers nature walks in the woods, up in the hills and also at the shore. On questioning CT1 about her memories on science in primary school and Nature Study she replied;

"The most we got doing in relation to nature and outside was that if it was a sunny day we had the tables and chairs outside. We never did any fun stuff. As far as I can see from teaching the last 20 years is that science came with the new 1999 curriculum."

9.4.2 Experience of science in training college

Recently qualified teachers interviewed

All aspects of the science curriculum are now being studied at training colleges with the introduction of the 1999 curriculum. All of the recently trained teachers studied primary science at training college under the 1999 curriculum in a way that teachers are expected to teach science to get the best from pupils. RT1 spoke of her science training;

> *"We were trained science under the 1999 curriculum. The first thing we received was a big grey box of curriculum books! We had science lectures every week. They were actually more workshops than lectures. Everyone loved science as it was hands on and very interesting with the various investigations. Even recording our results were interesting; results could be displayed in poster format for example. This is the way that science is to be taught to pupils now in primary schools. Over the course of our college years we were trained in all strands and strand units of the science curriculum. I choose science as my elective subject in my final year."*

On being asked how science was taught to training teachers in College, RQT3 spoke of how helpful the workshops were in developing her teaching strategies that she uses in teaching science to her pupils today;

> *"As a recently qualified teacher myself I was taught Science in training college in 1999. It was a course where we were pupils undertaking design and make lessons, experimentations etc. and would see how the lecturer taught us, let us work in groups and with the help of probing questions, discover the answers for ourselves. It certainly wasn't textbook material or a class where we sat, listened and wrote notes for forty minutes. Being part of the science lessons involved investigating, listening and*

reasoning with fellow classmates, experimenting, analyzing, hypothesising and interpreting results – scientific skills developed through working scientifically. This is the way that we are encouraged to teach our pupils and by receiving training at college in this subject I feel confident when I am teaching science".

Retired teachers interviewed

Science didn't seem to be a big subject in training colleges when the retired teachers were trained. The teachers didn't have much to say about their training but all five teachers however had a seomra eolaiochta in college, did some experiments (mostly secondary school level with Bunsen burners, test tubes etc.) and Rural Science/ Nature Study. RT2 was training in the 1950s and spoke of his science training;

There was a man who used to take us out to the garden. It was supposed to be some sort of Rural Science. There was a science room but it was only a revision of what science was taught in secondary school.

RT1 had a similar experience when training in the 1940s;

When I was a pupil in training though we were taken on nature walks. We had a big garden with a big sun-dial and we looked at plants. We had a seomra eolaiochta and did a few experiments.

Currently teaching experienced teachers

Both CT3 and CT2 were trained in college under the 1971 curriculum. Both teachers had similar answers on the training they received in Social Educational Studies in training college. The subjects studied by these teachers at training college were English, Irish, Maths, Religion, P.E., Art, Music and SES (Social Educational Studies). From interviewing CT2 I got an insight into what she studied under Elementary Science/ Nature Study in training college when under the 1971 curriculum.

- *Interviewer: What did you study under the Elementary Science/ Nature Study section of SES?*

  CT2: We focused mainly on nature around us, seasonal changes, different animals and their life cycles. We looked at buds, trees and leaves.

- *Interviewer: Was there any reference to scientific topics that are on the curriculum now like force, electricity, light, sound etc.?*

  CT2: I think we had one lecture involving topics like basic sound and light all in connection with nature around us though. We did temperature once looking at Celsius and Fahrenheit, I never used any of it in the classroom because the focus was always on nature. I have forgotten it now in any case.

CT1 however doesn't remember any reference to scientific topics such as sound and light at training college.

CT1 spoke of what training she received on SES in training college.

"It was mainly just about nature. We studied insects and their life cycles, animals, flowers and the changing seasons. We went on a few field trips to the sea shore, woods etc."

9.4.3 Experience of teaching science now and in the past

Recently qualified teachers interviewed

Each of the teachers interviewed spoke of their confidence in teaching science to pupils. They spoke of the enjoyment and participation of the pupils. Children become actively involved in discussion and exploration and work together to communicate and record observations, evidence and results of experimentations and investigations. RQT 2 commented on how the pupils work together and participate more as pairs and in-groups in a science lesson.

"Many skills are being developed that wouldn't be developed in other subject areas. From being a subject I was afraid to begin teaching with all the preparation it involved, it is one of my favourites when I see the interest, enjoyment and results from my pupils."

According to RQT 1

"Science is such an interesting subject and one of my pupils favourite. We are a well-resourced school now for science. I have 5th and 6th class and I teach topics like light, sound, heat, magnetism and electricity, forces, the environment and materials. Currently my class are working in groups in a design and make lesson. They are designing and making a jet plane! They love Science."

Children who are generally lacking in confidence in other subjects areas blossom in every aspect of the science subject and enjoy the involvement in the various investigations. RQT 3 spoke of this new found confidence she sees each year with some of her pupils.

"*Activities in science are great as they involve the pupils in exploring and investigating. They have opportunities to work as teams in their explorations. In the last four years I have watched quiet children develop a voice through science. While developing scientific understanding they were also developing social skills."*

Retired teachers interviewed

The similarity between the interviews of the retired teachers was quite amazing. Their responses and attitude to science in the classroom highlighted that it was not a subject that was taught during their school teaching years. As RT1 said and being quite adamant in her answer,

"There was no science whatsoever. No science taught at all in my time, there was never a mention of science."

One part of science education in Primary schools which has been in schools since early 1900s was the care of the school garden. While a school garden is something that many schools have now it didn't feature in many schools of the retired teachers interviewed. Most of the schools showed evidence of there once being a school garden but the upkeep of it seems to have been abandoned in the 1940s. RT2 spoke of the once school garden and why she didn't use it as basis for some lessons.

> *"It was tramped solid and children would just be filthy. All the other teachers I knew didn't really bother."*

RT1 spoke of the garden being time-consuming and time had to be spent on the main subjects.

> *"Sure who would have time to look after a garden... English, Irish and Maths. That was the three Rs. I had the younger classrooms and those were my subjects to teach."*

RT5 felt the same:

> *"When I began teaching there wasn't any science, it wasn't important and wasn't essential. It was just the core subjects as such, Irish, English and Maths. There was music, singing Irish Ballads but no art. The girls did so-called sewing!"*

Prior to the 1971 curriculum it wasn't compulsory to teach science or Nature Study, it was an optional subject, which is why many teachers never taught it. Specific questions on each of the topics displayed in Table 9.3 were asked as it was a possibility that the teachers could have been teaching something they had not perceived to be science. The retired teachers interviewed never taught science when it was an optional subject or did work in a school garden as is clear from Table 9.3.

Table 9.4. Display that these science topics were not taught by the retired teachers interviewed from the 1940's until the 1971 curriculum.

	RT 1	RT2	RT3	RT4	RT5
Human Life	X	X	X	X	X
Plant life	X	X	X	X	X
Light	X	X	X	X	X
Sound	X	X	X	X	X
Heat	X	X	X	X	X
Magnetism and electricity	X	X	X	X	X
Forces	X	X	X	X	X
Materials	X	X	X	X	X
Environmental awareness	X	X	X	X	X
Care of school garden	X	X	X	X	X

The majority of the retired teachers I interviewed were teaching during the introduction of the 1971 curriculum. With the introduction of this curriculum there was much controversy between the teachers with many not liking the changes being made to the curriculum. The major change mentioned by the teachers I interviewed was how the subjects were to be integrated and move smoothly from one to another. The older teachers didn't welcome the change. There was now the subject of social and environmental studies (SES), which included Civics, History, Geography and Elementary Science. Elementary Science was rarely mentioned as the programme was mainly made up of Nature Study which involved plant and animal life, nature walks and nature tables and awareness of the human environment. As RT4 said;

> *"I didn't know of any science, I knew nothing about plants, flowers, planets... how could I teach something I wasn't confident in and had no knowledge of?"*

RT2 stated;

> *"The curriculum changed in 1971. We knew it was coming for a while. We had to start integration and move as smoothly from one subject to another. I didn't. I always did my hour of Maths every*

morning. I spent over an hour at English and wherever you could I crammed in the rest after that. I loved history, Geography, I knew nothing of science."

Teachers did their best with the change and with what knowledge that they had with doing experiments that they remembered from their own secondary schools. RT2 never taught science until the 1971 curriculum where there was the introduction of Elementary Science. He taught the senior classes but didn't know much about science apart from a few lessons he remembered from secondary school.

"I remember reading about a bottle and sealing it all down with candle grease so it was sealed and water proof. A leafy branch was put it and then water was seen inside the bottle. Where did the water come from? It had come through the leaves! Another little thing two people gave us two nice small pieces of glass. We wet them and put them together and tried to pull them apart. Now what was holding them together? Air pressure! I remembered doing it in secondary school"

Even then science was not taught amongst the teachers he knew.

"All the other teachers I knew didn't really bother about the science when it came in 1971. Nobody knew what to do. It was a case that if the teacher had an interest and knew a bit about science they did a bit like I did now and again. We mainly focused on nature and information in textbooks. There was no organised science in any sense or form while I was teaching from 1956 until I retired!"

Even though Elementary Science was stated clearly in the curriculum for the senior classes and some elements of science with magnets and electricity in the middle classes many teachers just concentrated on plant and animal life and nature walks. The Elementary Science was a small section of a large programme. The programme on a whole was called science but the teachers themselves referred to it as nature studies and they could teach whatever aspects of the programme appealed to them or the pupils. As RT3 said:

"The 1971 curriculum wanted integration and I loved Geography and with teaching in Malin Head there was a lot of geographic sites so I started nature walks and so integrated geography and science. When looking at winds and explaining westerly winds and why Malin Head was such a stormy place in a geography lessons I might end up talking a bit about seagulls and their eggs. That was nature because talking about wildlife. I had one good text book 'Study of Nature' by J C Gang, 1967 Evans Brothers Ltd. I talked about the topics in it, hedgehogs, sparrows, frogs, potatoes, ducks, wind, cats, snow, pigs, fields, rain, trees, daises, buttercups and pond life."

This particular teacher mentioned that there was no difficulty in teaching these topics when you had books and that they were quite interesting. However as the years went on he found a change in the topics being printed in the class textbooks and found it difficult to teach topics he wasn't familiar with:

"But before I was retiring the books were different with lessons on global warming, the solar system. In 1967 in 'Look around 6th class' (Folens) the textbook had topics on magnets, electricity, the human body mixtures and food but I didn't know anything about them and neither did anyone else! I had no resources or adequate knowledge to teach these topics with success."

With the abolition of science as a compulsory subject none of the school teachers interviewed had taught science from 1940 until 1971. With the introduction of the 1971 curriculum and freedom to select topics from the science/ Nature Study programme, resulted in textbook lessons on plant and animal life, nature tables and nature walks with an attempt by one teacher interviewed to do a few experiments.

Current teaching experienced teachers

Since the introduction of the 1971 curriculum, some current teaching experienced teachers interviewed tried their hand at Elementary Science and many taught topics of nature. One teacher took his pupils on nature walks and passed on his knowledge of trees and their leaves to his pupils. On questioning the other two teachers about nature walks they stated that they had little knowledge of the various trees and leaves to pass on to their pupils. Science really came into each classroom with the 1999 curriculum. This is highlighted from my interviews with the three-currently teaching experienced primary school teachers.

CT1 spoke of science in her classroom under the 1971 curriculum.

"Science wasn't a separate subject it was part of Social and Environmental Studies. Most of the topics I taught were from the standard textbooks that each pupil had. They were topics about the weather, flowers, and animals and for the older classes there were some chapters on air and water but I never taught any experiments. I just stuck to the topics in the text books.'

CT3 was trained and taught for a few years under the 1971 curriculum.

"Up as far as second class the focus was on nature and civics. This represented looking at the life of a nurse, doctor, the postman whereas environmental was seasonal changes, lifecycles and there was a big focus on the wren, the budgie, the pig and dormouse for example. History and geography was first taught in 3rd class but there was no mention of science. I vaguely remember science being mentioned as a subject in 2000 when the department were talking about a grant that was going to be given to schools for science equipment. Science was something done in secondary school in 1st year!"

My interview with CT3 gave me a general insight to the reaction of teachers with the introduction of the 'new' subject science in the 1999 curriculum. Teachers were anxious, particularly older teachers, about the content of science for primary schools and whether they would have sufficient knowledge to teach it. It wasn't a subject that they had studied in training college.

> *"This sent panic through staff especially older teachers. Teachers retired earlier on the basis of computers coming in never mind science. The word science brought up ideas of chemistry experiments and Bunsen burners. That was my opinion of science also, the secondary school experience was what I thought was coming to primary schools."*

Grants were given to the schools for science equipment, which some schools spent before realising what was in the curriculum! In-service courses were given in other subjects of the curriculum such as English and Irish. The teachers who trained as science co-coordinators were to present these in-service courses as well but according to CT3 there was a disagreement.

> *"However there was a disagreement I think between the INTO and the Department of Education about the introduction of science so there was a delay in the official Department of Education Science curriculum in-service days. They didn't really happen until 2002/2003.*
> *Basically the trainers were trained and ready to start in 2000 but the official one was delayed."*

This delay resulted in the teachers who were on secondment leave to give courses to teachers who wished to avail of the opportunity in their schools.

> *"Meanwhile teachers had already their secondments in place so primary schools could sign up to avail of science introduction days. These were two half days within the school year at the school."*

According to all interviews of teachers teaching during the transition from the 1971 curriculum to the 1999 curriculum there were many anxious and worried teachers. The word 'science' conjured up a vision of secondary school.

> *"We expected our local co-coordinator to appear with a Bunsen burner under one arm and a filtration system under the other."*

Teachers soon came to realise that science had existed in many forms in the Nature Study but that to be a scientist was to participate, investigate and use skills of experimentation.

> *"What took place during that first half day session was a realisation on all teachers present and a great sense of relief to find that we had been teaching some form of science in the form of Nature Study... It was nice to realise that the science curriculum was practical work and discussion. This was what being a scientist meant.*
>
> *The science curriculum didn't require a great background of scientific knowledge. We had encountered some of these topics before but instead of using a pen and paper method it was to be more practical. There were no chemicals in sight."*

These teachers expressed both their own and their pupils' enjoyment of science lessons under the 1999 curriculum. The teachers enjoyed their in-service courses and thought of them to be important and much needed but still voiced their worries in attempting some areas of the science curriculum. All current teaching experienced teachers interviewed spoke of their lack of confidence in teaching science. CT1 states:

> *"Well I wouldn't be very confident as a 'science teacher' but the children find it very interesting. The in-service days helped with the few topics they covered on the day and I find that when the children work in groups it works well. But there are many other science areas not covered on that day that I haven't attempted yet! There are loads of books now and the school has good resources so I do try and cover the various topics but I'm still trying to get to grip with the 'hands on' approach! I*

try to follow the curriculum and teach what is to be taught each year but again I'm not confident in some topic areas.

CT3 finds science interesting but acknowledged he wasn't using the teaching approach required;

"*I am using a more didactic approach – a chalk and talk method, rather than an investigative approach where children learn by doing. More in-service training in effective hands on approaches is needed. I get disgusted with experiments because they are not working and the pupils get fed up.*"

9.5 Major findings from retired and current teachers teaching under the 1971 curriculum

On listening to the current teachers speak of their enjoyment and worries in teaching science under the 1999 curriculum I asked the retired and current teachers why they thought science had not being taught previous to the 1999 curriculum. Science was in the 1971 curriculum and previous curriculums but teachers had not approached the subject as with the 1999 curriculum. Participants reported that there were several factors that might contribute to teachers' negative attitudes in approaching science. Factors such as not having adequate training in the area concerned, necessary resources and enough time were the key factors noted. A resource that some of the teachers' spoke highly of was the magazine 'Eureka' that was conceived and written by Shiela Donegan and Eoin Gill. This magazine was published to provide primary teachers with confidence in their science teaching. Since the magazine was launched in 2004 a survey of teachers showed that 80% are now teaching more science. Schools can buy the concrete resources required for teaching science but it is

resources like the Eureka magazine that are valuable and necessary to help the less confident teachers in teaching science today.

Compared to the list of suggestions why science had not being taught by many teachers, more supports were selected as being necessary for science to be successful in the long term. These supports included:

(a) Knowledge of effective teaching strategies for teachers teaching science:

The curriculum states the methodology it would like used in the teaching of science.

"The teaching of science in the primary school involves the development of two types of understanding: Conceptual Understanding and Procedural Understanding"[240]

Conceptual Understanding concerns the development of scientific knowledge and with the deepening of fundamental scientific ideas. Procedural Understanding refers to the model of how scientists work and the development of basic scientific skills while engaging in scientific enquiry. The "didactic" approach that some of these teachers say they use to teach science would proficiently achieve the former "Conceptual Understanding" of science required by the curriculum however would leave the pupil sadly lacking in any "Procedural Understanding".

(b) Opportunities to network with other staff in the school to receive support and assistance.

"Partnership Teaching" could be used as a way to receive support and assistance from other staff. It is where a more confident science teacher aids a less confident teacher and they

teach together. Crebbin recommends "Partnership Teaching" in primary science to develop teacher confidence. He states that it *"produced higher levels of teacher confidence and understanding in using process skills".* [241]

(c) More in-service training on science education topics for teachers

Interviews indicated teachers desire for more in-service. They are looking for in-service in methods for teaching science and also in-service in scientific knowledge. As CT3 honestly admitted on teaching science to his pupils *"I haven' got the facts to support what I showed them."*

(d) Consultation and assistance from field experts

The AstraZenceca Science Teaching Trust is injecting much needed resources into continuing the professional development of primary teachers to improve their knowledge of science and as a direct result they feel that more training equals more confidence equals using the investigative approach to teaching science. They spent £7000 in one year providing science training to one school! The results were that all the teachers became;

> *"confident enough to change their method of teaching science...a move away from telling children the facts to employing active ,innovative teaching and learning strategies where children's conceptual understanding is developed"* [242]

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[240] Primary School Curriculum, Science. The Stationery Office, Dublin 1999. p. 6-7
[241] Crebbin,C .(2001) Abstract from *"Partnership teaching in primary science"* Primary Science Review,70, pp22-25
[242] www.azteachscience.co.uk/research/understanding_of_process_skilss.htm

(e) Sufficient time for teachers to plan the curriculum.

Science is subject that requires a lot of preparation and with it being a subject of SESE it would benefit the pupils if it was integrated into other areas. Planning time at the beginning of each year would be beneficial so teachers can plan how they will approach the subject.

Many of the teachers now teaching under the 1999 curriculum while teaching science are still not confident in this area and hope support continues in order for science to be a success. Research appears to maintain the importance of:

> *"recognising that confident teachers are more likely to be more innovative in their approach to science and may engender more enthusiasm for this subject in their pupils".* [243]

The findings from these interviews indicate that some teachers' worries in teaching science arise from teachers' heavy workload and insufficient training in the area. While many teachers commented that they supported science theoretically and tried their best with a subject children love, realistically many barriers led to their negative perceptions about science. For example, one teacher said

> *"Science is a good idea. However, heavy workload, large number of students per classroom, and lack of knowledge of the teaching strategies and content lead to lack in confidence and so are major barriers to me teaching science successfully."*

In the next chapter, details on science teaching in the Irish system from the late 1800's using both documentary evidence and interview data will be provided.

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[243] Taylor, N. & Lucas, Keith, B (2001) "S*ome learning outcomes from a science program for Pre- Service primary teachers undertaken in the context of a developing country"* Evaluation & Research in Education , Vol 15, No.4.(2001) p. 5

Chapter 10

Where to now?

10.1 Introduction

This chapter will attempt to answer the question '*Is science a new subject introduced to Irish Education with the 1999 primary school curriculum and why do teachers believe it to be?* Many teachers spoke of science with the introduction of the 1999 curriculum as being a 'new' subject and were stressed over how they would teach it. In the minds of these teachers they conjured up visions of science in secondary school. Muriel Whittaker (1980) spoke of the strong aversion most primary teachers have to physical science, a subject last experienced in secondary school where the factual and didactic approach left them with no experience of the type of work now required.

> '*Open-ended activity in which a teacher has to encourage particular skills by careful guidance of the pupils' own interests requires some knowledge, or confidence to learn, about many topics and some first-hand experience of the skills involved. Most primary teachers have neither.*'[244]

This chapter will provide details on evidence that the 1999 curriculum did not introduce Elementary Science as a new subject but that it existed in primary schools since the late 1800s. Finally, limitations of this study and suggestions for future research are presented.

[244] Whittaker, M. (1980) 'They're only playing-the problem of primary science', *School Science Review*, 61, 216,pp.556-60

10.2 Elementary Science programmes since 1898

Table 10.1 provides a summary of the various Elementary Science programmes that have existed in Irish schools since 1898 to the present day.

Table 10.1 Display of the primary science programmes from 1898 to the present day

Subject	1898	1900	1908	1922	1926	1956	1971	1999
Human Life	*	*	*	*	*	*	*	*
Plant life	*	*	*	*	*	*	*	*
Light	*	*	*	*	*	*	*	*
Sound	*	*	-	-	-	-	*	*
Heat	*	*	*	*	*	*	*	*
Magnetism & electricity	*	*	-	-	-	-	*	*
Forces	*	*	*	*	-	-	*	*
Materials	*	*	*	*	*	*	*	*
Environmental awareness	*	*	*	*	*	*	*	*

From studying Table 10.1 it is evident that the topics in the 1999-science curriculum existed in the 1898 and 1900 programmes and that various aspects of it had been part of the curriculum until its full return with the 1971 curriculum. Our present science curriculum is as it was a century ago.

In 1898 the Belmore Commission proposed a revised programme in manual instruction. It consisted of the same topic material and its ultimate aim was to give life-long skills in the sciences to pupils, which would carry them through the secondary system and into the vocational world. Heller was hopeful of a change in the way a teacher approached the process of science instruction.

'The aim is to endeavor to cultivate enthusiasm, purpose and method, without which teaching must fail to achieve its most important results.'[245]

The pupils would experience self-discovery unlike that found within the pages of a textbook. This is similar to the present day science programme.

10.3 How did Elementary Science continue through the century?

The 1900 science programme did not achieve as much as it aspired to:

'It is still too soon to be able to say much definitely of the progress and effects of the new scheme. A great deal of preparatory work was necessary. The teachers had to be instructed in, or to learn for themselves, the new subjects and the new methods. Strong prejudices had to be allayed, and deeply ingrained habits overcome and altered. Educational reforms seem, from the experience of the past, to be essentially of slow growth. It took over twenty years to discover and remove the evils of the results scheme, it would therefore, be unreasonable to expect much as yet from the latest inaugurated but in 1900.'[246]

There were many problems in implementing the programme successfully. Teachers were given more freedom than they had previously been accustomed to and were expected to teach subjects that they could only have taught superficially. With the need of finance, facilities, equipment and time there was little success in implementing the programme fully with the teachers using the heuristic approach. Organisers were appointed to give weekend and short-term courses but it was necessary to train teachers both in the subject of Elementary Science and new training methods. Because of this the programme was

[245] Heller's general Report on Science Instruction. Appendix to the 79th Report of the Commissioners ot National Education in Ireland, 1912013, p.119
[246] General Report by Chief Inspector, Mr. E. Downing, 1901, p. 34

amended in 1904. This amended programme formed the basis of instruction until 1922. Object lessons took the place of a modified experimental science course and a scheme of Nature Study was provided for rural schools in 1907. An alternative programme under the title Rural Science and Horticulture was introduced five years later.

With the First National Programme 1922-1926, came an emphasis on Irish as a language, Irish culture and Irish music. The First National Programme Conference reported that the main faults of the 1900-1922 programme were that it contained too many obligatory subjects. Rural Science and Horticulture was removed as an obligatory subject with the 1922 programme but became an additional subject that might be taught according to circumstances. The First National Programme had been adopted provisionally and in 1925 the Teachers' Organisation requested a conference to consider any alterations. From September 1926, Rural Science or Nature Study was once again obligatory under certain conditions, in schools other than those with only one teacher. Teachers interviewed spoke of being taught Rural Science or Nature Study when they were pupils at Primary school. Some teachers had been taught science and used science equipment but the main emphasis was placed on the school gardens and plants.

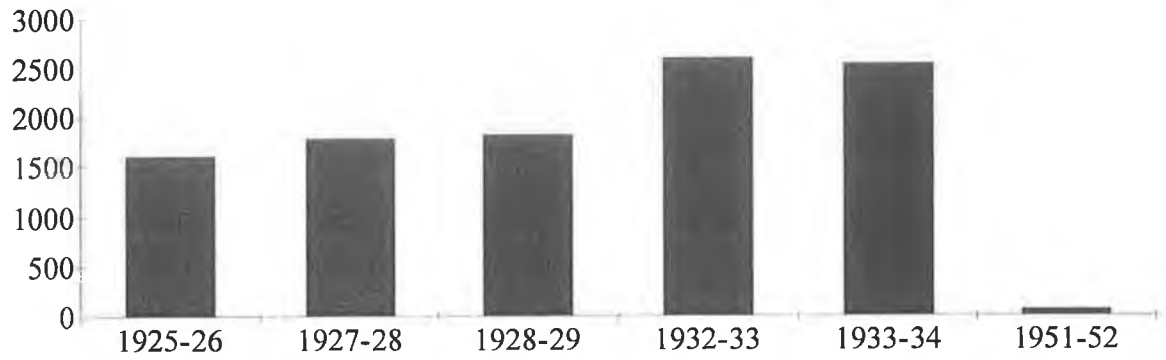
Information gained from the interviews of Retired teachers is represented in Table 10.2. This information is based on the memories of the teachers when they themselves were pupils on average in the 1920s and 1930s. From this table it can be seen that science existed and was taught in some schools with the use of scientific equipment or work in school gardens.

Table 10.2. Evidence of scientific teaching in primary schools in the 1920s and 1930s.

Teaching of science in the 1920's and 1930's	RT1	RT2	RT3	RT4	RT5
Scientific Equipment not used in school as a pupil but seen in storage then or in later years as a teacher.		*	*		
Use of scientific equipment as a pupil				*	*
Use of school garden as a pupil	*	*	*	*	

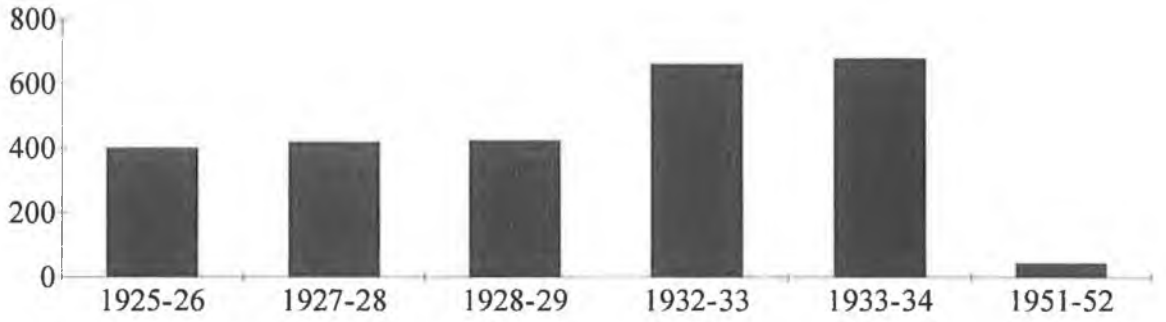
This change was short lived as modifications in 1934 made teaching of Rural Science and Nature Study optional once more in all schools. With the Subject being optional it resulted in a continuous fall in the number of schools teaching the subject. By the school year 1951-52 Rural Science was taught in only 45 schools and its sister subject Nature Study was taught in 55 schools with the majority of these schools being 'mixed' schools. This was a decrease on the number of schools teaching these subjects in 1926-1934.[247] The decrease is evident from Table 10.3 and Table 10.4.

Table 10.3. Number of schools teaching Nature Study



[247] Report of the Council of Education 1954. p.106

Table 10.4. Number of schools teaching Rural Science



The Council of Education was set up in May 1950 to report on the function of the Primary School and on the Curriculum. The council recommended that a standard curriculum be taught in all schools, which would include Nature Study as,

'the highest form of aesthetic training for the child is provided by the Study of Nature – the divine creation untouched by the hand of Man.'[248]

However while the recommendations in the report were sound, they were never implemented. Interviews with the retired teachers confirm this. Science was certainly not taught by any of the teachers and as Nature Study was an optional subject their focus was on the obligatory subjects. The subject appears to have died by this stage of the 1900s...

> '... by 1937 the heuristic method, as originally conceived, had vanished, killed by the examination system, and the collective criticisms of the new psychology.'[249]

[248] Social and Environmental Studies. Oideas 24, p. 32
[249] Brock, 1973. p. 50

Rural Science and Nature Study continued to be an optional subject not taught in many schools until the introduction of the 'new' curriculum –Curaclam na Bunscoile – in 1971.

One of the first steps taken in implementing the 1971 Curriculum in primary Schools was the establishment of Curriculum Centers in every Inspectorial district in 1970/ 71. Courses were organised by the Department of Education at Maynooth College from 1972-1975. These courses lasted for three- and two-week periods. Assistance was provided by organisations such as An Taisce, The Irish Wildbird Conservancy, The Forest and Wildlife Service, Bord na Móna and An Foras Talúntais. [250] Teacher Centres, The INTO and some colleges of Education also provided courses on certain aspects of these studies. Filmstrips and teacher's notes were provided on Nature. They were designed to supplement the pupils' own knowledge and experience and to encourage observation. Workbooks were provided for the children to record information. A lot of effort went into implementing the 'Nature Study' section of Social and Environmental Studies.

However, Elementary Science was a part of SES, the Social and Environmental Studies programme, with topics like Sound and Light, Gravity and levers and simple experiments to be taught in 5th and 6th class. Experiments with magnets, electricity, temperature and many more were in the 3rd and 4th class syllabus. From Table 10.5 one can see that only a select amount of science topics were chosen to be taught by these teachers and through the use of textbook material and were on the biology and botany topics as displayed in Table 10.5. Why was this the case when more science topics were on the curriculum?

[250] Social and Environmental Studies. Oideas 24, 1980. P. 33

Table 10.5. Display of science topics in 1971 curriculum taught by experienced current teachers

	CT 1	CT2	CT3
Science topics			
Human Life	*	*	*
Plant life	*	*	*
Light			
Sound			
Heat			
Magnetism and electricity			
Forces			
Materials	* (air and water)		
Environmental awareness			
Methodology			
Textbook taught material	*	*	*
Experimental taught material			

Elementary Science in 5th and 6th classes included air, water, heat, sound and light, gravity and levers and simple experimental studies of a bicycle pump, vacuum cleaner, flashlight battery. Experimental lessons that could be covered in 3rd and 4th classes were the use of a magnifying glass and experimenting with mirrors, magnets, electric battery, compass, flints, thermometers, springs and levers.

Was there no emphasis placed on this area of the curriculum by the teachers and the inspectors? Under section 5, Elementary Science in the Primary School Curriculum the following clearly states the use of a practical. Experimental approach.

'Experiments will form an important part of the course done in Elementary Science, as they enable pupils to discover scientific principles by participating in the work. The experiments should be purposeful but simple – within the capabilities of 10 to 12 year olds – and the homelier the apparatus used the better. The materials should be assembled by the pupils who should themselves, as far as possible, carry out the experiments. The teacher should guide the work unobtrusively and a thought-provoking question from him at a critical point in the activity can often be the deciding factor between success and failure.....it is important that the pupils should record what happens in the experiments even when the expected result is not obtained. The recording of the actual results obtained in such cases is in itself an exercise in integrity, while the quest for an explanation of such results may be a worthwhile development of the original experiment.'[251]

This statement was very similar to the beliefs of Armstrong and attempted implementation of Heller in the early 1900s. Would it fail to succeed again in 1971? Were the teachers aware of this Elementary Science section and have sufficient knowledge to teach it? On asking the three currently teaching experienced teachers further questions, I discovered that all three didn't use the 1971 curriculum handbook and some considered it outdated. They were teaching pupils in the 1990s and the 1971 curriculum handbook was 20 years old. Lessons based on the subject SES came in various textbooks from different companies and were used in the schools. These textbooks were regularly updated and were easier to use as full lesson material including questions were supplied. As RT3 who taught under the 1971 curriculum until 1992 states;

"I had one good text book 'Study of Nature' by J C Gang, 1967 Evans Brothers Ltd. I talked about the topics in it hedgehogs, sparrows, frogs, potatoes, ducks, wind, cats, snow, pigs, fields, rain, trees, daises, buttercups and pond life".

[251] Primary School Curriculum, Vol.2. An Roinn Oideachais. Cahill: Dublin, 1976., pp. 74, 78.

As mentioned earlier these textbooks were mainly based on the environment around us. Because of this CT1, a teacher of 5th and 6th classes didn't realise that Elementary Science was part of the 1971 programme. She discovered this during the interview when the researcher asked if she ever taught sound, light, magnetism and electricity

- *Interviewer: Did you ever teach any lessons on magnetism and electricity?*

  CT1: They weren't on the curriculum then.

- *Interviewer: What about topics of heat, sound and light?*

  CT1: Again they're more topics in the new curriculum. There was some sound in our textbooks but it wasn't scientific with any experiments, more in connection with nature and sounds around us. Science wasn't a topic like it is now in the curriculum.

On informing the teacher of the Elementary Science in the SES 1971 programme, she replied;

> *"Well I never knew they existed, I would probably have died if I knew I had to teach science. Science was never mentioned to us in training college or in any school I taught in. SES was all in connection with life and nature! The handbooks weren't looked at often anyway. We looked at the textbooks that came to the schools. They seemed to be more up to date."*

From my interviews with the current teaching experienced teachers one main result was that the topics of Elementary Science were not taught and very few experiments carried out in primary schools or in teacher training colleges. This supports surveys carried out by the INTO in 1985 and the Department of Education in 1983 that less than half of the respondents included Elementary Science in their programmes and only 31% had pupils undertaking simple scientific experiments. [252] This result could be due to the use of

[252] INTO Publication: Social and Environmental Studies in Primary Education in Ireland, Current issues and Concerns. p. 24

textbook material, teachers not using their 1971 curriculum as a guideline for planning or due to the freedom they had in selecting topics from the programme to suit their needs and the needs of the pupils. With no training and little knowledge of the scientific topics teachers were inclined to not choose "the more scientific topics" such as sound, light, magnetism and electricity, heat, forces and materials, as mentioned earlier, from the Elementary Science syllabus.

This may help explain why the teachers interviewed, and their colleagues they referred to in the interviews, thought that with the 1999 curriculum came the 'new' subject of science even though the same topics had existed in the 1971 curriculum. The 1999 science programme was a *revised* not a *new* programme and was implemented into the classrooms in the school year 2003/2004.

10.4 Further evidence that science existed in classrooms before the 1999 curriculum

Inspectors' schools reports from 1949 onwards and science lessons from 1900 can be used as a further evidence that science existed in classrooms prior to the introduction of the 1999 curriculum.

10.4.1 Inspector's school reports

Table 10.6 is a display of Inspectors school reports from 1949. These reports are from three and four teacher schools from Inishowen, Co. Donegal. The reports are consistent from one school to the next with many of the reports being identical word for word. These reports discussed all the subjects taught in the schools. The reports help identify which subjects

were examined by inspectors, the year in which were examined and what the teaching of the subject involved.

Table 10.6 An Roinn Oideachais, Inspectors School Reports

Subjects	1949	1953	1965	1981	1993	2000
Irish	*	*	*	*	*	*
English	*	*	*	*	*	*
Mathematics	*	*	*	*	*	*
History	*	*	*	*	*	*
Geography	*	*	*	*	*	*
Science/ Nature Study	-	-	-	*	*	*
Music	*	-	*	-	*	*
Art & Physical Education	-	-	-	*	*	*

Table 10.6 show that Nature Study wasn't inspected from the 1940s up until the 1971 curriculum. As it was an optional subject up until 1954 this is understandable, however Nature Study became a compulsory subject from this date but wasn't inspected until 1971. From 1971 the reports show that under the subject of science/ nature, nature was the only area being assessed with no mention of science. In the 1981 report the inspector wrote of science and Nature Study in the classroom: *'in the environmental programme attention is devoted to the immediate environment.'* In reports from 1993 and 2000 under science/ Nature Study the inspectors wrote the same for each report '*The programme across the stages, tended to be environmentally based.'* No reference was made to the teaching of science topics in the Elementary Science section in the reports. All reports were based on Nature Study. The teachers interviewed never taught any scientific topics until the implementation of the 1999 science curriculum. In the school year 2003/2004 pupils were

introduced to science as it was a hundred years previously with the same topics, the same idea of teaching by letting the children discover for themselves through hands-on activity and through carrying out similar experiments – in a circular motion we have returned to the science that was once taught!

10.4.2 Lessons of science experiments from the 1908 and 1999 curricula

Table 10.7 and Table 10.8 display two sample lessons from the 1999 teacher guidelines based on first solids, liquids and gas as three properties of matter and second Mixing (materials and change). These lessons can be compared to lessons of similar subject matter from the science school programme of 1908. There are many similarities between the two lessons displayed in Table 10.7. The content is basically the same. The pupils were to identify substances as solid or liquid. In both lessons reference is made to the fact that solids have a definite shape and that some solids contain liquid. Table 10.8 displays more similarities in lessons from 1908 and 1999. In both lessons the children were investigating what happens to various substances when mixed in water. With Armstrong's heuristic method children were to learn through discovery and guidance, a basis in the elementary programme implemented by Heller in 1900 and likewise a very important part of the 1999 science curriculum.

Table 10. 7 Lessons on Solids, liquids and gases as properties of matter from the 1999 and 1908 curricula

1999 curriculum	1908 curriculum
Lesson 1a[253]: Solids, liquids and gases Initial problem: what are solids liquids and gases? Development of lesson: Observation can be encouraged by asking the children to describe different liquids. 1. Solids: Children can make a collection of different solids. Encourage them to include: A) Solids that are made from soft materials, such as cotton wool or a sponge B) Solids that are transparent such as glass and plastics The children's ideas about solids can be refined through questioning 2. The children might compare solids with liquids. Some solids change shape and pour like liquids. As a result come children find it difficult to distinguish between some soft solids (flour, power, icing sugar) and liquids 3. The children can consider: What happens to materials when they are turned upside down? So any materials change shape or spread out? Some liquids, such as oil, treacle and honey can also pose a problem from children. They may describe these liquids as solids because they do not pour as easily as other liquids such as water.	**Lesson 1b**[254]: solids, liquids and gases 1. Get a list of solid bodies from pupils (wood, stone etc) also list of common liquids (water, milk). Note that a liquid can be poured from one vessel to another, that it takes the exact shape of the vessel and has a level surface (except ion very narrow vessels). A solid on the other hand does not change its shape when put into different vessels. Note that although the shape of a liquid readily changes, its size does not alter. 2. A solid has a definite size and shape A liquid has a definite size, but its shape is that of the vessel which holds it. 3. Get an extended list of solids –glass, feather, hair, paper, putty, butter, potato, etc. note that some of these e.g. butter and potato, although classified solids contain some liquid. Question the pupils as to the substances in the room, whether solid or liquid. Is there anything else in the room which has not been classified?

[253] Department of Education, Primary School Curriculum, Science Teacher Guidelines, 1999 p. 127

Table 10.8 Lessons on mixing (materials and change) from the 1999 and 1908 curricula

1999 Curriculum	1908 Curriculum
Lesson 2a[255]: Mixing (materials and change) Initial problem: What happens to things in water? Development of the lesson: 1. Children will be asked to predict: What do you think will happen if you add some salt to a jar of water? What do you think will happen if you add some sand to water? How could you find out? 3. Children will be encouraged to devise a fair test: for example, they will add the same amount (a teaspoon) of sand and salt to water, they will use the same amount to water, the water will be of the temperature and they will stir the same number of times. The only variable being change is the substance being added to the water. The children will observe that the substance has dissolved when the liquid is clear and transparent. 4. Observation will be encouraged by questioning: 5. Children can investigate what happens when different substances are mixed in water	**Lesson 2b**[256]: Mixing 1. Determination of the solubility, i.e. the weight of solids dissolved in a given weight of its solution – of familiar substances, salt, soda, sugar, tea, lime. Food materials must be rendered soluble before they can pass into the blood stream and nourish the body. 2. Dissolving and melting soluble, insoluble and partly soluble substances used in the household – sugar, butter, and tea. Most food materials are to a great extent insoluble in water. Beverages are solutions containing very little dissolved material and are therefore of small food value.

[254] Notes for teachers: Programme of Instruction for National Schools p 97 1908 Office of National Education Dublin (May 1908) P.E. Lemon + W.J. Dilworth
[255] Department of Education, Primary School Curriculum, Science Teacher Guidelines, 1999 p. 125
[256] Notes for teachers: Programme of Instruction for National Schools p 103 & 124 1908 Office of National Education Dublin (May 1908) P.E. Lemon + W.J. Dilworth

10.5 Summary of Elementary Science taught from the late 1800s

From researched documentation and interviews of various teachers a summary of science taught in one form or another from the late 1800s until the present day can be seen from Table 10.9. Science topics today in the 1999 curriculum are as they were one hundred years ago. From Armstrong came the belief that in order to teach pupils science they were to find out the results themselves, to explore, investigate, experiment, analyze and record – all scientific skills being developed through the 1999 science curriculum. Science existed in the Irish classrooms for the majority of the century in different forms including Rural Science and Nature Study but through time there has been a return to the science teaching of 1900. An attempt had been made to introduce science to Irish children and for twenty years it was carried out with some difficulties. Will we have learned from the 1900 attempt to introduce science that there was a great need of more finance, teacher training, time and equipment? This is being provided with the implementation of science with the 1999 curriculum yet from the interviews teachers still voice worries in teaching science confidently. It has to be ensured that science will be implemented successfully this time round with teachers having confidence in themselves when teaching science.

Table 10.9. Summary of the teaching of science from the late 1800s to the present day and indications of when curricula were introduced or changed.

Summary of science taught from late 1800s until the present day	**Year**	**When curricula were introduced or changed.**
Late 1800s: Elementary Science taught in few schools as focus was on 'Results system'.	1800s	**1831:** System of National Education introduced for Ireland by British Parliament **1866:** Results system introduced. 3 R's main focus in education.
Elementary Science taught in schools with a great interest in Nature, schools gardens and Rural Science.	1900-1922	**1900:** The Revised Programme of instruction was implemented in National Schools. **1904:** An amended science programme with the introduction of Nature and Rural Science formed the basis until 1922.
• Evidence of scientific equipment being used. • Evidence of care of school gardens. • Steady increase during the 1920s and 1930s of schools teaching Nature Study and Rural Science.	1920-1940	**1922:** Implementation of 1st National School Programme **1926:** Implementation of 2nd National School Programme **1934:** The Revised Programme in Instruction. Rural Science and Nature Study ceased to be a compulsory subject.
Large increase in the number of schools teaching Science/ Nature Study. Science not a compulsory subject therefore not taught in many schools	1940 -1971	**1948**: The introduction of a special programme, An Nái-scoil, for Infant classes in 1948. Nature Study was to be taught in infant classes. **1954:** Removal of optional subjects. Nature Study to be adopted as a standard curriculum subject.
Science programme similar to 1900 introduced but teachers had freedom to select topics from Elementary Science/ Nature Study programme. The majority taught aspects of nature.	1971-1999	**1971:** Introduction of the 1971 Curriculum
All strands of the 1999 curriculum to be taught and implemented in schools.	1999	**1999:** Introduction of the 1999 curriculum.

10.6 Possible implications

Current teachers' perceptions of science education based on their feedback in the interviews are not entirely positive. Their attitudes were not overly positive and their responses about barriers and supports to science education lead one to believe that primary education teachers face numerous challenges implementing science education successfully. In the researchers opinion these findings have several implications for practice.

Firstly, based on evidence from the interviews, the content and format of in-service training should be reformed. The focus of in-service training should be based on education teachers' needs. For example, effective teaching strategies and team work are priorities that general education teachers are eager to learn. Also, the traditional format of in-service training should be changed. For example, interactive, and well-designed workshops should be offered in a *semester long format* instead of as a *one-time/ two-time workshop*. Based on the interviews of teachers' they would appreciate more instruction. Goodrum et al[257] also suggests that time and opportunity be provided for teachers "*to increase their skills, confidence and knowledge in science teaching*" thus highlighting the link between teacher confidence and background knowledge in creating the good science teacher. The current teaching experienced teachers interviewed attended two in-service courses for the implementation of the science curriculum. CT3 stated:

> *"I felt together with my colleagues that two in-service days spent on this subject are not enough to gain confidence and knowledge in the teaching of science."*

[257] Goodrum, D .Hackling, M .Rennie,. "*The Status and Quality of Teaching & Learning of Science in Australian Schools*" A Research report prepared for the Department of Education. 2001. p 2

Productive in-service would be a vehicle to sharpen teachers' knowledge and skills in order to prepare them to be confident and competent teachers. Such training will not only help teachers teach students science but it will also prepare teachers to meet the needs of all students in their care during science lessons. Additionally, recruiting skilled, knowledgeable instructors should ensure the quality of the training. Follow-up consultation with coaching would help facilitate the use of teaching strategies, practices, and curricular modifications by workshop participants

Secondly, the establishment of a school wide mentoring system is needed. The current findings indicate that older teachers had more negative perceptions of science education. One of the reasons might be that they had less experience teaching science as a subject during their career and hadn't been trained to do so. Recently qualified teachers benefit from a three-year course on teaching primary science education while in training college. Increased knowledge and confidence in teaching science might occur as mentors interact with teachers. As a result, novice teachers' perceptions of science education might become more positive as teachers' negative or neutral attitudes would change over time as their experience or expertise increases.

10.7 Limitations

Several limitations emerged in this study. Firstly, while the teachers interviewed were very co-operating and forthcoming and provided detail on the teaching of science during their career, when divided into categories of retired teachers, current experienced teachers and recently qualified teachers, there was a small number of teachers in each category.

Secondly, the selection of participants limits the generalization of these findings. Because participants were limited to Primary teachers in Co. Donegal, care must be taken when interpreting the results.

10.8 Future research

Several implications for future research emerged from this study. First, a mix-methods design would be useful to obtain qualitative and quantitative information. Interview methodology was used in the current study together with documentary research. Although a large amount of data was obtained, interview information is limited to Co. Donegal. An in-depth questionnaire countrywide could be used to help better understand teachers' opinions of science education.

Finally, the relationship between teachers' current supports and perceived needs were explored a little in the current study but more information about existing supports should be targeted in future research. It might then be possible to link existing supports with desired resources to help understand and better meet teachers' needs.

10.9 Conclusion

Far from the belief of many, it is certain that science is not a new subject with the introduction of the 1999 curriculum. Science has been in the curriculum for over a century, taught under different guises and in many different ways. Today it is a popular subject with many in education, teachers and pupils alike though there is a need and hunger for in-service training among Irish primary teachers. If this is provided successfully it will clearly contribute towards the better more confident effective science teacher in Ireland! With this

continuing attention to successfully implement science in our classrooms it will help increase the effectiveness of primary science education to ensure that with the implementation of science in the 1999 curriculum, science is here to stay. Irish pupils to be once again, through science teaching, the discoverers – in true Armstrong fashion.

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Appendix A

Consent Letter

Consent letter

Lougherbraghey,
Malin-Head.
Co. Donegal.
27/02/06

Dear _____,

You are invited to participate in a research project investigating science-teaching programmes in primary schools from the late 1800's to the present day. Information obtained from an interview with you will help me research the areas of science that were taught in schools under different curricula.

If you are willing to participate, please sign the consent form. The interview will contain questions regarding what science topics were taught, science methodologies, apparatus and pupils attitude to Science. You should return this signed consent form by **13/03/06**

All information obtained during this research project will be aggregated and remain confidential. Your participation is completely voluntary, and you are free to withdraw at any time and for any reason without penalty. You may also omit any questions you do not wish to answer.

If you have any questions about this research project, please contact me by email at julieannegallagher@yahoo.co.uk or telephone at 0861519236.

Sincerely,

Julieanne Gallagher

****

I have read and understand the above information and voluntarily agree to participate in the research project described above.

Signature: _____

Date: _____

Appendix B

Transcript of Interviews

Each interview was introduced by the following:

Hello _____, I'm Julieanne Gallagher. I am a Primary school teacher, currently working in St. Mary's National School, Malin Head. I am carrying out research investigating science-teaching programmes in primary schools from the late 1800's to the present day. This research is part of my thesis as I am currently undertaking a course to achieve masters in Science. I'll report the results of the interviews in a way that you can't be identified as the source of any information. Any information, which I give to anyone, is also available to you.

This is the pause button. Please use it anytime you wish something not to be recorded. Please use it anytime you want me to erase something you've said.

RT 2: Retired Teacher No. 2

RT 2: Your here about science. I've being thinking about it. In the earlier days when my father was teaching it was common to have a plot of ground. This was for gardening and if it had any official name it was rural science. Then when I went out to teach there was some science equipment there when my predecessors must have used. There was a scale and set of weights, but they were falling to bits at this stage so there must have been some form of science been done. I found a beaker in a cupboard too and some test tubes.

- Interviewer: Around what year was your father teaching in, when there was rural science.

RT 2: This would be in the 20's and 30's. Now! In Cockhill where I went to teach there was a plot of ground at the back of the school. It was well trampled down in my time but it

used to be a garden for the pupils. Well not for the girls, they did sewing and the boys worked in the garden. The boys would dig up the ground and plant it. This would have been done in schools in the 30's but I never heard it been done anywhere in the 50's.

- Interviewer: When did you start teaching?

RT 2: I began on 14th September 1956 in Burt. I subbed for a local TD at the time and worked there for a few years and then began teaching in Carn on 4th January 1961. I was there for 10 years and then went to Cockhill in 1975. I became principal there and retired in 1997.

- Interviewer: When you were training to become a teacher before 1956 was there any mention of Science in primary schools.

RT 2: There was a man who used to take us out to the garden. It was supposed to be some sort of Rural Science. There was a science room but it was only a revision of what science was taught in secondary school.

- Interviewer: Did you ever teach any of this science?

RT 2: I never taught science. Maybe informally now and again. I did a wee bit of botany now and again.

- Interviewer: When you began teaching in 1956, in the curriculum at that time were you meant to teach science?

RT 2: If you could find time you could but we could never find time. In spring they didn't come to school. There was one boy at school three days in the whole year! It was Irish,

English and Maths. Some geometry and algebra was taught after school. The girls did sewing formally and the boys we drew maps. There was talk about grants for equipment but we never seen anything. The curriculum changed in 1971. We knew it was coming for a while. We had to start integration and move as smoothly from one subject to another. I didn't. I always did my hour of maths every morning. I spent over an hour at English and wherever you could I crammed in the rest after that. I loved history, Geography, I knew nothing of science'

- Interviewer: You mentioned that you taught science now and again informally. What did you do?

RT 2: I remember reading about a bottle and sealing it all down with candle grease so it was sealed and water proof. A leafy branch was put it and then water was seen inside the bottle. Where did the water come from? It had come through the leaves! Another little thing two people gave us two nice small pieces of glass. We wet them and put them together and tried to pull them apart. Now what was holding them together? Air pressure! I remembered doing it in secondary school, the preparatory college, we were from the gaeltacht and meant to spread the Irish.

- Interviewer: Did you do anything in the old plot of ground you mentioned with the children?

RT 2: No it was tramped solid and children would just be filthy. All the other teachers I knew didn't really bother about the science when it came in 1971. No body knew what to do. It was a case that if the teacher had an interest and knew a bit about science they a bit like I did now and again. We mainly focused on nature and information in textbooks. There

was no organised science in any form while I was teaching from 1956! We weren't trained or taught what to do in that subject area at training college. New teachers now I hear spend three years at college at college and are taught how to teach science.

RT 3: Retired Teacher no. 3

- Interviewer: In what years were you teaching

RT3: I taught from 1952-1992, for forty years and I'm retired 19 years.

- Interviewer: Do you remember being taught science when you were at primary school, going on nature walks?

RT 3: I was in primary school in the 1930s and I remember seeing science equipment in the Infants room in a glass cupboard. Weighing scales, test tubes in all different sizes but we never used them and I never seen them used with any other class. I changed then to another primary school and not only was there no science equipment there was nothing. Not even a toilet but the schools got good results.

- Interviewer: Did you ever carry out any experiments as a pupil?

RT 3: We never did anything like that.

- Interviewer: When you began teaching did you teach any science?

RT 3: When I began teaching there wasn't any science, it wasn't important. It was just the core subjects as such, Irish, English and Maths. There was music singing Irish Ballads but no art. The girls did so-called sewing!

- Interviewer: When the girls were sewing what did the boys do?

RT 3: The boys just carried on with there other lessons in the main subject areas. In my fathers time he would have taught geometry and algebra because it was part of the maths but not when I was teaching.

- Interviewer: Was there ever a garden around your schools when you were a pupil or when you were teaching?

RT 3: There was a garden but it was just wild! When my father was teaching he wanted us to know how to grow trees, crops and getting things to grow. It was very important then for boys to learn how to cultivate potatoes and carrots.

- Interviewer: As a teacher did you ever talk about the environment with your pupils, keeping it tidy etc.?

RT 3: Ah no, there wasn't much paper around then to throw away and sure the children would be slapped if they did.

- Interviewer: Did you receive training of any sort in science? Was science a subject you had in training college?

RT 3: We did look at bulbs and gardens but there wasn't much emphasis on it and we certainly weren't examined on it.

- Interviewer: With the 1971 curriculum did you find a change?

RT 3: The 1971 curriculum wanted integration and I loved Geography and with teaching in Malin Head there was a lot of geographic sites so I started nature walks and so integrated geography and science. When looking at winds and explaining westerly winds and why Malin Head was such a stormy place in a geography lessons I might end up talking a bit about seagulls and their eggs. That was science because talking about wildlife. I had one good text book 'Study of Nature' by J C Gang, 1967 Evans Brothers Ltd. I talked about the topics in it hedgehogs, sparrows, frogs, potatoes, ducks, wind, cats, snow, pigs, fields, rain, trees, daises, buttercups and pond life. We visited the weather station sometimes in Malin Head as it was beside us. But before I was retiring the books were different with global warming, solar system and then in 1967 in 'Look around 6th class'(Folens) This book had topics on magnets, electricity, the human body, mixtures and food but I didn't know anything about them neither did anyone else! I had no resources or adequate

knowledge to teach these topics with success. I tried small sections that I could to do with nature but I wasn't confident that what I was doing was right. Plenty of other teachers didn't bother with it! I suppose there were the proper science topics but the first time I came across science in primary school was with that book before I retired.

CT 1: Current Teacher no. 1

- Interviewer: When did you begin teaching?

CT 1: I began teaching in 1986 with the senior classes.

- Interviewer: Did you teach science in your classroom?

CT 1: Science wasn't a separate subject it was part of Social and Environmental Studies. Most of the topics I taught were from the standard text books that each pupil had. They were topics about the weather, flowers, and animals and for the older classes there were some chapters on air and water but I never taught any experiments. I just stuck to the topics in the text books.

- Did you ever teach any lessons on magnetism and electricity?

CT1: They weren't on the curriculum then.

- What about topics of heat, sound and light?

CT1: Again they're more topics in the new curriculum. There was some sound in our textbooks but it wasn't scientific with any experiments, more in connection with nature and sounds around us. Science wasn't a topic like it is now in the curriculum.

- Those topics I mentioned are part of elementary science that was to be taught in 5^{th} and 6^{th} classes in SES. There was air, water, heat, sound and light, gravity, and simple experiments.

CT1: Where did you get that information?

- It's in the 1971 curriculum handbook part 2.

CT1: well I never knew they existed, I would probably have had a shock if I knew I had to teach science. Science was never mentioned to us in training college or in any school I taught in. It was all in connection with life and nature! The handbooks weren't looked at often anyway. We looked at the textbooks that came to the schools. They seemed to be more up to date.

- Interviewer:

Did you ever bring your pupils on nature walks?

CT 1: I did once but I needed parents to help supervise and it was difficult talking and keeping the children interested. Again I didn't know much about any trees and plants around to be teaching it.

- Interviewer: What sort of science do you teach now in the classroom? How do you feel teaching it?

CT 1: Well I wouldn't be very confident as a 'science teacher' but the children find it very interesting. The in-service days helped with the topics they covered on the day and I find that when the children work in groups it works well. But there are many other science areas not covered on that day that I haven't attempted yet! There are loads of books now and the school has good resources so I do try and cover the various topics but I'm still trying to get to grip with the 'hands on' approach. I try to follow the curriculum and teach what is to be taught each year but again I'm not confident in some topic areas.

- Interviewer: When you were at primary school were you taught science or any topics like you teach today?

CT 1: The most we got doing in relation to nature and outside was that if it was a sunny day we had the tables and chairs outside. We never did any fun stuff. As far as I can see from teaching the last 20 years is that science came with the new 1999 curriculum.

- Interviewer: What training did you receive in training college for SES.

CT1: It was mainly just about nature and we went on a few field trips to the sea shore, woods etc.

CT 2: Current teacher number 2

- Interviewer: When did you begin teaching?

CT 2 I was trained in 1995 in the last years of the 1971 curriculum and still should have been energetic enough to embrace new changes like science.

- Interviewer: What subjects did you study at college?

CT 2: English, Irish, Maths, Religion, P.E., Art, Music and SES (Social Educational Studies)

- Interviewer: What did you study under the elementary science/ nature study section of SES

CT2: We focused mainly on nature around us, seasonal changes, different animals and their life cycles. We looked at buds, trees and leaves.

- Interviewer: Was there any reference to scientific topics that are on the curriculum now like force, electricity, light, sound etc.?

CT2: I think we had one lecture involving topics like basic sound and light all in connection with nature around us though. We did temperature once looking at Celsius and Fahrenheit, I never used any of it in the classroom because the focus was always on nature, I have forgotten it now in any case.

- Interviewer: Did you ever bring your pupils on nature walks?

CT2: I would have liked to but it would have been a walk and nothing else because I don't know much about the different trees.

- Interviewer: What did you do under SES?

CT 2: Up as far as second class the focus was on nature and civics. This represented looking at life of nurse, doctor, the postman whereas environmental was seasonal changes, lifecycles and there was a big focus on the wren, the budgie, the pig and dormouse for example.

History and geography was first taught in 3rd class but there was no mention of Science. I vaguely remember science being mentioned as a subject in 2000 when the department were talking about a grant that was going to be given to schools for science equipment. Science was something done in secondary school in 1st year!

This sent panic through staff especially older teachers- teachers retired earlier on the basis of computers coming in never mind science. The word science brought up ideas of chemistry experiments and Bunsen burners. That was my opinion of science also, the secondary school experience was what I thought was coming to primary schools. The mention of the grant and science was before anyone knew what exactly was in the curriculum. People didn't know what to do but principles started buying before they knew what was in the curriculum

Hand in hand with the grants and older teachers in panic in particular and principles buying equipment were teachers who had done science degrees and being very eager. Lots of people seemed to have hidden interest in science but we still didn't know what was in this curriculum.

- Interviewer: So science was a new subject to everyone in the primary school?

CT 2: Definitely we seen it as Bunsen burner experiments etc. It was being called a new subject. In the 1971 curriculum we had done nature studies. Science was new.

- Interviewer: How was it implemented?

CT 2: We didn't know but behind the scenes, teachers were being trained in science - I think it was PCSP co-ordinates they were being trained as, behind the science.

We received Irish, English in-service courses but I'm quiet confused about what happened regards Science. I think that some teachers who trained as science co-ordinates were expected to go around these areas just like the in-service trainers in other subject areas. However there was a disagreement I think between the INTO and the Department of Education about the introduction of science so there was a delay in the official department of education Science curriculum in-service days. They didn't really happen until 2002/2003.

Basically the trainers were trained and ready to start in 2000 but the official one was delayed.

Meanwhile teachers had already their secondments in place so primary schools could sign up to avail of science introduction days. These were two half days within the school year at the school. We were very anxious. We all believed that in order to teach science one needed good strong background knowledge in science content. We expected our local co-ordinator Noreen Fiorentini to appear with a Bunsen burner under one arm and a filtration system under the other.

What took place during that first half day session was a realisation on all teachers present and a great sense of relief to some to find that we had been teaching some form of science in the form of nature study. I remember Noreen doing a lesson on mini-beasts. It was nice to realise that the science curriculum was practical work and discussion. She informed us that this was what being a scientist meant and that the science curriculum didn't require a great background of scientific knowledge. We had encountered some of these topics before but instead of using a pen and paper method it was to be more practical. There were no chemicals in sight. But it has pushed civics away. I wish I had been in college like now where they have weekly lessons on science. I love teaching some areas but you have to resource a lot of things yourself for other lessons and it's hard to get the time to do that. I try but I'm not great! Would love a few more inservice days on other topic areas of science to tell you the truth.

RQT 1: Recent qualified teacher number 1

- Interviewer: How long have you been teaching?

RQT 1: This is my third year teaching.

- Interviewer: What are the subjects you teach?

RQT 1: Irish, English, Maths, Geography, History, Science, Drama, P.E, Music, Art and Religion

- Interviewer: Were you prepared for all these subjects in college?

RQT 1: Yes these are all part of the 1999 curriculum and we were trained science under the 1999 curriculum. The first thing we received was a big grey box of curriculum books! We had science lectures every week. They were actually more workshops than lectures. Everyone loved science as it was hands on and very interesting with the various investigations. Even recording our results were interesting; results could be displayed in poster format for example. This is the way that science is to be taught to pupils now in primary schools. Over the course of our college years we were trained in all strands and strand units of the science curriculum. I choose science as my elective subject in my final year.

- Interviewer: What topics do you teach in Science?

RQT 1: Science is such an interesting subject and one of my pupils favourite. We are a well-resourced school now for science. I have 5th and 6th class and I teach topics like light, sound, heat, magnetism and electricity, forces, the environment and materials. Currently my classes are working in-groups in a design and make lesson. They are designing and making a jet plane! They love Science.

- Interviewer: In Materials for example, what sort of lessons can be taught?

RQT 1: Well lessons on solids, liquids and gases is a popular one. Or floating and sinking and materials and change. Like what substances would dissolve in water and what liquids will not mix.

- Interviewer: Do you ever take your pupils for Nature walks?

RQT 1: we are lucky in that the school is beside the water. We don't even have to walk along the main road so it is quiet safe. I take the resource teacher with me the Home School Liaison Teacher to help with supervision. We collect shells, seaweed etc and have discussions. Environmental care can be integrated in these lessons because rubbish can be seen lying around.

- Interviewer: Do you remember if you were taught science in Primary school or taken for nature walks?

RQT 1: Well I'm from the city so I never seen much of nature. No I was never on a nature walk. I think the boys in school did some nature study while we (girls) were taught singing and sewing. it wasn't experimental science with test tubes just talking about nature and birds. Our master was all into birds and brock watching!

Appendix C

Inspectors' School Reports

Inspector report 1949

FÁ DISCRÉID. (458)

Contae Tír Chonaill. Uimh. 13221. Scoil Naomh Brighid.

An Príomh Oide,
[redacted]

MÓR-CHUAIRISC
GENERAL REPORT.

Ainm [redacted] Post i Scoil Príomh-Oide.
Teacher Position in School

The following extracts from the Inspector's General Report on this teacher are forwarded for your information.

LABRÁS Ó MUIRTHE,
Rúnaí Cúnta.

ROINN OIDEACHAIS,
BRAINSE AN BHUNOIDEACHAIS,
BAILE ÁTHA CLIATH, C.8. 2 Bealtaine 1949

Extracts are furnished to the Manager, to the Principal Teacher and to the Teacher reported on. The copy sent to the Principal Teacher should be preserved amongst the school records.

Ainm an Cigire
Name of Inspector [redacted]

Dáta an Mhór-Iniúchta
Date of General Inspection 1. 3. 1949.

1. Éifeacht an Oide in oiliúint na ndaltaí.
Efficiency of Teacher in training pupils.

The teacher maintains effective control. The pupils are man... and respectful and ready and keen in oral response. A featu... of the training ... special commendation is the teache... assiduous attention to character training.

2. Cúinsí neamh-fhabhrach a chuaidh ar obair an Oide.
Adverse circumstances, if any, which have affected Teacher's work.

Rating awarded. Éifeachtach.

(2045) E4729. Wt1947. D195. 10,000. 7-46. F.P.—G28.
(2810) F1886. Wt817. D160. 20,000. 7-47. F.P.—G28.

Subject	Grade	Efficiency of Teaching.
Irish (a) Oral.	Good.	An appreciable improvement in proficiency h been effected since the last General Inspec of the teacher's work. Reading, recitation formal grammar and general conversation are taught in the senior classes. The work in t middle group approaches a very satisfactory standard.
b)written.	Good.	Satisfactory attention is being given to pe ship, written composition, supervision and correction work.
English (a) Oral.	Good.	All sub-divisions of the subject receive cre table attention and with pleasing results.
(b) written.	Good.	
Arithmetic.	Good.	Due attention is being given to oral work an the explanation of basic principles of work generally.
History.	Very Good.	The pupils display a thorough and minute knowledge of the portion of the second year's course taught during the current school year
Geography.	Very Good.	The pupils answer intelligently on a wid course taught, though it would appear that t lessons given on European geography need fur revision.
Singing.	Very Good.	All sub-divisions of the subject receive thorough and very effective treatment.

Scr.....

Inspector report 1953

MÓR-ṪUAIRISC
(GENERAL REPORT)

[redacted]

FAOI RÚN (CONFIDENTIAL).

Contae. Ea... Uimh. [redacted] Scoil. [redacted]

Oide..... [redacted]
Teacher

Post sa Scoil..... Parish Priest
Position in School

Tá na sleachta seo as mór-ṫuairisc an Ċigire ar an oide seo á ṫabhairt ar aird duit
The extracts overleaf from the Inspector's General Report on this teacher are forwarded fo your information.

LABHRÁS Ó MUIRṪE,
Rúnaí Ginearálta.

An Rómh Oideachais,
(Department of Education)

Brainse an Bun-Oideachais,
(Primary Branch)

Baile Átha Cliath,

14/12/53

Ṫugtar sleachta ḋuig an mBainisteoir, ḋuig an bPriomh-Oide agus ḋuig an Oide go mbeadhaḋ mór-ṫuairisc ar a ḋúth oibre. An ċóip a ṫugtar ḋuig an bPriomh-Oide ba ċeart í ḋoimeád i measg cromlaí na scoile.

Extracts are furnished to the Manager, to the Principal Teacher and to the Teacher reported on. The copy sent to the Principal Teacher should be preserved amongst the school records.

Ainm an Ċigire..... M. E. Meade M.A.
Name of Inspector

Dáta an mhór-thuairisc..... 11/11/53
Date of General Inspection.

Ábhar (Subject)	Éifeacht an Teagaisc (Efficiency of Teaching)
Gaeilge - labhairt	Maith : Tátar ag dul chun cinn go [illegible] an gach [illegible].
Gaeilge - a scríobh	Maith : Maith le peannaireacht, néatacht agus cumas ceapadóireachta. Molta go [illegible] [illegible] an oide
Béarla - labhairt	Maith : Léann na daltaí go cruinn líofa agus tugtar aire chuí don díospóireacht ar an téacs. Tá greim an-mhaith ag na daltaí ar an ghramadach.
Béarla - a scríobh	An-Mhaith : Gach gné de.
Uimhríocht	An-Mhaith : Déantar an obair scríofa go cruinn ins [illegible] gach rang. Saothraítear intleacht na ndaltaí tríd an teagasc.
Stair	An-Mhaith : Tá eolas an-tsásúil ag na daltaí ar an chúrsa sa
Tír-eolas	An-Mhaith : [illegible] ábhar

1. Obair an oide in oiliúint na ndaltaí : (Work of Teacher in training pupils).

Tá rian na dea-oiliúna ar na páistí maidir le béasa, slacht agus forbairt intinne.

2. Éinní neamhghnách a chuaidh ar obair an oide : (Adverse circumstances, if any, which affected Teacher's work)

Inspector report 1965

[redacted]
Co Sir-Chonaill

Mór-Thuairisc
(GENERAL REPORT)

Faoi rún (CONFIDENTIAL)

Sir. Chonaill [redacted]

Contae ... Uimh. [redacted] Scoil [redacted]
County Number School

Oide [redacted] Post sa scoil Iar mháinde
Teacher Position in school

Tá na sleachta thall as mór-thuairisc an chigine an an oide seo á gcur as thiall ort mar eolas duit.
The extracts overleaf from the inspector's General Report on this teacher are forwarded for your information.

Tarlach Ó Raifeartaigh
Rúnaí.

An Roinn Oideachais.
(Department of Education)

Bhainse an Bun Oideachais
(Primary Branch)

Baile Átha Cliath,
(Dublin).

12. Iúil 65

Cuirtear sleachta thuig an mbainisteoir, thuig an bpriomh oide agus thuig an oide go mbeannaigh mór thuairisc an a chuid oibre. An éilp a cuirtear thuig an bpriomh-oide ba cheart i gcoimeád i measc cromlíocht na scoile.

Contae (County) Tír Conaill   **Uimir** (Number) 1572[redacted]

Obair an oide in oiliúint na ndaltaí. (Work of teacher in training pupils).

Ábar (Subject)   **Éifeaċt an Teagaisc** (Efficiency of Teaching)

Cuireann an t-oide oiliúint maiṫ ġinearálta ar na páistí, músclann sé suim san obair ionntu tré feiḋm a ḃaint as modanna múinte oiriúnaċa agus coṫaíonn sé an féinmuinín agus an féiniarraċt ionntu go tuisceanaċ.

Déantar an teagasc foirmiúil go coinsiasaċ cúramaċ; baintear caiġdeán fíoréifeaċtúnaċ amaċ i dteagasc na Gaeilge agus an Béarla, idir obair ó ḃéal agus obair scríofa; múintear an uimhríoċt go cúramaċ agus coṫaíttear slaċt san ríomhaireaċt; tá an Stair agus an Ċíreolaíoċt á dteagasc le tuiscint ionnus go ḃfuil suim na ndaltaí á múscailt san obair; i dteagasc an ceol níor mór cur leis an iarraċt lagċeoltóirí a meallaḋ ċun iarraċta.

Éinní neaṁġnáṫaċ a ċuaiḋ ar obair an oide. (Adverse circumstances, if any, which affected teacher's work).

Droċ-ḟoirgneaṁ dorċa

Inspector report 1981

29/1/81

TUAIRISC SCOILE

CONTAE: Dhún na nGall UIMHIR: [redacted] SCOIL: [redacted]

CUNTAS AR OBAIR NA SCOILE

This 4 teacher school is situated at the most northerly tip of Ireland, at Malin Head, in the Inis Eoin Peninsula. There are 3 classrooms in the main building with a further classroom and staffroom and storage facilities available in an older building on the same site. The standard of heating/lighting/toilets in both buildings are acceptable. The school is supplied with a good stock of resources which includes a photocopier/ tape recorders/projectors/record player. A school policy document has been drawn up and it covers most areas of the curriculum.

The Principal Teacher carries out his duties effectively and he receives good co-operation from the staff. School protocal is adequate and the pupils, generally, presented as being well mannered and happy in their environment.

The teachers make regular preparation for their work and colourful displays of charts and other illustrative materials creates a meaningful learning environment in most classrooms. Class, group and individual teaching is practised throughout the school and a special effort is made to cater for the weaker pupils.

Conversation lessons in Irish are regularly tuaght and the pupils, generally, displayed an understanding of the language. It is recommended that more use be made of the language in an incidental way throughout the day as an aid towards greater fluency and communicative ability on the part of the pupils. The standard of the written work in senior stages was fair/good. English reading is well catered for and there was ample evidence of a good prereading programme. The standard of penmanship varied a great deal across the stages and this is an area that could be reviewed. In the teaching of Mathematics due attention is being paid to oral work and the written work, in general, is acceptable. In the Environmental Programme attention is devoted to the immediate environment and the pupils, particularly in the middle section, display an admirable interest in this area. A suitable programme is being pursued in

[redacted]

TUAIRISC SCOILE

[redacted]: Dhún na nGall UIMHIR: [redacted] SCOIL: [redacted]

CUNTAS AR OBAIR NA SCOILE (AR LEAN.)

Art/Craft with good integration with most other areas of the curriculum. The children have a suitable repertoire of songs and the P.E. programme, considering the limitation of space and the weather factor in this area, is adequate.

There is evidence of co-operation between the school, the parents and the managerial authorities. A P.T.A. is in existence and it is hoped that this co-operation will evolve for the benefit of the pupils.

SÍNIÚ: [redacted] CIGIRE DÁTA: 29.1.87

Inspector report 1983

Co. Dhún na nGall..... Uimhir Rolla..... Scoil.....

CUNTAS AR OBAIR NA SCOILE

Tá an scoil dhá oide seo suite i gceantar tuaithe thart fá chúig mhile ó thuaidh ó Bhun Cranncha. Tá radharc álainn le feiceáil ón scoil den timpeallacht cnocach, foraoiseach, maguaird. Tá caoi an-mhaith ar an scoiltheach agus tá moladh faoi leith tuillte ag an gCathaoirleach agus ag an mBord Bainistíochta as úcht an tsli ina gcoimeádtar an foirgneamh agus as na leasaithe iontacha atá curtha i bhfeidhm le déanaí.

Saothraíonn an Príomhoide go dian díograiseach agus comhlionann sé a chuid dualgas go beacht coinsiasach. Cothaíonn sé atmaisféar sona sa scoil agus téann an comhoibriú idir é féin agus an Cúntóir go mór chun tairbhe do na daltaí. Déanann na hoidí ullmhúchan scríofa go rialta agus tá roinnt mhaith léiriúcháin in úsáid - go háirithe 'sna hísealranganna. Eagraítear an scoil mar is gnáth do scoileanna beirt oide agus tá na daltaí roinnte go cothrom ar na hoidí. Cleachtann na hoidí modhanna éifeachtúla teagaisc agus úsáidtear grúpmhodhanna go healaíonta chun freastal ar na daltaí eagsúla. Nótaítear leis go bhfuil sé mar nós sa scoil seo nach bhfanann cuid de na daltaí ach blian amháin 'sna Naíonáin - moltar sa chás, athbhreithniú a dhéanamh ar an nós seo agus ligint dóibh an gnáth tréimhse, i.e. dhá bhlian a chaitheamh sa roinn seo.

Múintear na ceachtanna comhrá Gaeilge go dícheallach tríd an scoil agus léann na daltaí go creidiúnach. Nótaítear leis go mbaintear úsáid as an nGaeilge mar theanga chaidrimh cuid mhór i rith an lae agus tá líofacht nach beag ag na daltaí dá bharr. I dteagasc an Bhearla tá gluaiseacht cheart faoin léitheoireacht agus faoin scríbhneoireacht agus tá caighdeán na peannaireachta go hard. Aithrisíonn na daltaí le brí agus le cruinneas sa dá theanga. Déantar an-chúram de mhór-ranna na Matamaitice agus múintear na bunrialacha go sciliúil agus déantar clárú cuí ar an bhfoghlaim i gcoitinne. Sa Daoneolas/

/.....

CUNTAS AR OBAIR NA SCOILE (AR LEAN)

Eolas Imshaoil labhair na daltaí, sa dá roinn, go muinineach faoin méid a bhí déanta acu. San Ealaín/Ceardaíocht, tá iarracht fhónta á dhéanamh raon leathan gniomhaíochtaí a chur ar fáil do na daltaí agus bhí na samplaí d'obair na ndaltaí go néata maiseach, go háirithe ʻsna híseal ranganna. Leantar cúrsa oiriúnach sa Chorpoideachas agus tá teagasc an Cheoil, go háirithe teagasc na n-amhrán go sásúil.

Tá comhoibriú ceart idir na hoidí agus na tuismitheoirí. Tugann an Príomhoide gach cabhair do na húdaráis eagsúla, mar atá an Bord Bainistíochta agus cuairteoirí oifigiúla eile.

DÁTA....4/8/83.... SÍNIU AN CHIGIRE...[redacted]...

Inspector report 1993

AN ROINN OIDEACHAIS

BRAINSE AN BHUNOIDEACHAIS

TUAIRISC SCOILE
(SCHOOL REPORT)

CONTAE: Dún na nGall UIMHIR ROLLA: [redacted]

AINM NA SCOILE: [redacted]

SEOLADH: Leifear, Co. Dún na nGall.

CATHAOIRLEACH AN BHOIRD BHAINISTÍOCHTA: Rev. Fr. [redacted]

SEOLADH: [redacted], Ifford, Co. Donegal.

(ISA)
01

DÁTA NA TUAIRISCE: 13/5/93

TUAIRISC SCOILE (SCHOOL REPORT.)

CONTAE: Dhún na nGall. UIMHIR: [redacted]

SCOIL: [redacted]

In the Middle/Senior section of the school the Irish conversation lessons were regularly dealt with and the Senior pupils showed evidence of good understanding in this area. The written work of the pupils was, on the whole, well presented, and of a good standard.

MATHEMATICS:

A commendable degree of mastery of the principles of the Mathematics curriculum was displayed by the majority of the pupils. The children in the Infant/Junior section answered promptly and accurately. In the Junior/Middle section the written assignments were neatly recorded and regularly monitored. In the Middle/Senior stages the pupils acquitted themselves well in a written test. Some standardised assessment procedures are in use. Continued use of such instruments is recommended as an aid to determining pupils in need of remediation on the one hand, and as an affirmation tool to the efforts of the teachers/pupils on the other.

SOCIAL AND ENVIRONMENTAL STUDIES:

The programme, across the stages, tends to be environmentally based. The nature/interest table provides a focus for worthwhile learning in the Infant/Junior section. Here, too, the pupils recorded and discussed their findings clearly, in word and in picture. Those pupils in the Junior/Middle stages of the school presented a wide range of good visual material dealing, particularly, with the agents of weathering/erosion. At Middle/Senior level subject areas like Geography and History are given proper consideration.

AESTHETIC AND CREATIVE ACTIVITIES / PHYSICAL DEVELOPMENT:

The Infants had a wide repertoire of verse both for recitation and for singing. The choral work in the Junior section was good and in the Senior class was satisfactory.
The Infant/Junior/Middle stages are given experience of a wide range of techniques in Art/Craft and there was ample evidence of their worthwhile efforts. Art has been used as an integrational force throughout the curriculum, and particularly so in the non-textbook areas, and the display of the pupils work added greatly to the pleasant, colourful surroundings throughout the school.

Inspector reports 2000

TUAIRISC SCOILE (SCHOOL REPORT.)

CONTAE: Dhún na nGall. UIMHIR: [redacted]

SCOIL: [redacted]

This school is the base school for the rural co-ordinator and the principal teacher displayed a conscientious involvement in monitoring this role.

He receives willing and whole-hearted co-operation from the two assistants in the good running of the school and particularly with supervisory duties.

PREPARATION AND PLANNING:

The teachers prepare regularly and diligently for their teaching duties. The standard of general preparation in the infant/junior rooms as evidenced by charts, workcards, art exhibits, projects and interest/nature displays was excellent. The additional space in the C.P. area is well used for display purposes though the fact that it is removed from the main school building means that it cannot impact as positively as one would wish on the pupils.

MATERIAL RESOURCES:

The school has an adequate supply of educational resources among the list being a photocopier, a television, a video, and the usual array of tape recorders and tapes. Recent years have seen the acquisition of computer technology and this has impacted positively on the pupils' presentation skills.

METHODOLOGY / PRINCIPLES OF THE CURRICULUM:

There was a judicious mix of methodologies in evidence throughout the school along a continuum from the traditional approaches to more modern practices. The infant-junior classes used activity methods to good effect. Discovery methods, with the pupils playing a significant part in their own learning, were used effectively in all classes. The pupils, on the whole, presented as being happy in the learning environment and their curricular achievements were laudable.

LANGUAGE:

The language programme in English and Irish was satisfactory in every class. The language acquisition programme in the infant classes was presented with care and the pupils, in this section, displayed a fair grasp of the basic sight vocabulary. Basic reading was well monitored and a progress profile was available on every reader. Approaches to reading

TUAIRISC SCOILE (SCHOOL REPORT.)

CONTAE: Dhún na nGall. UIMHIR: [redacted]

SCOIL: [redacted]

across the stages was effective and in the senior classes twenty of the twenty-three pupils were scoring at or above the fiftieth percentile in the Micra-Test. The pupils displayed a fair/good comprehension of Irish across the stages though this is an area that could be improved upon with further incidental use of the language throughout the day. Poetry and choral verse work was excellent across the stages with good integration between this and other curricular areas.
The written work of the pupils was, on the whole, well presented, regularly monitored and of a good standard.

MATHEMATICS:

The pupils acquitted themselves well in a short written test in the junior-senior classes and they displayed a commendable degree of mastery of a sample selection (about 10%) of the principles of the Mathematics curriculum. The pupils in the infants /junior classes answered well orally and addressed the set tasks accurately. In the senior classes the pupils presented their work neatly and gave evidence of purposeful direction.

SOCIAL AND ENVIRONMENTAL STUDIES:

The programme, across the stages, tended to be environmentally based. The nature/interest table and project work provided a focus for worthwhile learning in the Infant/Junior section. Here, too, the pupils recorded and discussed their findings clearly and had a good knowledge of the wide and interesting range of materials on display. In the senior classes the pupils ably demonstrated their ability to communicate their view of aspects of the History and Geography programmes. These presentations proved interesting and provided a basis for worthwhile further discussion and exploration. I recommended that some of these presentations could usefully be retained in the school as fact/information sheets.

AESTHETIC AND CREATIVE ACTIVITIES / PHYSICAL DEVELOPMENT:

The Infants had a wide and varied repertoire of verse in both languages. These they presented confidently and with obvious enjoyment. The choral work in the junior section was good. All stages presented evidence of a wide range of techniques in Art/Craft and there was evidence, too, of worthwhile integration between this and other curricular areas, particularly in language and Social and Environmental Studies.

TUAIRISC SCOILE (SCHOOL REPORT).

CONTAE: Dhún na nGall. UIMHIR: [redacted]

SCOIL: [redacted].

ASSESSMENT:

Assessment, both formal and subjective, forms the basis for school planning. The Learning Support Teacher who has been appointed since the last School Report educationally supports the pupils at risk. I did not have an opportunity of conferring with this teacher though I understand that the provision is working satisfactorily. The staff, however, would appreciate an increase in the support hours assigned to this school. There is a good rapport between the school and the home. Contacts between both have improved since the advent of Breaking the Cycle and should have a continuing and expanding influence on the education of these children in the future.

CONCLUSION:

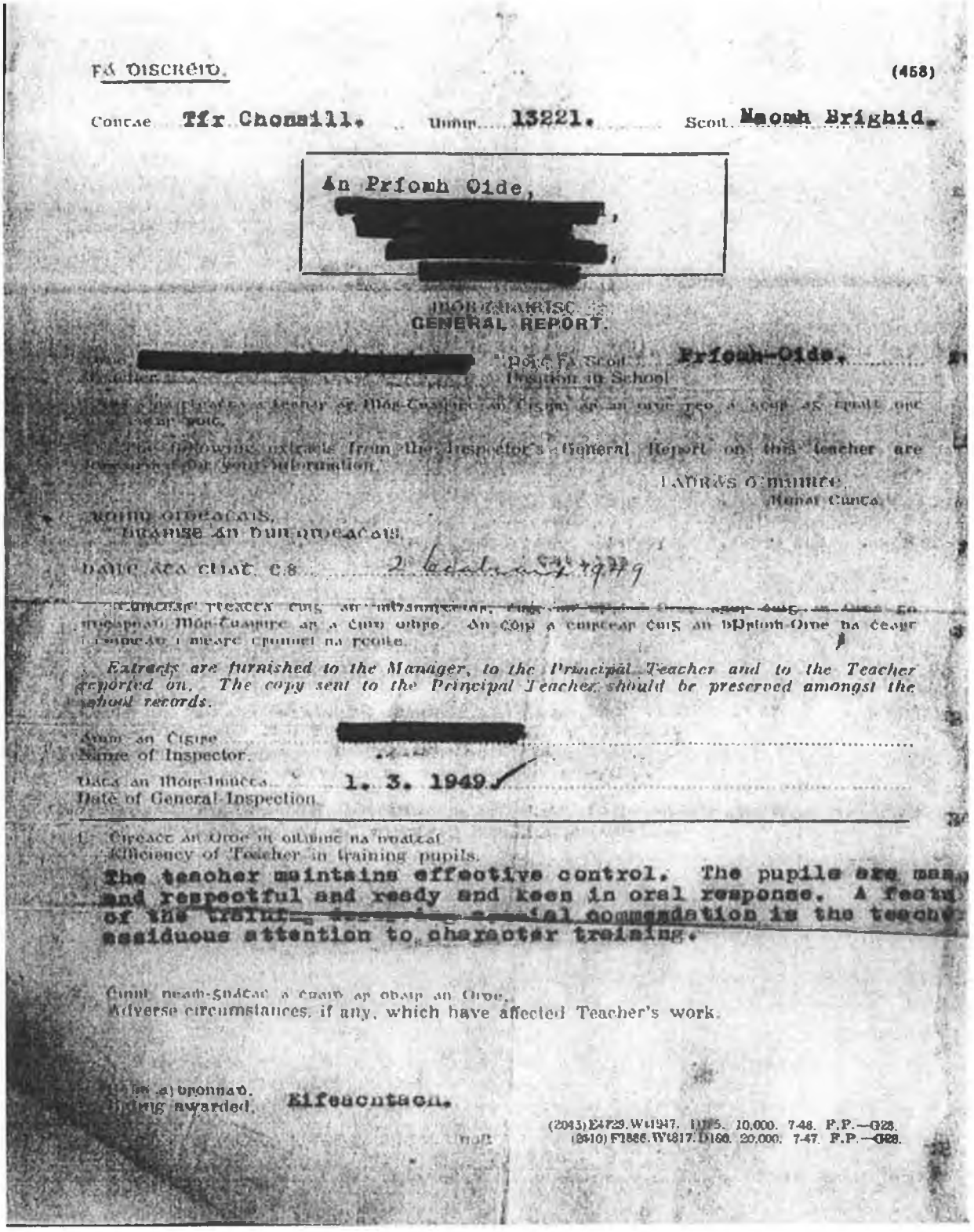
I found this to be a good school with a committed staff and co-operative, enthusiastic pupils. As in the past the fact of the school being located in two buildings creates certain difficulties in terms of organisation of the curriculum and use of resources. These, though, are minor irritants and the staff deserves credit for their efforts and achievements to date.

Síniú: [redacted] Dáta: 3/4/00.

Appendix C

Inspectors' School Reports

Inspector report 1949



FÁ DISCRÉID. (458)

Contae Tír Chonaill. Uimh. 13221. Scoil Naomh Brighid.

An Príomh Oide,
[redacted]

GENERAL REPORT.

[redacted] Príomh-Oide.
Position in School

The following extracts from the Inspector's General Report on this teacher are forwarded for your information.

LÁMH OIDEACHAIS,
Roinn Cuntas.

DATE ACT CHIAT C.S. 2 Feabhra 1949

Extracts are furnished to the Manager, to the Principal Teacher and to the Teacher reported on. The copy sent to the Principal Teacher should be preserved amongst the school records.

Ainm an Cigire [redacted]
Name of Inspector.

Dáta an Mhoiniúcháin 1. 3. 1949
Date of General Inspection.

1. Éifeacht an Oide in oiliúint na bpáistí.
Efficiency of Teacher in training pupils.

The teacher maintains effective control. The pupils are man[illegible] and respectful and ready and keen in oral response. A feat[illegible] of the train[illegible] special commendation is the teache[illegible] assiduous attention to character training.

Cuntas maidir le gnóthaí a chuireann as obair an Oide.
Adverse circumstances, if any, which have affected Teacher's work.

Más [illegible] bronnadh.
Grading awarded. Éifeachtach.

(2043) E4729. W.1947. D.1/5. 10,000. 7-48. P.P.—G28.
(3410) F1866. W.917. D.160. 20,000. 7-47. P.P.—G28.

Subject	Degree of Teasure. Efficiency of Teaching.	
English (a) Oral	Good.	An appreciable improvement in proficiency h been effected since the last General Inspec of the teacher's work. Reading, recitation formal grammar and general conversation are taught in the senior classes. The work in middle group approaches a very satisfactory standard.
(b) written.	Good.	Satisfactory attention is being given to pe ship, written composition, supervision and correction work.
English (a) Oral	Good.	All sub-divisions of the subject receive ore table attention and with pleasing results.
(b) written.	Good.	
Arithmetic.	Good.	Due attention is being given to oral work an the explanation of basic principles of work generally.
History.	Very Good.	The pupils display a thorough and minute knowledge of the portion of the second year' course taught during the current school year
Geography.	Very Good.	The pupils answer intelligently on a wid course taught, though it would appear that s lessons given on European geography need fur revision.
Singing.	Very Good.	All sub-divisions of the subject receive thorough and very effective treatment.

Scr.....DH.....

Inspector report 1953

MÓR-ṪUAIRISC
(GENERAL REPORT)

[redacted]

FAOI RÚN (CONFIDENTIAL).

Contae [redacted] Uimhir [redacted] Scoil [redacted]

Oide [redacted] Post sa Scoil Príomh Oide
Teacher Position in School

Tá na sleachta seo as mór-tuairisc an Chigire ar an oide seo á scur ag chiall duit mar eolas duit.

The extracts overleaf from the Inspector's General Report on this teacher are forwarded for your information.

LABHRÁS Ó MUIRTE,
Rúnaí ~~Comh~~

An Roinn Oideachais,
(Department of Education)

Brainse an Bun-Oideachais,
(Primary Branch)

Daite Áta Cliath,

11/12/53

Cuirtear sleachta chuig an mDaimsteoir, chuig an bPriom-Oide agus chuig an Oide go mbeadnaid mór-tuairisc ar a chuid oibre. An cóip a cuirtear chuig an bPriom-Oide ba cheart i gcomhéan i measc cnuimicí na scoile.

Extracts are furnished to the Manager, to the Principal Teacher and to the Teacher reported on. The copy sent to the Principal Teacher should be preserved amongst the school records.

Ainm an Chigire M. E. Mac Aodh M.A.
Name of Inspector

Dáta an Mhór-Iniúcta 11/11/53
Date of General Inspection.

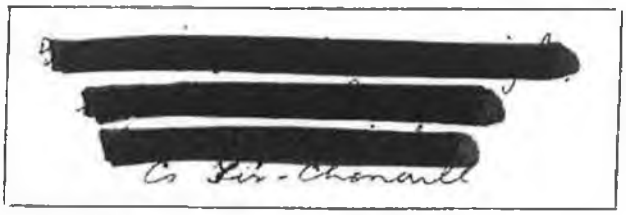
Ábhar (Subject)	Éifeacht an Teagaisc (Efficiency of Teaching)
Gaeilge - labhairt	Maith : Tá tár ag dul chun cinn go [illegible] an [illegible].
Gaeilge - a scríobh	Maith : Maith le foramhóir, neartacha agus cumas ceapadóireachta. Moltar go [illegible] an [illegible]
Béarla - labhairt	Maith : Léann na daltaí go cruinn líofa agus tugtar aire chuig don díospóireacht ar an téacs. Tá greim an-mhaith ag na daltaí ar an ghramadach.
Béarla - a scríobh	An-Mhaith : Gach gné de.
Uimhríocht	An-Mhaith : Déantar an obair scríofa go cruinn [illegible]. Saothraítear intleacht na ndaltaí tríd an teagasc.
Stair	An-Mhaith : Tá eolas an-tsásúil ag na daltaí ar an cúrsa sa
Tír eolas	An-Mhaith : eolas

1. Obair an oide in oiliúint na ndaltaí : (Work of Teacher in training pupils).

Tá [illegible] na dea-oibre ar na páistí maidir le léitheoireacht, slacht agus forbairt intinne.

2. Cinntí neamhghnácha a chuaigh ar obair an oide : (Adverse circumstances, if any, which affected Teacher's work)

Inspector report 1965



Mór-Ċuairisc
(GENERAL REPORT)

Faoi rún (CONFIDENTIAL)

Sir. Conall

Contae [redacted] Uimhir [redacted] Scoil [redacted]
County Number School

Oide [redacted] Post sa scoil Emonde
Teacher Position in school

Tá na sleachta cait as mór-ċuairisc an chigire an an oide seo á gcur as gnáth ort mar eolas duit.
The extracts overleaf from the inspector's General Report on this teacher are forwarded for your information.

Tarlac Ó Raifeartaigh.
Rúnaí.

An Roinn Oideachais,
(Department of Education)

Bhaimse an Bun Oideachais,
(Primary Branch)

Baile Átha Cliath,
(Dublin).

12. Jan 65

Cuirtear sleachta cuig an mbainistreoir, cuig an bprionsa-oide agus cuig an oide go ndéanfaidh mór-ċuairisc an a cuid oibre. An córp a cuirtear cuig an bprionsa-oide ba cheart í coimeád i measc cromlaigh na scoile.

Contae (County) Tír Chonaill   Uimhir (Number) 1572[redacted]

Obair an oide in oiliúint na ndaltaí. (Work of teacher in training pupils).

Ábhar (Subject)   **Éifeacht an Teagaisc** (Efficiency of Teaching)

Cuireann an t-oide oiliúint mhaith ghinearálta ar na páistí, músclann sé suim san obair ionntu trí fheidhm a bhaint as modhanna múinte oiriúnacha agus cothaíonn sé an féinmhuinín agus an féiniarracht ionntu go tuisceanach.

Déantar an teagasc foirmiúil go comhsiasach cúramach; baintear caighdeán fíorchreidiúnach amach i dteagasc na Gaeilge agus an Bhéarla, idir obair ó bhéal agus obair scríofa; múintear an uimhríocht go cúramach agus cothaítear slacht san ríomhaireacht; tá an Stair agus an Tíreolaíocht á dteagasc le tuiscint ionnus go bhfuil suim na ndaltaí á múscailt san obair; i dteagasc an cheoil níor mhór cur leis an iarracht lagcheoltóirí a mhealladh chun iarrachta.

Éinní neamhghnáthach a chuaidh ar obair an oide. (Adverse circumstances, if any, which affected teacher's work).

Droch-Fhoirgneamh Dorcha

Inspector report 1981

29/1/81

2.

TUAIRISC SCOILE

CONTAE: Dhún na nGall UIMHIR: [redacted] SCOIL: [redacted]

CUNTAS AR OBAIR NA SCOILE

This 4 teacher school is situated at the most northerly tip of Ireland, at Malin Head, in the Inis Eoin Peninsula. There are 3 classrooms in the main building with a further classroom and staffroom and storage facilities available in an older building on the same site. The standard of heating/lighting/toilets in both buildings are acceptable. The school is supplied with a good stock of resources which includes a photocopier/ tape recorders/projectors/record player. A school policy document has been drawn up and it covers most areas of the curriculum.

The Principal Teacher carries out his duties effectively and he receives good co-operation from the staff. School protocal is adequate and the pupils, generally, presented as being well mannered and happy in their environment.

The teachers make regular preparation for their work and colourful displays of charts and other illustrative materials creates a meaningful learning environment in most classrooms. Class, group and individual teaching is practised throughout the school and a special effort is made to cater for the weaker pupils.

Conversation lessons in Irish are regularly tuaght and the pupils, generally, displayed an understanding of the language. It is recommended that more use be made of the language in an incidental way throughout the day as an aid towards greater fluency and communicative ability on the part of the pupils. The standard of the written work in senior stages was fair/good. English reading is well catered for and there was ample evidence of a good prereading programme. The standard of penmanship varied a great deal across the stages and this is an area that could be reviewed. In the teaching of Mathematics due attention is being paid to oral work and the written work, in general, is acceptable. In the Environmental Programme attention is devoted to the immediate environment and the pupils, particularly in the middle section, display an admirable interest in this area. A suitable programme is being pursued in

TUAIRISC SCOILE

[redacted]: Dhún na nGall UIMHIR: [redacted] SCOIL: [redacted]

CUNTAS AR OBAIR NA SCOILE (AR LEAN.)

Art/Craft with good integration with most other areas of the curriculum. The children have a suitable repertoire of songs and the P.E. programme, considering the limitation of space and the weather factor in this area, is adequate.

There is evidence of co-operation between the school, the parents and the managerial authorities. A P.T.A. is in existence and it is hoped that this co-operation will evolve for the benefit of the pupils.

SÍNIÚ: [redacted] CIGIRE DÁTA: 29.1.87

Inspector report 1983

Co. Dhún na nGall..... Uimhir Rolla..... Scoil.....

CUNTAS AR OBAIR NA SCOILE

Tá an scoil dhá oide seo suite i gceantar tuaithe thart fá chúig mhíle ó thuaidh ó Bhun Cranncha. Tá radharc álainn le feiceáil ón scoil den timpeallacht cnocach, foraoiseach, maguaird. Tá caoi an-mhaith ar an scoiltheach agus tá moladh faoi leith tuillte ag an gCathaoirleach agus ag an mBord Bainistíochta as úcht an tsli ina gcoimeádtar an foirgneamh agus as na leasaithe iontacha atá curtha i bhfeidhm le déanaí.

Saothraíonn an Príomhoide go dian díograiseach agus comhlíonann sé a chuid dualgas go beacht coinsiasach. Cothaíonn sé atmaisféar sona sa scoil agus téann an comhoibriú idir é féin agus an Cúntóir go mór chun tairbhe do na daltaí. Déanann na hoidí ullmhúchan scríofa go rialta agus tá roinnt mhaith léiriúcháin in úsáid - go háirithe 'sna hísealranganna. Eagraítear an scoil mar is gnáth do scoileanna beirt oide agus tá na daltaí roinnte go cothrom ar na hoidí. Cleachtann na hoidí modhanna éifeachtúla teagaisc agus úsáidtear grúpmhodhanna go healaíonta chun freastal ar na daltaí eagsúla. Nótaítear leis go bhfuil sé mar nós sa scoil seo nach bhfanann cuid de na daltaí ach blian amháin 'sna Naíonáin - moltar sa chás, athbhreithniú a dhéanamh ar an nós seo agus ligint dóibh an gnáth tréimhse, i.e. dhá bhlian a chaitheamh sa roinn seo.

Múintear na ceachtanna comhrá Gaeilge go díchealach tríd an scoil agus léann na daltaí go creidiúnach. Nótaítear leis go mbaintear úsáid as an nGaeilge mar theanga chaidrimh cuid mhór i rith an lae agus tá líofacht nach beag ag na daltaí dá bharr. I dteagasc an Bhéarla tá gluaiseacht cheart faoin léitheoireacht agus faoin scríbhneoireacht agus tá caighdeán na peannaireachta go hard. Aithrisíonn na daltaí le brí agus le cruinneas sa dá theanga. Déantar an-chúram de mhór-ranna na Matamaitice agus múintear na bunrialacha go sciliúil agus déantar clárú cuí ar an bhfoghlaim i gcoitinne. Sa Daoneolas/

/.....

CUNTAS AR OBAIR NA SCOILE (AR LEAN)

Eolas Imshaoil labhair na daltaí, sa dá roinn, go muiníneach faoin méid a bhí déanta acu. San Ealaín/Ceardaíocht, tá iarracht fhónta á dhéanamh raon leathan gníomhaíochtaí a chur ar fáil do na daltaí agus bhí na samplaí d'obair na ndaltaí go néata maiseach, go háirithe ‘sna híseal ranganna. Leantar cúrsa oiriúnach sa Chorpoideachas agus tá teagasc an Cheoil, go háirithe teagasc na n-amhrán go sásúil.

Tá comhoibriú ceart idir na hoidí agus na tuismitheoirí. Tugann an Príomhoide gach cabhair do na húdaráis eagsúla, mar atá an Bord Bainistíochta agus cuairteoirí oifigiúla eile.

DÁTA....4/4/83.... SÍNIÚ AN CHIGIRE...[redacted]...

Inspector report 1993

AN ROINN OIDEACHAIS

BRAINSE AN BHUNOIDEACHAIS

TUAIRISC SCOILE
(SCHOOL REPORT)

CONTAE: Dún na nGall UIMHIR ROLLA: [redacted]

AINM NA SCOILE: [redacted]

SEOLADH: Leifear, Co. Dún na nGall.

CATHAOIRLEACH AN BHOIRD BHAINISTÍOCHTA: Rev. Fr. [redacted]

SEOLADH: [redacted], Ballyford, Co. Donegal.

25A
01

DÁTA NA TUAIRISCE: 13/5/93

TUAIRISC SCOILE (SCHOOL REPORT.)

CONTAE: Dhún na nGall. UIMHIR: [redacted]

SCOIL: [redacted]

In the Middle/Senior section of the school the Irish conversation lessons were regularly dealt with and the Senior pupils showed evidence of good understanding in this area. The written work of the pupils was, on the whole, well presented, and of a good standard.

MATHEMATICS:

A commendable degree of mastery of the principles of the Mathematics curriculum was displayed by the majority of the pupils. The children in the Infant/Junior section answered promptly and accurately. In the Junior/Middle section the written assignments were neatly recorded and regularly monitored. In the Middle/Senior stages the pupils acquitted themselves well in a written test. Some standardised assessment procedures are in use. Continued use of such instruments is recommended as an aid to determining pupils in need of remediation on the one hand, and as an affirmation tool to the efforts of the teachers/pupils on the other.

SOCIAL AND ENVIRONMENTAL STUDIES:

The programme, across the stages, tends to be environmentally based. The nature/interest table provides a focus for worthwhile learning in the Infant/Junior section. Here, too, the pupils recorded and discussed their findings clearly, in word and in picture. Those pupils in the Junior/Middle stages of the school presented a wide range of good visual material dealing, particularly, with the agents of weathering/erosion. At Middle/Senior level subject areas like Geography and History are given proper consideration.

AESTHETIC AND CREATIVE ACTIVITIES / PHYSICAL DEVELOPMENT:

The Infants had a wide repertoire of verse both for recitation and for singing. The choral work in the Junior section was good and in the Senior class was satisfactory.
The Infant/Junior/Middle stages are given experience of a wide range of techniques in Art/Craft and there was ample evidence of their worthwhile efforts. Art has been used as an integrational force throughout the curriculum, and particularly so in the non-textbook areas, and the display of the pupils work added greatly to the pleasant, colourful surroundings throughout the school.

Inspector reports 2000

TUAIRISC SCOILE (SCHOOL REPORT.)

CONTAE: Dhún na nGall. UIMHIR: [redacted]

SCOIL: [redacted]

This school is the base school for the rural co-ordinator and the principal teacher displayed a conscientious involvement in monitoring this role.

He receives willing and whole-hearted co-operation from the two assistants in the good running of the school and particularly with supervisory duties.

PREPARATION AND PLANNING:

The teachers prepare regularly and diligently for their teaching duties. The standard of general preparation in the infant/junior rooms as evidenced by charts, workcards, art exhibits, projects and interest/nature displays was excellent. The additional space in the C.P. area is well used for display purposes though the fact that it is removed from the main school building means that it cannot impact as positively as one would wish on the pupils.

MATERIAL RESOURCES:

The school has an adequate supply of educational resources among the list being a photocopier, a television, a video, and the usual array of tape recorders and tapes. Recent years have seen the acquisition of computer technology and this has impacted positively on the pupils' presentation skills.

METHODOLOGY / PRINCIPLES OF THE CURRICULUM:

There was a judicious mix of methodologies in evidence throughout the school along a continuum from the traditional approaches to more modern practices. The infant-junior classes used activity methods to good effect. Discovery methods, with the pupils playing a significant part in their own learning, were used effectively in all classes. The pupils, on the whole, presented as being happy in the learning environment and their curricular achievements were laudable.

LANGUAGE:

The language programme in English and Irish was satisfactory in every class. The language acquisition programme in the infant classes was presented with care and the pupils, in this section, displayed a fair grasp of the basic sight vocabulary. Basic reading was well monitored and a progress profile was available on every reader. Approaches to reading

TUAIRISC SCOILE (SCHOOL REPORT.)

CONTAE: Dhún na nGall. UIMHIR: [redacted]

SCOIL: [redacted]

across the stages was effective and in the senior classes twenty of the twenty-three pupils were scoring at or above the fiftieth percentile in the Micra-Test. The pupils displayed a fair/good comprehension of Irish across the stages though this is an area that could be improved upon with further incidental use of the language throughout the day. Poetry and choral verse work was excellent across the stages with good integration between this and other curricular areas.
The written work of the pupils was, on the whole, well presented, regularly monitored and of a good standard.

MATHEMATICS:

The pupils acquitted themselves well in a short written test in the junior-senior classes and they displayed a commendable degree of mastery of a sample selection (about 10%) of the principles of the Mathematics curriculum. The pupils in the infants /junior classes answered well orally and addressed the set tasks accurately. In the senior classes the pupils presented their work neatly and gave evidence of purposeful direction.

SOCIAL AND ENVIRONMENTAL STUDIES:

The programme, across the stages, tended to be environmentally based. The nature/interest table and project work provided a focus for worthwhile learning in the Infant/Junior section. Here, too, the pupils recorded and discussed their findings clearly and had a good knowledge of the wide and interesting range of materials on display. In the senior classes the pupils ably demonstrated their ability to communicate their view of aspects of the History and Geography programmes. These presentations proved interesting and provided a basis for worthwhile further discussion and exploration. I recommended that some of these presentations could usefully be retained in the school as fact/information sheets.

AESTHETIC AND CREATIVE ACTIVITIES / PHYSICAL DEVELOPMENT:

The Infants had a wide and varied repertoire of verse in both languages. These they presented confidently and with obvious enjoyment. The choral work in the junior section was good. All stages presented evidence of a wide range of techniques in Art/Craft and there was evidence, too, of worthwhile integration between this and other curricular areas, particularly in language and Social and Environmental Studies.

TUAIRISC SCOILE (SCHOOL REPORT).

CONTAE: Dhún na nGall. UIMHIR: [redacted]

SCOIL: [redacted].

ASSESSMENT:

Assessment, both formal and subjective, forms the basis for school planning. The Learning Support Teacher who has been appointed since the last School Report educationally supports the pupils at risk. I did not have an opportunity of conferring with this teacher though I understand that the provision is working satisfactorily. The staff, however, would appreciate an increase in the support hours assigned to this school. There is a good rapport between the school and the home. Contacts between both have improved since the advent of Breaking the Cycle and should have a continuing and expanding influence on the education of these children in the future.

CONCLUSION:

I found this to be a good school with a committed staff and co-operative, enthusiastic pupils. As in the past the fact of the school being located in two buildings creates certain difficulties in terms of organisation of the curriculum and use of resources. These, though, are minor irritants and the staff deserves credit for their efforts and achievements to date.

Síniú: [redacted] Dáta: 3.4.'00.