

The Armagh Observatory and Planetarium Accounts for 2005/2006, Year Ended 31 March 2006

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Foreword to the Accounts

Background

The Armagh Observatory and the Armagh Planetarium are distinctive organizations, part of a single corporate entity “The Governors of the Armagh Observatory and Planetarium” described in the Armagh Observatory and Planetarium (Northern Ireland) Order 1995, which superseded the original 1791 Act, an Act for Settling and Preserving a Public Observatory and Museum in the City of Armagh for ever, and amending legislation in 1938. The 1995 Order was subsequently amended by the Audit and Accountability (Northern Ireland) Order 2003, Schedule 1, paragraph 6. The corporation is registered as a charity under section 505 of the Income and Corporation Taxes Act 1988.

The Armagh Observatory (see <http://star.arm.ac.uk/>) is a modern astronomical research institute, the oldest scientific institution in Northern Ireland. Founded by Archbishop Richard Robinson in 1790 as part of his dream to see the creation of a university in the City of Armagh, the Observatory stands close to the centre of the City of Armagh together with the Armagh Planetarium in approximately 14 acres of attractive, landscaped grounds known as the Armagh Astropark. The Observatory Grounds and Astropark, which are managed by the Observatory, include scale models of the Solar System and the Universe, two sundials and two historic telescopes, as well as telescope domes and other outdoor exhibits (see <http://star.arm.ac.uk/astropark/>). A new public outreach facility, the Armagh Human Orrery (see <http://star.arm.ac.uk/orrery/>), is located close to the historic main building of the modern Observatory. The Observatory’s Library and Archives, and its specialist collection of scientific instruments and artefacts associated with the development of modern astronomy over more than two hundred years, rank amongst the leading collections of their kind in the UK and Ireland.

The Armagh Planetarium was founded by Dr Eric Mervyn Lindsay, the seventh director of the Armagh Observatory, and was officially opened on 1 May 1968, the first in Ireland and one of the first in the UK. The Armagh Observatory and the Armagh Planetarium operate under separate directors and receive core funding from the Northern Ireland Department of Culture, Arts and Leisure. The total staff and student complement is approximately 40: 30 in the Observatory and 10 in the Planetarium.

Aims and Objectives

The aim of the corporation is to advance the knowledge and understanding of astronomy and related sciences through the execution, promotion and dissemination of astronomical research nationally and internationally in order to enrich the intellectual, economic, social and cultural life of the community.

Principal Activities

The principal function of the Armagh Observatory, which is a third-level institution funded by the Northern Ireland Department of Culture, Arts and Leisure (DCAL), is to undertake original research of a world-class academic standard that broadens and expands our understanding of astronomy and related sciences. Research interests of Observatory staff currently focus on (i) Stellar and Galactic Astrophysics (including brown dwarfs, hot stars, helium stars), (ii) the Sun (the dynamic solar atmosphere, chromosphere and corona), and (iii) Solar System Astronomy (including celestial mechanics, planetary science, the interrelationships between comets, asteroids, meteoroids and interplanetary dust, and NEOs). In addition, Observatory staff participate in an active programme of education, lifelong learning and public outreach via lectures, popular astronomy articles and interviews with the press, radio and television, as well as providing advice to the general public and undertaking occasional Observatory tours. Further details concerning the research interests of the Observatory staff may be obtained from the Observatory web-site at: <http://star.arm.ac.uk/>. In addition to this primary research role, the Observatory maintains a unique 210-year long meteorological record and data-bank (<http://climate.arm.ac.uk/>), the longest in the UK and Ireland from a single site, and has an important responsibility to maintain and preserve the fabric of the historic buildings, the library, historic books and archives, and the collection of scientific instruments and other artefacts built up over more than 215 years of continuous astronomical activity in Armagh. The main historic buildings of the Observatory have unique architectural features and together house some of the most valuable collections of scientific books, instruments and archives in Northern Ireland.

The Armagh Planetarium is a leading educational establishment whose primary function is to disseminate knowledge of a wide range of science and to promote the public understanding of astronomy and science through its programme of educational services for schools and the wider public. Staff deliver interactive presentations using the latest projection and information technology to all age groups and abilities on a wide range of astronomical and scientific topics, including meteorite impacts, the planets, current astronomical phenomena and Earth sciences. The Planetarium, also through the large number of visitors coming through its doors, plays an important role in promoting and enhancing tourism within Armagh City and District.

Equal Opportunities Policy

The corporation is an equal opportunities employer, committed to ensuring that the talents and resources of all members of the corporation are utilised to the full. The corporation does not discriminate directly or indirectly on the grounds of religious belief, political opinion, trade union membership, gender, marital status, sexual orientation, age, disability, race, colour or ethnic origin, against any member of staff, full-time or part-time, or job applicant, actual or potential, in any aspect of the corporation’s activities, including matters of recruitment, training, promotion, appointment, nomination or selection for any position, job transfer or redundancy.

Policy on Payment of Suppliers

The corporation is committed to the payment of all invoices not in dispute within agreed contractual terms or within 30 days of the presentation of a valid invoice, or delivery if later. In the year ended 31 March 2006, 100% of Armagh Observatory invoices and 99.9% of Armagh Planetarium invoices were paid within these limits.

Auditors

Under the Audit and Accountability (Northern Ireland) Order 2003, responsibility for the audit of the accounts of the Armagh Observatory and Planetarium has been vested in the Comptroller and Auditor General for Northern Ireland.

Employee Information and Consultation

The corporation takes every opportunity to inform and consult with all members of the organisation on the corporation's activities and plans for the future through the dissemination of annual reports and operational plans, the provision of the latest information on research, educational and other activities through the web-sites, regular formal and informal briefing and discussion meetings, and consultations with staff representatives on employment-related and operational policies and procedures.

Further information is available on the Observatory at <http://star.arm.ac.uk/>, and on the Planetarium at <http://www.armaghplanet.com>.

Corporate Governance

Board of Governors

The Board of Governors comprises the Church of Ireland Archbishop of Armagh (Chairman), the Dean and Chapter of the Church of Ireland Cathedral of Armagh, 1 DCAL nominee, 1 Queen's University Belfast (QUB) nominee, and up to 3 additional members nominated by the Board of Governors. Nominees normally serve for an initial period of 5 years with the possibility of extension.

Chairman: His Grace, The Most Reverend Dr R.H.A. Eames, The Lord Archbishop of Armagh
The Very Reverend Dean H. Cassidy, St. Patrick's Cathedral, Armagh (To 31 January 2006)
The Venerable Archdeacon R.G. Hoey, Camlough
The Reverend Canon J.M. Barton, Acton
The Reverend Canon W.J.A. Dawson, Pomeroy
The Reverend Canon J.W. McKegey, Armagh
The Reverend Canon C.F. Moore, Newtownhamilton
The Reverend Canon H.J.W. Moore, Ballinderry
The Reverend Canon R.J.N. Porteus, Derryloran
The Reverend Canon F.D. Swann, Drumglass
Councillor W. Gardiner-Watson (DCAL Nominee – Re-appointed from 1 April 2005 to 31 March 2010)
Professor A. Hibbert, Queens University Belfast (QUB Nominee)
Lord Ballyedmond, Ballyedmond Castle, Rostrevor (Board of Governors Nominee)
Professor J.E. Dyson, University of Leeds (Board of Governors Nominee – from May 2005)

Management Committee

The Management Committee, an advisory committee to the Board of Governors, comprises the Church of Ireland Archbishop of Armagh or his nominee (Chairman), 3 Nominees from the Board of Governors, 4 DCAL nominees, 1 QUB nominee, 1 Particle Physics and Astronomy Research Council (PPARC) nominee, 1 Dublin Institute for Advanced Studies (DIAS) nominee, and up to 4 additional members co-opted by the Board of Governors. Nominees and those co-opted by the Governors normally serve for an initial period of 3–5 years with the possibility of extension.

Chairman: His Grace, The Most Reverend Dr R.H.A. Eames, The Lord Archbishop of Armagh
Deputy Chairman: Dr F.N. Byrne (Co-opted, Board of Governors)
The Venerable Archdeacon R.G. Hoey, Camlough (Board of Governors Nominee)
Professor J.E. Dyson, University of Leeds (Board of Governors Nominee – from May 2005)
Professor A. Hibbert, Queens University Belfast (Board of Governors Nominee – from March 2005)
Dr E.M. (Á.) Downey (DCAL Nominee)
Mrs S. Hogg (DCAL Nominee)
Mrs M. Cruickshank (DCAL Nominee)
Professor P.L. Dufton, Queens University Belfast (QUB Nominee)
Professor M.R. Merrifield, University of Nottingham (PPARC Nominee)
Professor L. Drury, Dublin Institute for Advanced Studies (DIAS Nominee)
Sir Kenneth Bloomfield (Co-opted, Board of Governors)

Directors and Secretary

Professor M.E. Bailey — Director, Armagh Observatory
Dr T.R. Mason — Director, Armagh Planetarium
Mr L.F. Young — Secretary

The Armagh Observatory — Operating Review

Research Highlights

The following research highlights, performance indicators for 2005/2006, and the objectives for 2006/2007 are extracted from the Armagh Observatory Annual Report for Calendar Year 2005 (Financial Year 2005/2006), which contains an extensive summary of the whole of the Observatory's principal research and other activities during 2005. The full report is available at <http://star.arm.ac.uk/annrep/> or by contacting the Administrator at the Armagh Observatory, College Hill, Armagh, BT61 9DG, tel. +44-28-3752-2928; e-mail: info@arm.ac.uk.

Stellar Astrophysics

During the year the stellar astrophysics groups have published papers on subdwarf B stars, which are highly evolved low-mass stars, most being about half the mass of the Sun and with helium-burning cores, on extreme helium and post asymptotic giant branch stars, and theoretical and computational astrophysics.

Subdwarf B Stars Subdwarf B (sdB) stars are highly evolved stars which vibrate with many different frequencies. Such vibrations enable astronomers to establish the structure of a star with unusual precision. The Observatory has been involved in a series of campaigns to use the phenomenal high-speed camera ULTRACAM on the 4.2m William Herschel Telescope (WHT) in La Palma, and in 2005 — for the first time — on one of the 8m units of the Very Large Telescope (VLT) in Chile.

At the VLT, members of the stellar astrophysics group teamed up with Conny Aerts (Nijmegen and Leuven) to observe the subdwarf B star PG1336–018. This is a short-period variable which is alternately eclipsed and reflected by an unseen binary companion every 2½ hours. In August, they again teamed up with Aerts, and also with Gilles Fontaine (Montreal) and Stéphane Charpinet (Observatoire Midi-Pyrénées) to observe the bright subdwarf B star Balloon 090100001. This star pulsates simultaneously in short-period pressure modes and long-period gravity modes. The observing campaign combined the light-gathering power of the WHT with that of the 4m Canada-France-Hawaii Telescope and the 2m Himalaya Chandra Telescope to obtain data around the clock for 6 days.

The goal of these observations is to disentangle the different frequencies present and to compare the *amplitude* of each oscillation in red, green and ultraviolet light. This enables the spherical degree (or shape) of each oscillation to be identified, and thus assists a comparison with theoretical pulsation models. This is the process of *asteroseismology*, the science of probing a star's interior by studying oscillations on its surface.

Cool Stars The cool stars group researches primarily into a class of very low-mass stars known as brown dwarfs. The means by which a dwarf star such as the Sun develops and maintains a highly ionized layer known as the corona in its outermost atmosphere remains uncertain. What is clear, however, is that the presence of a corona is intimately linked to the existence of the magnetic field. We know that magnetic activity is common amongst late-type stars, in particular, M-type dwarfs, with the frequency and strength of the quiescent H α emission indicating the presence of a hot chromosphere.

For cooler stars, including ultra-cool late-type M, L and T dwarfs, H α emission declines rapidly both in strength and frequency of detection, so that few field objects later than L5 exhibit any detectable optical emission. Similar trends are found for the quiescent X-ray emission. Below the stellar mass limit ($\approx 0.075M_{\odot}$) the realm of brown dwarfs has attracted immense attention since such objects were first conclusively identified in 1995. Below this mass limit the stellar cores are no longer able to reach the temperatures necessary for sustained hydrogen fusion, although deuterium burning can last for a short time.

The reduction in both chromospheric and coronal emission is in broad agreement with theoretical models: i.e. the cool, dense atmosphere implies low ionization fractions and thus high electrical resistivities, leading to decoupling of the lines of magnetic force from the gaseous motions in the star's upper atmosphere. As a result, the available free magnetic energy for support of a chromosphere and corona becomes smaller with later spectral type. Nevertheless, the occurrence of flare activity does not drop off as rapidly as the quiescent emission, as objects as late as L5 have been observed in outburst. Hence, the presence of flares (in H α and X-rays) from these very late-type dwarfs provides strong evidence that magnetic fields are still present, although how these are transmitted through the largely neutral atmosphere is unclear.

Given these considerations, it was expected that non-thermal radio emission from brown dwarfs should be weak or absent in accordance with empirical correlations involving a range of late-type objects. However, in recent years a number of confirmed radio detections have now been made at and below the sub-stellar boundary, violating this relation by up to four orders of magnitude. This suggests that high-energy electrons are present somewhere in the vicinity of ultra-cool dwarfs, although their chromospheric and thermal coronal emission is suppressed.

Over the next few years the brown dwarf group will study this question using four principal lines of investigation: (1) new VLA and e-MERLIN observations of ultra-cool field dwarfs; (2) EVN observations of selected dwarf stars; (3) modelling; and (4) a limited amount of optical observations of ultra-cool dwarfs in young star clusters, showing H α in emission.

Star Formation During the year, the star formation group has focused primarily on understanding the physics of protostellar jets: outflows of material from young stars which play a key role in the star formation process. The group is particularly interested in studying the influence of the environment on the observable characteristics and evolution of the jets, and specifically how non-uniform external media influence the propagation of the outflow.

Planetary Science

Faulkes Telescope Observations of the New ‘Planet’ 2003 UB₃₁₃ In July 2005, Elizabeth Connolly (Loreto Grammar School, Omagh), a Nuffield bursary student using Faulkes Telescope North, made an impromptu observation of a newly announced minor planet — labelled 2003 UB₃₁₃. Assisted and supervised by Armagh Observatory staff, this was the first observation from the island of Ireland of the solar system’s most significant addition in over 70 years. More recent observations have shown ‘Planet X’ to be significantly larger than Pluto. As a result, Elizabeth was interviewed on *UTV Live*, she was selected to speak on behalf of all Northern Ireland Nuffield bursary students at the Nuffield awards ceremony, and also selected by the President of Ireland to talk about her project and the Observatory during the latter’s visit to Loreto school in 2006 January.

Mutual Events Between Planetary Satellites Building on the Observatory’s initial experience with observing the mutual eclipses and occultations between Jupiter’s satellites during the 2002/2003 season, predictions for 320 similar events occurring among the five major Uranian satellites (Ariel, Umbriel, Titania, Oberon and Miranda) from 2006 to 2009 have been generated, of which about half should be detectable from different longitudes around the world. A world-wide campaign of photometric observations of these events will yield significant new information on the Uranian satellite system.

These Uranian mutual events are extremely rare, occurring once every 42 years (half a Uranian orbital period). Since Uranus will not be visited by spacecraft in the foreseeable future, the events represent an excellent, and perhaps the only, opportunity to bring our level of knowledge of the satellites’ orbits up to that of the satellites of Jupiter and Saturn. Predictions were published in *Icarus* in November 2005 and also presented at the 2005 American Astronomical Society DPS meeting in Cambridge. Test observations of the Uranian satellite system have also been made using the Faulkes Telescope North in Hawaii, in collaboration with Fraser Lewis at the University of Cardiff. Provisional arrangements have been made to observe the first batch of mutual events using the Faulkes Telescope South in 2006.

Irregular Satellites All four giant planets possess irregular satellite systems. Sometimes one satellite will make a moderately close approach to another satellite orbiting the same planet. Armagh Observatory staff are investigating the possibility that the gravitational deflection induced on one satellite by the other could cause an orbital change that is measurable on a useful timescale (i.e. within a couple of decades or so from the present). This would allow the mass of the deflecting satellite to be estimated. Knowledge of the masses of planetary satellites provides an invaluable tool to constrain their densities and thus their origin and collisional history by proxy. Options for studying these effects observationally will be evaluated in detail.

Origin of Comets Staff have continued to work with Professor V.V. Emel’yanenko (South Ural University, Russia) on dynamical questions related to the origin of comets, whether from the Oort cloud or the high-eccentricity trans-Neptunian region. A numerical study of an ensemble of orbits, based on observed objects in the Near-Neptune High-Eccentricity (NNHE) region with perihelion distances q in the range $28 < q < 35.5$ AU and semi-major axes a in the range $60 < a < 1000$ AU, was used to predict the orbital distribution of Centaurs ($5 < q < 28$ AU) for comparison with observations after correcting for discovery biases. The majority of Centaurs produced in this way were found to have $a \leq 60$ AU. However, the intrinsic number of observed Centaurs is dominated by longer period objects, the number with $a > 60$ AU being roughly an order of magnitude greater than that for $a < 60$ AU, and therefore inconsistent with a source in the NNHE region. It was also found that the observed distribution of Centaurs with $a \leq 60$ AU was somewhat inconsistent with this source, although it is conceivable that the discrepancies might be explained by factors such as out-gassing, splitting or varying albedo not included in the numerical model. Thus, although Centaurs *can* be produced from the NNHE region, their numbers and orbital distributions are not consistent with this region being the dominant source for all Centaurs. This work therefore concluded that there must be another source flux, particularly to explain the longer period, intrinsically more populous group of Centaurs, and suggested that the most likely source for these objects is the Oort cloud. In this way, the work re-opened the question of the dominant source of Jupiter-family comets: whether from the Oort cloud, a possibly somewhat flattened inner core of the Oort cloud, or a flattened, near-Neptune trans-Neptunian disc; and predicted that there should be at least two different sources for observed Jupiter-family comets.

Meteors in Planetary Atmospheres Armagh Observatory staff have published a review paper on meteor shower forecasting; made results on Taurids, Leonids and other meteor showers (based on their previous computational models) available to interested parties; and demonstrated a variety of inconsistencies between currently widely believed assessments of the impact hazard and the number of near-Earth objects observed to have actually approached the Earth. There is evidence that current assessments may underestimate the impact hazard and that a substantial population of rather dark (and hence not easily observed at large distances) objects populate interplanetary space.

Also on the theoretical modelling front, staff have studied the physics of meteors in the atmospheres of Mars and Venus, including large-scale simulations of meteor showers in the atmospheres of Mars and Venus, which are potentially observable from orbiting spacecraft.

Solar Physics

During 2005 the solar physics group has published the results of a wide range of investigations into the dynamics of the solar atmosphere, including the time-evolution of solar spicules and so-called ‘blinkers’; the electron densities in coronal bright points; coronal oscillations in the vicinity of a sunspot; the causes of the excitation of standing acoustic waves in coronal loops; evidence for explosive activity originating in the Sun’s chromosphere; and so on.

Over the past decade there have been many very significant developments in solar physics, leading to a better understanding of many of the solar activity phenomena. Based on observational facts about their physical origin, we are able to build more precise models aimed at describing these phenomena. A great deal of observational effort has been directed towards the problem of understanding coronal heating mechanisms based on large-scale magnetic loops. However, these occupy only 10% of the solar surface. Less attention has been paid to the remaining 90%, where the magnetic fields are concentrated into small-scale magnetic flux tubes. When observed with high spatial and temporal resolution, the 'quiet' Sun is anything but quiet showing its dynamic nature through quasi-periodic fluctuations in the intensity and Doppler shift of spectral lines emitted in the solar chromosphere, transition region and corona. The dynamics of the solar atmosphere is displayed through transient phenomena such as spicules and macrospicules (jet-like structures) seen in chromospheric and transition region lines, UV (ultra-violet) brightenings, transition-region blinkers (a term introduced to describe an enhancement in the intensity of transition region lines), UV bi-directional jets (known as explosive events), and coronal UV and X-ray bright points. The main thrust of our work is to understand the interrelationships between these features and their connection to the heating in the upper atmosphere.

In order to investigate these events, Armagh Observatory staff use a combination of high-quality spectral data from spectrometers onboard SoHO, imagers onboard SoHO and TRACE, ground and space-based magnetogram data, plus MHD and HD modelling, in combination with high-quality atomic physics input to investigate the line formation process and to produce model line profiles for comparison with observations. Determining in detail the observational signatures of magnetic reconnection and/or propagating waves, and finding out which of the many proposed regimes of reconnection or which type of waves are operating, has fundamental significance for understanding the chain of heating processes that generates and sustains the million degrees hot solar corona.

Over the past 7–8 years, many authors have suggested that these small features are unrelated. However, new simultaneous spectral and imaging data and its interpretation suggest that it is time to look again. Misinterpretation can and has resulted from single frequency observations. The picture emerging from our work suggests a sequence of events beginning with cancellation of photospheric magnetic fields, which pass through shock formation, resulting in transition region jets or micro-flares. Hence, starting from the collision of flux tubes, if the angle between the resulting shocks is head-on then no flows are produced (i.e. only a brightening, termed a blinker). If the shocks have the correct angle, then flows are produced (i.e. explosive events jets); and if the interacting flux tubes collide in the vicinity of a vertical magnetic field, then perhaps this is the starting point of the fast solar wind.

With the pending launch of Solar-B, coupled with SoHO and TRACE missions, the Sun is accessible to highly-detailed remote-sensing observations which should lead to an improved understanding of these basic physical processes in the solar atmosphere. The suite of projects currently under investigation is extensive and requires people with experience in the reduction of multi-instrument data, e.g. high spectral resolution data, imaging, and atomic physics knowledge, if we are to address all of them.

Climate

The climate research group has published a further six volumes in the Armagh Climate Series. Printed versions of these papers have been deposited in several UK and Irish climate archives for long-term storage. All these climate data sets are now available for historical and scientific research and to the general public via the Observatory's Climate web-site (see <http://climate.arm.ac.uk/>).

Technical Equipment

Technical equipment at Armagh, which is used primarily for numerical analysis, computer modelling and data reduction, is funded by the PPARC, PRTLI, and the DCAL. Facilities presently comprise several iMac workstations, approximately 40 Linux workstations and peripherals, and a computer cluster comprising 25 dual-processor work nodes and one master node with a total of 50 GB memory. These are used mainly for computationally intensive research projects in areas such as solar physics, stellar atmospheres, numerical magneto-hydrodynamics, and solar system dynamics.

The internal network is a 1 Gbps backbone ethernet linked with switched hubs. The external network is connected to the Joint Academic Network (JANET) through a 10 Mbps link provided through the Observatory's participation in the Northern Ireland Regional Area Network (NIRAN). The increase in the Observatory's network capacity together with a continuing programme of equipment upgrades will enable the Observatory to participate in important new developments such as the Virtual Observatory, the UK AstroGRID, the European Grid of Solar Observatories, the ESA SpaceGRID, and GRID Ireland. Access to Grid technology is currently provided via CosmoGrid (<http://www.cosmogrid.ie/>). This will provide access to three high-performance supercomputer clusters, each comprising 128 x 1 GHz PCs, one in Galway and two in Dublin (DIAS and UCD).

Armagh Observatory staff regularly receive awards of telescope time on national and international facilities, and research grants from various grant awarding bodies. The Observatory is also a member of the UK SALT Consortium (UKSC), providing access to the 10-metre class SALT telescope (the Southern African Large Telescope, see <http://star.arm.ac.uk/SALT/>), located at the Sutherland Observatory, South Africa. Restoration of the Observatory's historic telescopes has brought opportunities to reintroduce professional observing from Armagh, both for research and student training, and particularly through the use of the 18-inch Calver reflector equipped with a new CCD camera and by the establishment of a new video system systematically to record meteors. The latter was installed on the roof of the main building and has now been fully operational since June 2005. The system has already accumulated many gigabytes of data which will be analyzed by a PhD student.

Education and Public Outreach

The scientific, cultural and architectural heritage provided by astronomy at Armagh is a highly significant asset for the whole of Northern Ireland. The Observatory's collection of scientific artefacts, instruments and historic telescopes spans virtually every aspect of modern astronomy, while its Grounds and Astropark provide a unique addition to the 'Gardens of Armagh' as well as an opportunity for visitors to tour a scale model of the solar system and the wider Universe. In many cases, the underlying motivation and reasons for the developments in astronomy at a particular time can be explained with reference to discoveries at Armagh, or to material held within the Library and Archives. These facilities provide astronomers at Armagh with a unique opportunity to explain the development of astronomy and related sciences over more than two hundred years and the context in which modern research is carried out.

The Armagh Observatory thus has important responsibilities to (a) maintain and preserve the fabric of the historic buildings, the library, historic books and archives, and the collection of scientific instruments and other artefacts built up over more than two hundred years of astronomical activity in Armagh, and (b) advance public understanding of science, and of astronomy in particular. These responsibilities lead to the important secondary objectives for the Observatory to contribute to lifelong learning and to promote a broader public understanding of astronomy and related sciences. This is achieved in a variety of ways, for example by:

- attracting visitors to Armagh, primarily to the Armagh Observatory Grounds and Astropark, and to the Human Orrery and Phenology Garden;
- disseminating knowledge of the Observatory's unique meteorological record, the longest in the UK and Ireland from a single site, and maintaining and extending it in the long term;
- widening knowledge of the Observatory's *cultural* heritage, for example its listed buildings, library, archives and historic scientific instruments, the telescopes and telescope domes, and the historical development of the Observatory's landscaped Grounds and Astropark;
- providing talks and presentations to individuals and groups encompassing people of all ages and from all backgrounds;
- developing links with institutions and organizations having similar public education objectives to those of the Armagh Observatory, for example the Astronomical Science Group of Ireland, the Armagh Natural History and Philosophical Society, the Armagh Visitor Education Committee, the Irish Astronomical Association and other astronomy organizations, and university research groups and research institutes;
- ensuring that technical questions from members of the public about astronomy can be answered, and that the results of astronomical research are disseminated widely to the press, radio and television; and
- maintaining and developing the Observatory's web-site as a rich and versatile educational resource with the facility to widen access to the latest research findings on astronomy and related sciences and to the Armagh Observatory's history and heritage.

Performance Indicators

The Armagh Observatory has achieved considerable success during the past year. Staff have produced a record 46 publications in refereed scientific journals during the year, and both the number of identified media citations (349) and the number of Distinct e-Visitors to the Observatory web-sites (<http://star.arm.ac.uk/>, <http://climate.arm.ac.uk/> and <http://arpc65.arm.ac.uk/~spm/>), namely 1,012,000, were also record figures. The number of refereed scientific journal publications represents just a fraction of the Observatory's total scientific output.

Staff at the Observatory have also obtained external grants and other income totalling £220,966 during the period (£207,947 in external grant receipts), maintaining the current high levels of external, non-DCAL support for astronomy at Armagh. These have averaged in excess of £250,000 per year over the past decade, nearly 40% of the present level (£666,500) of total DCAL core funding to the Observatory. The associated high level of astronomical activity at Armagh demonstrates an extremely good return per unit of core DCAL funding.

In the same period, Armagh Observatory staff have delivered 82 talks and other scientific contributions at meetings both locally and abroad, slightly less than the number (93) in 2004, and have expanded its currently very active programme of formal seminars and internal colloquia at the Observatory (30 such talks, more than in any previous year).

A notable milestone was the inauguration of the Southern African Large Telescope (SALT), on 10 November 2005. The management and staff of the SALT project and those at the South African Astronomical Observatory, are to be congratulated for their achievement in bringing such a complex astronomical project to fruition just five years after the ground-breaking ceremony in September 2000. A copy of the speech of the South African President, Mr Thabo Mbeki, at the inauguration is included as an appendix in the Observatory Annual Report for calendar year 2005 (see <http://star.arm.ac.uk/annrep/>).

In addition to pursuing front-line astronomical research, the Observatory continues to present a strong, positive image of Armagh and Northern Ireland on the national and world stage. Members of staff edit international academic journals and serve on various national

and international committees for bodies such as the Particle Physics and Astronomy Research Council, the Royal Astronomical Society, the Royal Irish Academy etc. The Observatory's three principal web-sites, namely <http://star.arm.ac.uk/>, <http://climate.arm.ac.uk/> and <http://arpc65.arm.ac.uk/~spm/>, have attracted growing interest by members of the general public, evidenced by the record number of recorded 'hits' and Distinct e-Visitors (DEVs) and by the growing amount of data transferred from the web-site to external users. During 2005 these key indicators of web-site activity were recorded as 12.6 million hits, 1.012 million DEVs, and 1.84 TB data exported (1 TB = 1,000 GB).

In short, staff at the Armagh Observatory have produced a high level of scientific and other output during the year and have maintained an exceptionally high public profile at regional, national and international level. These activities reflect not just the strength of public interest in astronomy and space science, but also the wide range of research interests of Observatory staff and the activities of its core funding agency, the Department of Culture, Arts and Leisure (DCAL), presenting all in a very positive light. The Armagh Observatory makes a unique contribution to projecting a positive image of Armagh City and District — and of Northern Ireland — on the world stage.

Objectives for 2006/2007

The Armagh Observatory is a modern astronomical research institute with a rich heritage, the oldest scientific institution in Northern Ireland. Its principal function is to carry out front-line scientific research in astronomy and related sciences; an important secondary activity is to pursue a high-profile and high value-for-money programme of education and public outreach. The Observatory's principal objectives during 2006 and the coming Financial Year 2006/2007 are to:

- maintain existing high-quality research programmes;
- obtain grants and additional external funding to support new research projects;
- strengthen the Observatory's research capability in solar system and stellar astrophysics in readiness for the next Research Assessment Exercise (RAE 2008; census date 31 October 2007);
- enhance the Observatory's use of research infrastructure such as CosmoGrid, the Southern African Large Telescope (SALT), and the Northern Ireland Regional Area Network (NIRAN);
- promote use of the Armagh Observatory Grounds and Astropark, and widen access to astronomy at Armagh by continuing to develop the Observatory's Education and Public Outreach (EPO) programme; and
- progress plans for a new Library, Archives and Historic Scientific Instruments Building.

The key task for the year is to obtain a sustainable level of core funding and to identify additional funding to increase the number of senior research staff. This is to maintain the heritage of front-line astronomy at Armagh, to lay a strong foundation for the forthcoming Research Assessment Exercise, and to ensure that the Observatory's ability to obtain external research grants is not undermined.

The Armagh Planetarium — Operating Review 2005/2006

Refurbishment of the Planetarium

The refurbishment of the Planetarium's buildings, which have been closed to the public apart from limited summer opening since November 2000, was substantially completed during the year. The building works included: extensive upgrading both inside and outside the buildings to meet the requirements of disability legislation, including a passenger lift, access and emergency exit ramps and parking facilities; the replacement of the mechanical, ventilation and electrical services; new fire alarm, emergency lighting and access control systems; an extension to the main Planetarium building to provide additional office and storage space; and the refurbishment of the front entrance and visitor reception area.

In addition to the refurbishment of the buildings new equipment and facilities have been installed in the Planetarium theatre. These include: a Digistar 3 all-dome projection system; a fully addressable LED lighting system, the second such system in the world, with rich colours that fully flood the dome; a multi-speaker surround sound system, first launched in the market in late 2005; and reclining seats specially designed to cope with the unusual configuration of the hemispherical dome and its challenging audio characteristics.

The bungalow has been converted into a deep storage facility and new computer and switching fibre optic equipment has been installed in the basement of the bungalow by a company involved in the provision of internet access. This will also allow the Planetarium access to a high speed, large capacity broadband connection for creating virtual visitor experiences, as well as special events broadcast through streaming video. This will include broadcasts of launches, ISS events and NASA TV programmes.

Work will continue in the early part of 2006/2007 to complete all outstanding building works and the building will be fully open to the public by 31 July 2006.

Three new shows, *Wonders of The Universe, Big, & Sunshine* have been installed and tested and work is continuing on the live component of the Planetarium's in-house star show. *Wonders of the Universe* is a general show for all ages, which exploits the Digistar's amazing ability to show stunning images from space. *Big* explores the concept of the size of the cosmos. A first for the Planetarium is the story of a friendly star, specially written for children under 5. A further show, *Night and Day*, will be installed later in the year together with a new Christmas show in December and a special short program for Halloween.

Work on refurbishing the exhibit area and the space craft models continued during the year and extensive new displays are planned for the re-opening, including an Earth observation exhibit in collaboration with Ordnance Survey Northern Ireland.

Educational activities

The Planetarium's outreach service reached a record 22,435 people in the year, compared with 16,300 in the previous year. Education staff delivered presentations to schools and other groups and at large science events throughout Ireland, including a summer event with the Ulster Museum and the British Telecom Young Scientists event at the Royal Dublin Society.

In March 2005, the Director was awarded an MBE for his work in astronomy education. He also was elected as the President of the British Association of Planetaria and sits on the organising committee of the International Planetarium Society as an international affiliate member.

Significant progress has been made on educational collaboration programmes in Europe, with the Planetarium's participation in the European Hands On Universe Project, the Faulkes robotic Telescope Project and work with the European Space Agency and UNESCO in Nigeria. Further development work has been carried out working with the British Council to expand the Faulkes Project internationally in Russia, the US, China and Ireland.

Objectives for 2006/2007

The primary aim of the Armagh Planetarium is to promote the public knowledge and understanding of astronomy and related sciences by being, and being recognised as, the leading centre for space science, astronomy and related science education and advice in Ireland. The project for the restoration and refurbishment of the Planetarium has been substantially completed allowing us to begin the work to fully realise this aim and to develop the full potential of the Planetarium and its educational services. In pursuance of this aim the following key objectives have been identified:

- to be the leading centre for space astronomy and related science education and advice in Ireland;
- to remain at the leading edge of centre-based and outreach learning through the use of state-of-the-art technical and other resources;
- to enhance the Planetarium's reputation as a centre of innovation for astronomy and science teaching and events for young people and the general public;
- to provide a unique visitor experience that will strike a balance between formal education and fun based learning;
- to make a significant contribution to the implementation of the Northern Ireland curriculum through the medium of space and astronomy education;
- to make a significant contribution to major science events throughout Ireland;
- to bring our education services to as many people as is possible through visits to the Planetarium and through the Planetarium's Outreach Service and in so doing also contribute to the development of cultural tourism in Armagh City and District;
- to provide equal access to the wonders of space and astronomy to all in our society;
- to seek to maximize income from our services whilst taking account of the needs of those from economically and other deprived backgrounds;
- to establish, with appropriate funding support, the Planetarium as the European Space Agency's outlet for space education in Ireland in partnership with colleagues and sister institutions in the Republic of Ireland.

The year ahead will provide an exciting opportunity for the Planetarium to finally deliver all its educational services and facilities to the schools and the wider public in Ireland and further afield. Additional staff resource will be employed to deliver these services and provide a very valuable educational resource for all. The "new" Planetarium will be an exciting and enthralling visitor experience for all ages and it is anticipated that during the year at least 35,000 people will visit the Planetarium to see the new shows and tour the exhibit areas, generating valuable additional income to re-invest in the further development of the educational services. The outreach activities will continue with a target of 12,000 persons to be reached during the year. In addition, the Planetarium will continue to strive to include as many underprivileged or otherwise disadvantaged persons or groups as possible and to work with special interest groups and minority ethnic groups.

Armagh Observatory — Financial Review for the Year Ended 31 March 2006

Unrestricted Funds

Unrestricted funds are those funds received for the general purposes of the Observatory. The Observatory received £750,000 (2004/2005: £754,000) in recurrent grant from the DCAL for general operating costs, comprising £660,000 grant-in-aid announced by the Department for the year and a further £90,000 from the December 2005 Northern Ireland Government Monitoring round. In addition, £55,291 (2004/2005: £44,979) was received from research grants and other funds for restricted purposes as a contribution towards the unrestricted costs of the Observatory and a total of £12,928 (2004/2005: £10,986) was received for bank interest, rents and miscellaneous income. Unrestricted funds totalled £818,219 (2004/2005: £809,965) for the year.

Total expenditure from unrestricted funds amounted to £801,887 (2004/2005: £795,677) resulting in a net surplus on unrestricted funds of £16,332 (2004/2005: £14,288) for the year. The surplus was transferred to unrestricted reserves leaving a balance on unrestricted reserves of £151,667 at 31 March 2006. The major variances in expenditure compared with the previous year were:

Salaries and wages: Savings arising from not filling two permanent posts, which became vacant during the year, were offset by higher pension costs and salary inflation.

Student maintenance grants: On 1 October 2005 the grant paid to PhD students increased from £10,500 to £12,000 in accordance with the increase in the level of PPARC postgraduate grants.

Northern Ireland Regional Area Network: The Northern Ireland Regional Area Network, set up in 2004/2005, provides the Observatory with a 10 Mbps connection and many other benefits at an annual cost of £25,850. The costs reflect a full year's costs compared with the costs for 8 months in 2004/2005.

Heat, light and power: Electricity consumption increased due to a full year's use of the 30-node computer cluster installed in 2004/2005.

Property and grounds maintenance: The costs in 2004/2005 included exceptional additional costs, which did not arise in 2005/2006, for the refurbishment of the fabric of the main building to improve access for those with a disability and for health and safety reasons.

Restricted Funds

Restricted funds are those funds received for research projects and other specific purposes. The DCAL provided a capital grant of £6,500 (2004/2005: £6,000) and a further £35,000 (2004/2005: £123,777) for capital purposes from the December 2005 Northern Ireland Government Monitoring round. Funding of £207,947 (2004/2005: £239,427) was received from other bodies for research purposes. This funding included £55,291 (2004/2005: £44,979) for the general running costs of the Observatory. Income for specific projects is matched against the expenditure incurred during the year and project income retained for expenditure in subsequent years is transferred to deferred income.

The deficit of £1,691 for the year represents expenditure on SALT travel funded out of reserves earmarked for such purposes in previous years. The balance of restricted reserves amounted to £10,173 at 31 March 2006.

There was an overall reduction in expenditure on restricted funds due to the completion of projects for the restoration and refurbishment of the buildings and the completion of the Observatory's initial financial commitments to the Southern African Large Telescope project in 2004/2005. In addition, research salary costs were lower due to a reduction in the number of fixed-term research staff employed in the year.

Factors which will Influence Future Financing Requirements

Recurrent grant from the DCAL is anticipated to be £660,000 for the year ending 31 March 2007, the same level of funding announced by the DCAL for the previous three years. This level of core funding is insufficient to maintain the current planned programmes of research, outreach and public understanding of science for the year. If no additional funding is obtained it will be necessary to fund the shortfall in income from the Observatory's unrestricted reserves. Furthermore, the Observatory needs access to additional funding for the recruitment of additional research staff in order to compete effectively with growing university groups in the next Research Assessment Exercise (RAE 2008; census date 31 October 2007).

Armagh Planetarium — Financial Review for the Year Ended 31 March 2006

Unrestricted Funds

The Planetarium received recurrent grant of £390,000 from the DCAL for general operating costs. The net surplus on unrestricted funds of £26,333 for the year was transferred to unrestricted reserves leaving a balance on unrestricted reserves of £42,725 at 31 March 2006.

Overall expenditure of £363,838 (2004/2005: £382,502) decreased mainly due to cost savings arising from not recruiting for vacant posts, lower levels of agency staff, not purchasing any further shows and the curtailing of expenditure on other operating costs during the period of building closure. However, these savings were partly offset by increases in power, heating and other building-related costs when staff re-occupied the main building in January 2006. In addition, additional funds were expended on refurbishing the space models, and on the purchase of computer consumables and software for the projection system as part of the preparations for the re-opening of the building.

Restricted Funds

The DCAL provided funding of £2,190,886 (2004/2005: £492,477) for the refurbishment of the buildings project, which was substantially completed during the year, and £6,404 (2004/2005: £6,000) for capital equipment. The Planetarium also received income of £14,747 (2004/2005: £4,972) for specific educational projects of which £9,777 was transferred to deferred income to be matched against expenditure on these projects in subsequent years.

The major expenditure was on the building refurbishment project. General refurbishment costs amounted to £1,778,886. The remaining £412,000 was expenditure on new building assets created in the refurbishment project and these costs were shown as an addition to fixed assets.

Factors which will Influence Future Financing Requirements

The Planetarium has received flat funding from the DCAL for the last three years and this is forecast to continue in 2006/2007. Although this was manageable over the period of closure of the main building, the Planetarium will need to attract a significant number of visitors in 2006/2007, approximately 35,000 for the year, increasing in subsequent years, in order to provide additional funds for the necessary staff resources, the development of its education services and for other additional costs arising from a fully operational facility. Capital funds will also be required for new interactive models and other displays in the exhibit area.

Remuneration Report — Armagh Observatory

The salary and pension entitlements of the Director of the Observatory were as follows:

Director	Salary	Accrued Pension at 31 March 2006	Real Increase in Accrued Pension	Accrued Lump Sum at 31 March 2006	Real Increase in Lump Sum	CETV at 31 March 2005	CETV at 31 March 2006	Real Increase in CETV
	£	£	£	£	£	£	£	£
Professor M.E. Bailey	51,306	16,473	717	49,420	2,152	246,213	272,496	21,595

Signed:



Professor Mark Bailey
Accounting Officer for the Armagh Observatory

Date: 23 June 2006

Remuneration Report — Armagh Planetarium

The salary and pension entitlements of the Director of the Planetarium were as follows:

Director	Salary	Accrued Pension at 31 March 2006	Real Increase in Accrued Pension	Accrued Lump Sum at 31 March 2006	Real Increase in Lump Sum	CETV at 31 March 2005	CETV at 31 March 2006	Real Increase in CETV
	£	£	£	£	£	£	£	£
Dr T.R. Mason	51,106	6,214	561	18,643	1,684	73,083	83,560	10,380

Signed:



Dr Tom Mason
Accounting Officer for the Armagh Planetarium

Date: 23 June 2006

- The Directors of the Observatory and Planetarium are the persons in senior positions having authority and responsibility for directing and controlling the activities of their respective organisations.
- The salary of each Director shown above comprises gross salary and a performance bonus. Gross salary is based on the Northern Ireland Civil Service Grade 6 pay scale. The maximum performance bonus entitlement in the year was £400. Neither of the Directors receives any benefits in kind.
- The service contracts of the Directors are open-ended until they reach the normal retirement age of 65.
- Pension benefits are provided through the Northern Ireland Local Government Officers' Superannuation Committee Pension Scheme (NILGOSC). Members pay contributions of 6% of pensionable earnings to the scheme up until retirement. On retirement, benefits payable are: (i) a retirement pension at a rate of 1/80th of final pensionable pay for each year of membership of the scheme; and (ii) a lump sum retirement grant at a rate of 3/80ths of pensionable pay for each year of membership of the scheme. On death after retirement, the surviving spouse will receive a pension payable for 3 months (6 months if there are dependent children) paid at the same rate as the monthly retirement pension at the date of death and thereafter a spouse's pension of half of the retirement pension for life. On death in service, the scheme pays a lump sum death grant of twice pensionable pay, normally to the surviving spouse or, if the member was not married, to next of kin.
- The real increase in pension payable, lump sum and cash equivalent transfer value (CETV) shown above have been adjusted to take account of inflation and market investment factors. The CETV figures include the value of any pension benefit in another scheme which the individual has transferred to the NILGOSC.
- A CETV is the actuarially assessed capitalised value of the pension scheme benefits accrued by a member at a particular point in time. The benefits valued are the member's accrued benefits and any contingent spouse's pension payable from the scheme. A CETV is a payment made by a pension scheme to secure pension benefits in another scheme when the member leaves a scheme and chooses to transfer the benefits accrued in their former scheme.

Statement of the Responsibilities of the Governors and Accounting Officers

Under the Audit and Accountability (Northern Ireland) Order 2003 the Governors are responsible for keeping proper accounts and proper records in relation to the accounts, and for preparing a statement of accounts in respect of each financial year in such form and containing such information as the DCAL, with the approval of the Department of Finance and Personnel, shall direct. The Accounting Officer of the DCAL has designated the respective Directors of the Armagh Observatory and Planetarium as the corporation's Accounting Officers. As Accounting Officers the Directors take personal responsibility for the propriety and regularity of the public finances for which they are answerable and for the keeping of proper accounts. They are required to sign the accounts thereby accepting personal responsibility for their proper presentation and to sign the Statement of Internal Control. Their relevant responsibilities as Accounting Officers, including their responsibilities for the propriety and regularity of the public finances and for the keeping of proper records, are set out in the Non-Departmental Accounting Officer Memorandum issued by the Department of Finance and Personnel.

The accounts are prepared on an accruals basis and give a true and fair view of the corporation's state of affairs at the end of the financial year and of its income and expenditure, total recognised gains and losses and cash flows for the financial year. The accounts have been prepared in accordance with the Statement of Recommended Practice "Accounting and Reporting by Charities" issued in October 2000 (SORP 2000). The financial statements comply with the guidance issued by the Department of Finance and Personnel on the form and contents of the Annual Reports and Accounts of Executive Non-Departmental Public Bodies and in particular:

- suitable accounting policies have been selected and applied consistently (subject to changes arising on the adoption of new accounting standards);
- reasonable and prudent judgements and estimates have been made;
- applicable accounting standards have been followed, subject to any material departures disclosed and explained in the financial statements;
- the financial statements have been prepared on the going concern basis, unless it is inappropriate to presume that the corporation will continue in business.

The Accounting Officers are also responsible for safeguarding the assets of the corporation and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

Armagh Observatory — Statement on Internal Control

As Accounting Officer for the Armagh Observatory I have responsibility for maintaining a sound system of internal control that supports the achievement of the policies, aims and objectives of the Armagh Observatory, whilst safeguarding public funds and the assets of the Armagh Observatory for which I am personally responsible in accordance with the responsibilities assigned to me by the Governors of the Armagh Observatory and Planetarium and in Government Accounting Northern Ireland.

The system of internal control is designed to manage risk to a reasonable level, rather than to eliminate all risk of failure to achieve policies, aims and objectives; it can therefore only provide reasonable and not absolute assurance of effectiveness. The system of internal control is based on an ongoing process designed to identify and prioritise the risks to the achievement of the Armagh Observatory's policies, aims and objectives, to assess the likelihood of the events occurring and the impact should they be realised, and to manage the risks effectively, efficiently and economically. The system of internal control has been in place in the Armagh Observatory for the year ended 31 March 2006 and up to the date of approval of the annual accounts, and accords with Department of Finance and Personnel guidance. The main procedures in place to monitor the effectiveness of the system of internal control are as follows:

- Regular meetings with officials from the DCAL to consider both operational and strategic issues and matters relating to the system of internal control.
- Continuous assessment of the quality of research through peer review of grant applications, applications for telescope time, and the submission of scientific papers to academic journals of national and international standing.
- Peer review of the research quality, capability and output of the Observatory through participation in the periodic Research Assessment Exercise.
- Regular reports by administrative staff on progress against principal financial targets and the projected financial outcome for the year and progress reports by staff responsible for major projects.
- Detailed progress reports to the Management Committee and Board of Governors at their regular meetings, and inclusion of performance measures and results against targets in the annual operating plan.
- Annual reports from internal auditors to the Internal Audit Committee on the system of internal control, which provide an opinion on the adequacy and effectiveness of the system and contain recommendations for improvement.
- Annual reports from external auditors to the Management Committee and the Board of Governors on the material issues relating to the annual accounts, which provide an opinion on whether the accounts give a true and fair view of the affairs of the organisation and of its incoming resources and application of resources.
- Periodic review of the Armagh Observatory Risk Register by the Director and the Administrator, and also by the Armagh Observatory and Planetarium Internal Audit Committee. The principal risks to the achievement of the Armagh Observatory's policies, aims and objectives have been identified and recorded in the Armagh Observatory Risk Register together with the controls in place and any further controls required to manage the risk effectively, efficiently and economically. Reports on emerging issues and strategies to deal with any associated risks are made to the DCAL and to the Management Committee and Board of Governors of the Armagh Observatory and Planetarium at their regular meetings.

As Accounting Officer, I have responsibility for reviewing the effectiveness of the system of internal control. My assessment is informed by the work of the internal auditors and the senior staff within the Armagh Observatory who have responsibility for the development and maintenance of the internal control framework, and by the comments made by the external auditors in their management letter and other reports. I have been advised on the effectiveness of the system of internal control and plan to address any weaknesses so as to ensure continuous improvement of the system.

A number of minor weaknesses were identified during the financial year 2005/2006 as part of the annual audit and appropriate action has been taken to resolve them.

Signed:



Professor Mark Bailey
Accounting Officer for the Armagh Observatory

Date: 23 June 2006

Armagh Planetarium — Statement on Internal Control

As Accounting Officer for the Armagh Planetarium I have responsibility for maintaining a sound system of internal control that supports the achievement of the policies, aims and objectives of the Armagh Planetarium, whilst safeguarding public funds and the assets of the Armagh Planetarium for which I am personally responsible in accordance with the responsibilities assigned to me by the Governors of the Armagh Observatory and Planetarium and in Government Accounting Northern Ireland.

The system of internal control is designed to manage risk to a reasonable level rather than to eliminate all risk of failure to achieve policies, aims and objectives; it can therefore only provide reasonable and not absolute assurance of effectiveness. The system of internal control is based on an ongoing process designed to identify and prioritise the risks to the achievement of the Armagh Planetarium's policies, aims and objectives, to assess the likelihood of the events occurring and the impact should they be realised, and to manage them effectively, efficiently and economically. The system of internal control has been in place in the Armagh Planetarium for the year ended 31 March 2006 and up to the date of approval of the annual accounts, and accords with Department of Finance and Personnel guidance. The main procedures in place to monitor the effectiveness of the system of internal control are as follows:

- Periodic review of the Armagh Planetarium Risk Register by the Director and the Administrator, and also by the Armagh Observatory and Planetarium Internal Audit Committee. The principal risks to the achievement of the Armagh Planetarium's policies, aims and objective have been identified and recorded in the Armagh Planetarium Risk Register together with the controls in place and any further controls required to manage the risk effectively, efficiently and economically. Reports on emerging issues and strategies to deal with any associated risks are made to the DCAL and to the Management Committee and Board of Governors of the Armagh Observatory and Planetarium at their regular meetings.
- Detailed progress reports to the Management Committee and Board of Governors at their regular meetings, and inclusion of performance measures in the annual operating plan.
- Regular meetings with officials from the DCAL to consider both operational and strategic issues and matters relating to the system of internal control.
- Annual reports from the internal auditors to the Internal Audit Committee on the system of internal control, which provide an opinion on the adequacy and effectiveness of the system and contain recommendations for improvement.
- Annual reports from external auditors to the Management Committee and the Board of Governors on the material issues relating to the annual accounts, which provide an opinion on whether the accounts give a true and fair view of the affairs of the organisation and of its incoming resources and application of resources.
- Regular reports by administrative staff on progress against principal financial targets and the projected financial outcome for the year and progress reports provided by staff responsible for major projects.

As Accounting Officer, I have responsibility for reviewing the effectiveness of the system of internal control. My assessment is informed by the work of the internal auditors and the senior staff within the Armagh Planetarium who have responsibility for the development and maintenance of the internal control framework, and by the comments made by external auditors in their management letter and other reports. I have been advised on the effectiveness of the system of internal control and plan to address any weaknesses so as to ensure continuous improvement of the system.

A number of minor weaknesses were identified as part of the annual audit for the 2005/2006 financial year and appropriate action has been taken to resolve them.

Signed:



Dr Tom Mason
Accounting Officer for the Armagh Planetarium

Date: 23 June 2006

The Armagh Observatory and Planetarium

The Certificate and Report of the Comptroller and Auditor General to The House of Commons and The Northern Ireland Assembly

I certify that I have audited the financial statements of the Armagh Observatory and Planetarium for the year ended 31 March 2006 under the Audit and Accountability (Northern Ireland) Order 2003. These comprise the Armagh Observatory's and Armagh Planetarium's Statements of Financial Activities, Balance Sheets, Cashflow Statements and Statements of Total Recognised Gains and Losses and related notes. These financial statements have been prepared under the accounting policies set out within them.

Respective responsibilities of the Governors, Accounting Officers and Auditor

The Governors and Accounting Officers are responsible for preparing the Annual Report and the financial statements in accordance with the Audit and Accountability (Northern Ireland) Order 2003 and Department of Culture, Arts and Leisure directions made thereunder and for ensuring the regularity of financial transactions. These responsibilities are set out in the Statement of Governors and Accounting Officers' Responsibilities.

My responsibility is to audit the financial statements in accordance with relevant legal and regulatory requirements, and with International Standards on Auditing (UK and Ireland).

I report to you my opinion as to whether the financial statements give a true and fair view and whether the financial statements and the parts of the Armagh Observatory's and Planetarium's Remuneration Reports to be audited have been properly prepared in accordance with the Audit and Accountability (Northern Ireland) Order 2003 and Department of Culture, Arts and Leisure directions made thereunder. I also report whether in all material respects the expenditure and income have been applied to the purposes intended by Parliament and the financial transactions conform to the authorities which govern them. I also report to you if, in my opinion, the Annual Report is not consistent with the financial statements, if the Armagh Observatory and Planetarium has not kept proper accounting records, if I have not received all the information and explanations I require for my audit, or if information specified by relevant authorities regarding remuneration and other transactions is not disclosed.

I review whether the statements on pages 15 and 16 reflect the Armagh Observatory and Planetarium's compliance with the Department of Finance and Personnel's guidance on the Statement on Internal Control, and I report if it does not. I am not required to consider whether the Accounting Officers' statements on internal control cover all risks and controls, or form an opinion on the effectiveness of the Armagh Observatory and Planetarium's corporate governance procedures or its risk and control procedures.

I read the other information contained in the Annual Report, and consider whether it is consistent with the audited financial statements. This other information comprises only the Foreword to the Accounts, Corporate Governance, the Armagh Observatory's and Armagh Planetarium's Operating Reviews, Financial Reviews and the unaudited parts of their Remuneration Reports. I consider the implications for my report if I become aware of any apparent misstatements or material inconsistencies with the financial statements. My responsibilities do not extend to any other information.

Basis of audit opinion

I conducted my audit in accordance with International Standards on Auditing (UK and Ireland) issued by the Auditing Practices Board. My audit includes examination, on a test basis, of evidence relevant to the amounts, disclosures and regularity of financial transactions included in the financial statements and parts of the Remuneration Reports to be audited. It also includes an assessment of the significant estimates and judgments made by the Governors and Accounting Officers in the preparation of the financial statements, and of whether the accounting policies are most appropriate to the Armagh Observatory and Planetarium's circumstances, consistently applied and adequately disclosed.

I planned and performed my audit so as to obtain all the information and explanations which I considered necessary in order to provide me with sufficient evidence to give reasonable assurance that the financial statements and the parts of the Remuneration Reports to be audited are free from material misstatement, whether caused by fraud or error and that in all material respects, the expenditure and income have been applied to the purposes intended by Parliament and the financial transactions conform to the authorities which govern them. In forming my opinion I also evaluated the overall adequacy of the presentation of information in the financial statements and the parts of the Remuneration Reports to be audited.

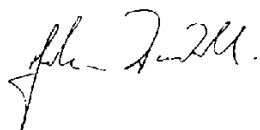
Opinion

In my opinion:

- the financial statements give a true and fair view, in accordance with the Audit and Accountability (Northern Ireland) Order 2003 and directions made thereunder by the Department of Culture, Arts and Leisure, of the state of the Armagh Observatory and Planetarium's affairs as at 31 March 2006 and of its movement in funds after cost of capital for the year then ended;

- the financial statements and the parts of the Armagh Observatory's and Armagh Planetarium's Remuneration Reports to be audited have been properly prepared in accordance with the Audit and Accountability (Northern Ireland) Order 2003 and Department of Culture, Arts and Leisure directions made thereunder; and
- in all material respects the expenditure and income have been applied to the purposes intended by Parliament and the financial transactions conform to the authorities which govern them.

I have no observations to make on these financial statements.



J M Dowdall CB
Comptroller and Auditor General
Date: 31 July 2006

Northern Ireland Audit Office
106 University Street, Belfast BT7 1EU

Armagh Observatory

Statement of financial activities for the year ended 31 March 2006

	Notes	Unrestricted funds 2006 £	Restricted funds 2006 £	Total funds 2006 £	Total funds 2005 £
Incoming resources					
DCAL grants	2	750,000	41,500	791,500	883,777
Other grants and receipts	2	-	207,947	207,947	239,427
Interest receivable		6,577	-	6,577	6,054
Rents		4,050	-	4,050	3,707
Miscellaneous income		2,301	-	2,301	1,225
Donations		-	-	-	-
Proceeds from sale of assets		-	-	-	-
Transfer to deferred income	11	-	(63,012)	(63,012)	(26,029)
Transfer from deferred income	11	-	44,416	44,416	87,061
Transfer between funds		55,291	(55,291)	-	-
Total incoming resources		818,219	175,560	993,779	1,195,222
Resources expended					
Direct expenditure of the corporation	3	694,465	111,770	806,235	848,223
Fundraising and publicity	4	-	-	-	-
Management and administration of the corporation	6	107,303	881	108,184	201,900
Capital expenditure		119	64,600	64,719	126,737
Total resources expended		801,887	177,251	979,138	1,176,860
Net incoming resources for the year before cost of capital					
		16,332	(1,691)	14,641	18,362
Cost of capital		-	(35,314)	(35,314)	(33,750)
Net movement in funds after cost of capital		16,332	(37,005)	(20,673)	(15,388)
Cost of capital reversed		-	35,314	35,314	33,750
Net movement in funds		16,332	(1,691)	14,641	18,362
Balances brought forward at 1 April		135,335	11,864	147,199	128,837
Balances carried forward at 31 March	13,14	151,667	10,173	161,840	147,199

All amounts above relate to continuing operations of the corporation.

The income and expenditure summary is included at Note 8.

Cost of capital at 3.5% has been charged on the average net assets of the corporation, excluding the net book value of donated assets. As this is a notional charge the cost of capital is reversed in the Statement of Financial Activities.

Statement of total recognised gains and losses for the year ended 31 March 2006

There have been no gains or losses other than those recognised in the statement of financial activities.

Armagh Observatory

Balance sheet at 31 March 2006

	Notes	2006 £	2005 £
Tangible assets	9	1,494,256	1,506,864
Current assets			
Debtors	10	31,384	66,978
Cash at bank and in hand	18,19	243,143	250,208
		274,527	317,186
Creditors: amounts falling due within one year	11	(128,407)	(185,707)
Net current assets		146,120	131,479
Total assets less current liabilities		1,640,376	1,638,343
Creditors: amounts falling due after more than one year		-	-
Net assets		1,640,376	1,638,343
Funds			
Unrestricted	13	151,667	135,335
Restricted	14	10,173	11,864
Government grant reserve	12	800,662	808,400
Designated	16	677,874	682,744
		1,640,376	1,638,343

The financial statements on pages 19 to 34 were approved on 23 June 2006 and were signed by:



Professor Mark Bailey, Accounting Officer for the Armagh Observatory

Armagh Observatory

Cash flow statement for the year ended 31 March 2006

	Notes	2006 £	2005 £
Net cashflow from operating activities		(13,627)	63,838
Returns on investments and servicing of finance			
Interest received		6,577	6,054
Interest paid and similar charges		(15)	-
		6,562	6,054
Capital expenditure			
Purchase of tangible assets		(64,719)	(126,737)
Capital grants received		64,719	126,737
Proceeds from the disposal of fixed assets		-	-
		-	-
Net cash (outflow)/inflow before financing and management of liquid resources		(7,065)	69,892
Management of liquid resources			
Movement in First Trust deposit account		(16,435)	(50,895)
Net cash outflow from management of liquid resources		(16,435)	(50,895)
(Decrease)/increase in cash in the year	18, 19	(23,500)	18,997

Reconciliation of operating result to net cash flow

	2006 £	2005 £
Net incoming resources per statement of financial activities	14,641	18,362
Proceeds from sale of asset	-	-
Interest received	(6,577)	(6,054)
Interest paid and similar charges	15	-
Depreciation	86,257	84,517
Release of deferred credit - Government grant reserve	(72,457)	(70,717)
Release of deferred credit - donated asset reserve	(13,800)	(13,800)
Decrease in debtors	35,594	78,983
Decrease in creditors	(57,300)	(27,453)
Net cash (outflow)/inflow from operating activities	(13,627)	63,838

Armagh Observatory

Notes to the financial statements for the year ended 31 March 2006

1 Accounting policies

These financial statements are prepared on the going concern basis under the historical cost convention, as modified by the revaluation of certain tangible fixed assets, and in accordance with The Audit and Accountability (Northern Ireland) Order 2003, directions made thereunder by the Department of Culture, Arts and Leisure and applicable accounting standards. The principal accounting policies are set out below.

Tangible fixed assets

The cost of tangible fixed assets is their replacement or purchase cost, together with any incidental costs of acquisition. Depreciation is calculated so as to write off the cost, or valuation, of tangible fixed assets, less their estimated residual values, on a straight-line basis over the expected useful economic lives of the assets concerned. The principal annual rates used are as follows:

	%
Furniture and fittings	10 - 15
Office equipment	10 - 25
Scientific equipment and other equipment	15 - 25
Land and buildings	1 - 2
Astropark	5

Land and buildings are included in the balance sheet at depreciated replacement cost or, where lower, the estimated value in use.

Government grants

Grants that relate to specific capital expenditure are treated as deferred income which is then credited to the income and expenditure account over the related asset's useful life. Other grants are credited to the statement of financial activities when received.

Pension costs

The corporation participates in the Northern Ireland Local Government Officers' Superannuation Committee Pension Scheme (NILGOSC) which provides benefits based on final pensionable pay. The assets of the scheme are held separately from those of the corporation. The corporation is unable to identify its share of the underlying assets and liabilities of the scheme on a consistent and reasonable basis and therefore, as required by FRS 17 'Retirement benefits', accounts for the scheme as if it were a defined contribution scheme. As a result, the amount charged to the statement of financial activities represents the contributions payable to the scheme in respect of the accounting period.

Fund accounting

The corporation has various types of funds for which it is responsible, and which require separate disclosure. These are as follows:

Restricted funds

Grants or donations received which are earmarked by the donor for specific purposes. Such purposes are within the overall aims of the organisation.

Unrestricted funds

Funds which are expendable at the discretion of the Governors in furtherance of the objectives of the corporation. In addition to expenditure on the provision of services, such funds may be held in order to finance capital investment and working capital.

Armagh Observatory

2 Incoming Resources

Department of Culture, Arts and Leisure

The accounts reflect the receipt of the following grants from the Department of Culture, Arts and Leisure (DCAL):

	2006	2005
	£	£
Recurrent (unrestricted)	750,000	754,000
Capital (restricted)	6,500	6,000
In-year capital grant	35,000	-
Human Orrery (restricted)	-	20,000
Capital for DDA and other capital projects (restricted)	-	103,777
Transfer to Deferred Income	-	(3,468)
Transfer from Deferred Income	21,855	77,516
Transfer between funds	55,291	44,979

Other grants and receipts

	Unrestricted	Restricted	Total	Total
	funds 2006	funds 2006	funds 2006	funds 2005
	£	£	£	£
PPARC Research, Visitor and Travel grants	-	107,584	107,584	89,445
PPARC System Manager Support grant	-	11,202	11,202	11,844
PPARC rolling travel grant	-	10,516	10,516	6,919
Programme for Research in Third Level				
Institutions - Cosmogrid project	-	56,490	56,490	97,684
Miscellaneous travel grants	-	1,212	1,212	2,186
Lindsay Scholarship	-	16,749	16,749	-
Environment and Heritage Service	-	-	-	28,250
INTAS	-	706	706	-
The Royal Society	-	3,400	3,400	2,746
Meteorological Office grant	-	88	88	175
Other grants and receipts	-	-	-	178
	-	207,947	207,947	239,427

Armagh Observatory

3 Direct expenditure of the corporation

	Unrestricted funds 2006	Restricted funds 2006	Total funds 2006	Total funds 2005
	£	£	£	£
Salaries and wages	460,629	82,146	542,775	579,600
Release of provision for taxation	-	-	-	(21,064)
Student maintenance grants	116,390	-	116,390	105,415
Meteorology data input agency costs	-	-	-	2,677
Scholarship and training	12,021	772	12,793	10,448
Travelling and subsistence	22,873	24,120	46,993	34,114
Technical maintenance and computer consumables	17,538	407	17,945	19,124
Library and publications	31,930	729	32,659	35,726
BT phone link	-	-	-	11,088
JANET access service	(656)	-	(656)	1,625
Northern Ireland Regional Area Network	25,850	-	25,850	17,233
Southern African Large Telescope contribution	-	-	-	37,000
Radio Telescope for Ireland Project	3,484	-	3,484	-
Conferences	-	-	-	6,007
Historic books and instruments	-	-	-	-
Visitor programme	4,406	3,596	8,002	9,230
	694,465	111,770	806,235	848,223

4 Fundraising and publicity

	Unrestricted funds 2006	Restricted funds 2006	Total funds 2006	Total funds 2005
	£	£	£	£
	-	-	-	-

5 Travel and subsistence

Restricted travel and subsistence is funded in the main from external grant aid from the Particle Physics and Astronomy Research Council (PPARC).

Armagh Observatory

6 Management and administration of the corporation

	Unrestricted funds 2006 £	Restricted funds 2006 £	Total funds 2006 £	Total funds 2005 £
Insurance	13,027	-	13,027	13,594
Heat, light and power	26,567	-	26,567	19,788
Rates	276	-	276	280
Property and grounds maintenance	16,945	-	16,945	88,914
Grounds agency staff costs	15,787	-	15,787	14,145
Buildings, Domes and Telescopes restoration project - building refurbishment	-	-	-	26,719
Postage and telephone	4,684	-	4,684	5,593
Recruitment costs	708	-	708	-
General expenses	4,408	881	5,289	5,411
Cleaning costs	1,437	-	1,437	4,474
Management Committee and meetings	804	-	804	1,878
Office equipment	2,593	-	2,593	1,794
Bank charges	15	-	15	-
Audit	4,680	-	4,680	5,459
Other professional fees	10,850	-	10,850	10,126
Stationery and advertising	4,522	-	4,522	3,725
Depreciation	-	86,257	86,257	84,517
Release from grants reserve	-	(72,457)	(72,457)	(70,717)
Release from donated asset reserve	-	(13,800)	(13,800)	(13,800)
	107,303	881	108,184	201,900

Armagh Observatory

7 Average staff numbers and related costs

Average staff numbers

	2006	2005
	Number	Number
Permanent staff	13	14
Fixed-term contract staff	3	5
Agency staff	1	1
	17	20

Included within permanent staff numbers is the corporation's Administrator whose salary is apportioned on a 50:50 basis between the Observatory and Planetarium.

Costs

	2006	2005
	£	£
Permanent staff		
Wages and salaries	396,924	414,563
Social security costs	32,586	34,605
Pension costs	31,119	18,760
	460,629	467,928
Fixed-term contract staff costs		
Wages and salaries	72,681	100,739
Social security costs	5,776	8,263
Pension costs	3,689	2,670
	82,146	111,672
Total permanent and fixed-term contract staff	542,775	579,600
Agency staff costs	15,787	16,822
Total staff costs	558,562	596,422

Permanent staff costs include 50% of the salary costs of the corporation's Administrator and the costs of cleaning and security costs shared with the Planetarium.

Average student numbers and related costs

	2006	2005
	Number	Number
PhD students	10	10
	2006	2005
	£	£
Student maintenance grants	116,390	105,415

8 Income and expenditure summary

	2006	2005
	£	£
Gross income	929,060	1,068,485
Expenditure		
Direct charitable expenditure (note 3)	806,235	848,223
Fund raising and publicity (note 4)	-	-
Management and administration of the corporation (note 6)	108,184	201,900
	914,419	1,050,123
Surplus for the year	14,641	18,362

Armagh Observatory

9 Tangible fixed assets

	Land & buildings £	Exhibits and grounds £	Astropark £	Furniture Fittings £	Office Eqpt. £	Equipment & Historic telescopes £	Total £
Cost or valuation							
At 1/4/05	2,115,852	93,137	367,490	84,702	97,253	721,766	3,480,200
Additions	8,930	9,530	-	1,315	-	53,874	73,649
Disposals	-	-	-	-	-	(6,864)	(6,864)
At 31 March 2006	2,124,782	102,667	367,490	86,017	97,253	768,776	3,546,985
Depreciation							
At 1/4/05	1,076,388	2,530	183,747	75,215	74,989	560,467	1,973,336
Charge for year	27,350	2,642	18,375	1,174	3,153	33,563	86,257
Disposals	-	-	-	-	-	(6,864)	(6,864)
At 31 March 2006	1,103,738	5,172	202,122	76,389	78,142	587,166	2,052,729
Net book value							
At 31 March 2006	1,021,044	97,495	165,368	9,628	19,111	181,610	1,494,256
Net book value							
At 31 March 2005	1,039,464	90,607	183,743	9,487	22,264	161,299	1,506,864

Tangible fixed asset additions of £73,649 as shown above were funded as follows:

	£
DCAL grant	
Buildings, domes and telescopes restoration,	
Human Orrery and other capital projects	21,855
Capital grant	6,500
In-year capital grant	35,000
Recurrent grant	119
Donated by the Meteorological Office	8,930
Research grants	
PPARC	1,245
	73,649

The corporation's Buildings were valued at 31 March 2002 on the basis of depreciated replacement cost by Leighton Johnston Associates, Chartered Architects. If the Buildings had not been valued, they would have been included at the following amounts:

	2006 £	2005 £
Cost	580,345	580,345
Aggregate depreciation	(116,078)	(104,470)
Net book value based on historic cost	464,267	475,875

Depreciation on fixed assets for the year was £86,257 (2005: £84,517).

Land and buildings include grounds and buildings with a net book value of £623,050 at 31 March 2006 which were donated to the corporation in 1790 by Archbishop Richard Robinson, the founder of the corporation.

Armagh Observatory

10 Debtors

	2006	2005
	£	£
Grant debtors	2,970	39,256
Sundry debtors and prepayments	28,414	27,722
	31,384	66,978

11 Creditors: amounts falling due within one year

	2006	2005
	£	£
Trade creditors	36,133	98,849
Accruals	15,474	29,191
Deferred income	76,263	57,667
Other creditors	537	-
	128,407	185,707

Analysis of deferred income

	2006	2005
	£	£
Balance at 1 April	57,667	118,699
Transfer to statement of financial activities	(44,416)	(87,061)
Transfer from statement of financial activities	63,012	26,029
Balance at 31 March	76,263	57,667

12 Government grants reserve

	Land and buildings	Exhibits and grounds	Astropark	Furniture Fittings	Equipment Office & Historic Eqpt. telescopes	Total	
	£	£	£	£	£	£	
Balance at 1 April	340,996	90,607	183,743	9,487	22,268	161,299	808,400
Additions	-	9,530	-	1,315	-	53,874	64,719
Amortised	(14,528)	(1,664)	(18,375)	(1,174)	(3,153)	(33,563)	(72,457)
Balance at 31 March	326,468	98,473	165,368	9,628	19,115	181,610	800,662

Armagh Observatory

13 Unrestricted funds

	Balance 1/4/2005	Incoming resources	Resources expended	Transfer from defrd. income	Transfer to defrd. income	Balance 31/3/2006
	£	£	£	£	£	£
Unrestricted funds	135,335	818,219	(801,887)	-	-	151,667

It is the policy of the Armagh Observatory to retain a sufficient level of unrestricted cash reserves based on a realistic assessment of future cash needs and other contingencies.

Grants for research purposes together with other grants for specific purposes are normally received in arrears. During the period between the expenditure being incurred and receipt of the corresponding grants, such projects must be funded from unrestricted funds. It is therefore necessary to retain an amount of cash reserves from such funds. In addition a contingency fund is required for development opportunities and possible exceptional expenditure not anticipated in the annual budget.

The total cash reserves represents approximately 15% of the total annual grant income of the Observatory.

This policy will be reviewed by the Director on an annual basis at the end of the financial year.

Armagh Observatory

14 Restricted funds

	Balance 1/4/2005	Incoming resources	Resources expended	Transfer between funds	Transfer from defrd. income	Transfer to defrd. income	Balance 31/3/2006
	£	£	£	£	£	£	£
DCAL grants							
Buildings, Domes and Telescopes, Human Orrery and other capital projects	-	-	(21,855)	-	21,855	-	-
SALT	6,722	-	(1,691)	-	-	-	5,031
Capital	-	6,500	(6,500)	-	-	-	-
In-year capital grant	-	35,000	(35,000)	-	-	-	-
Lindsay Scholarship Fund (NAM)	2,037	-	-	-	-	-	2,037
	8,759	41,500	(65,046)	-	21,855	-	7,068
Other grants							
Environment and Heritage Service	1,531	-	-	-	-	-	1,531
PPARC grants	1,349	129,302	(68,129)	(42,546)	22,561	(41,188)	1,349
Programme for Research in Third Level Institutions - Cosmogrid project	-	56,490	(39,446)	(5,291)	-	(11,753)	-
Lindsay Scholarship Fund (DIAS)	-	16,749	-	(7,366)	-	(9,383)	-
Miscellaneous travel grants	-	1,212	(1,212)	-	-	-	-
Miscellaneous grants	-	4,194	(3,418)	(88)	-	(688)	-
	2,880	207,947	(112,205)	(55,291)	22,561	(63,012)	2,880
Donations							
	225	-	-	-	-	-	225
	11,864	249,447	(177,251)	(55,291)	44,416	(63,012)	10,173

Armagh Observatory

DCAL capital grants

The Observatory received capital grant of £6,500 and a further in-year capital grant of £35,000 from the DCAL during the year for expenditure on equipment.

Other Grants and Receipts

PPARC research and visitor grants

The Observatory received funding from the Particle Physics and Astronomy Research Council (PPARC) to fund a number of research projects during the year:

- Solar Transient Events and their importance for Coronal Heating and Solar Wind Acceleration.
- The Origin of Hot Stellar Remnants.

These grants fund salary, travel and other direct costs of the research project and provide a contribution towards certain indirect running costs of the Observatory based on 46% of grant-aided salary costs.

PPARC system manager support grant

The PPARC provided a grant of £11,202 towards the salary and other costs of the computer systems manager.

Programme for Research in Third Level Institutions – Cosmogrid project

The aim of the project, led by the Dublin Institute for Advanced Studies, is to study natural phenomena occurring in the cosmos using powerful computers connected by modern Grid technology. The project is funded by the Irish Higher Education Authority under the National Development Plan as part of the Programme for Research in Third Level Institutions. The Armagh Observatory is one of a number of collaborating institutions in this programme and will receive €370,180 over five years for staff and equipment to support its contribution to the project. During the year £56,490 was received for the project costs.

Lindsay Scholarship Fund

The Astronomical Science Group of Ireland (ASGI), whose membership includes the Armagh Observatory, the Dublin Institute for Advanced Studies (DIAS) and the main universities in Ireland, agreed at its Autumn 2003 meeting to create a postgraduate studentship called the Lindsay Scholarship, after Dr E.M. Lindsay, Director of the Observatory from 1937 until his death in 1974. Surplus funds arising from the National Astronomy Meeting, held in Dublin in 2003 and hosted by the ASGI, will be used as seed funding for the scholarship and the Observatory and the DIAS will share the additional costs. The first Lindsay Scholar has been appointed and will carry out a PhD research programme at the Observatory. During the year £16,749 was received from the DIAS in respect of the Observatory's share of the seed funds and 50% of the first year's costs of the scholarship.

Armagh Observatory

15 Analysis of transfer between funds

The transfer from restricted to unrestricted funds represent amounts received from the PPARC and Cosmogrid projects which are to be used as a contribution to the general running costs of the Observatory and the DIAS contribution to the costs of the Lindsay Scholar.

16 Designated funds

	2006 £	2005 £
Revaluation of land and buildings		
Balance at 1 April	45,894	696,544
Revaluation	8,930	-
Transfer to donated assets reserve	-	(650,650)
Balance at 31 March	54,824	45,894

During the year the Meteorological Office donated the sunshine recording tower to the Observatory. The construction cost of the tower, £8,930, is shown as an addition to fixed assets and the corresponding credit shown in valuation of assets reserve.

Donated assets reserve

Balance at 1 April	636,850	-
Transfer from revaluation of land and buildings	-	650,650
Amortised	(13,800)	(13,800)
Balance at 31 March	623,050	636,850

Total designated funds at 31 March 2006	677,874	682,744
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Buildings and grounds with a net book value at 31 March 2006 of £623,050 (2005: £636,850) were donated to the corporation in 1790 by Archbishop Richard Robinson, the founder of the corporation.

17 Analysis of net assets between funds

	Designated Funds £	Unrestricted Funds £	Restricted Funds £	Total Funds £
Tangible assets	1,478,536	5,547	10,173	1,494,256
Current assets	-	274,527	-	274,527
Current liabilities	-	(128,407)	-	(128,407)
Net assets	1,478,536	151,667	10,173	1,640,376

18 Analysis of net funds

	1 April 2005 £	Cash Flow £	31 March 2006 £
Cash at bank and in hand	64,650	(23,500)	41,150
Liquid resources	185,558	16,435	201,993
Net funds	250,208	(7,065)	243,143

Liquid resources comprise short term deposits held at the bank.

Armagh Observatory

19 Reconciliation of net cash flow to movement in net funds

	2006	2005
	£	£
(Decrease)/increase in cash in financial year	(23,500)	18,997
(Decrease)/increase in deposits	16,435	50,895
(Decrease)/increase in net funds in the year	(7,065)	69,892
Net funds at 1 April	250,208	180,316
Net funds at 31 March	243,143	250,208

20 Pension Costs

The corporation participates in the Northern Ireland Local Government Officers' Superannuation Committee Pension Scheme (NILGOSC). This is a defined benefit scheme but the corporation is unable to identify its share of the underlying assets and liabilities. In accordance with the provisions of FRS 17, the contributions to the scheme are accounted for on a defined contribution basis.

An Actuarial valuation of the scheme was carried out as at 31 March 2004. At this date there was a deficit in the scheme, which will have to be recovered by increasing employers' contribution rates. Since the date of the last valuation in 2001, the scheme has suffered from reduced investment returns arising from the fall in the global stock market and the return on the scheme's assets since 2001 has been significantly lower than the long-term returns anticipated in valuing the liabilities in 2001. The funding level (ratio of assets to past service liabilities) as at 31 March 2004 is 85% compared to 121% at 31 March 2001. This corresponds to a past service deficit of £392.1 million.

Employers' contribution rates increased from 4.6% to 8.5% in the year ending 31 March 2006, and will increase to 11% in the year ending 31 March 2007 and 13% in the year ending 31 March 2008.

	2006	2005
	£	£
The charge for the year in respect of this scheme amounted to:	34,808	21,432

21 Commitments

There were no outstanding capital commitments at 31 March 2006 (2005: £3,468).

22 Investment in Southern African Large Telescope Project

	2006	2005
	£	£
Total investment at 1 April	185,096	148,096
Additions	-	37,000
Total investment at 31 March	185,096	185,096
	2006	2005
	£	£
Provision for impairment at 1 April	185,096	148,096
Provision in current year	-	37,000
Provision for impairment at 31 March	185,096	185,096
Net book value at 31 March	-	-

The Southern African Large Telescope (SALT) project involves the construction of a 10-metre class telescope with related buildings at the Sutherland Outstation of the South African Astronomical Observatory in Northern Cape Province. The main objective is to advance science and education in South Africa through the promotion of deep-sky astronomy, and by participating in the project the Armagh Observatory will attain rights to use the telescope in the future. The DCAL has provided funding of £200,000 to meet the Armagh Observatory's financial commitment to the project. The project has been completed and it is anticipated that SALT will soon come into regular scientific use.

Armagh Observatory

23 Related-Party Transactions

None of the members of the Board of Governors, the Management Committee, the Director or other related parties have undertaken any material transactions with the Armagh Observatory during the year. The Armagh Observatory has had various material transactions with a number of Government Departments, Executive Agencies and Non-Departmental Public Bodies in Northern Ireland and the UK. Most of these transactions have been with the Department of Culture, Arts and Leisure, the Central Procurement Directorate, and the Particle Physics and Astronomy Research Council.

Armagh Planetarium

Statement of financial activities for the year ended 31 March 2006

	Notes	Unrestricted funds 2006 £	Restricted funds 2006 £	Total funds 2006 £	Total funds 2005 £
Incoming resources					
DCAL grants	2	390,000	2,197,290	2,587,290	883,371
Other grants and receipts	3	732	14,747	15,479	5,471
Admissions		-	-	-	2,908
Rents		2,600	-	2,600	3,812
Interest receivable		87	-	87	44
Miscellaneous income		50	-	50	-
Outreach income		15,038	-	15,038	17,898
Shop and mail order loss	23	(18,336)	-	(18,336)	(16,301)
Transfer to deferred income	12	-	(9,777)	(9,777)	(3,139)
Transfer from deferred income	12	-	1,104	1,104	202,561
Total incoming resources		390,171	2,203,364	2,593,535	1,096,625
Resources expended					
Direct expenditure of the corporation	4	270,302	6,074	276,376	291,462
Fundraising and publicity	5	3,093	-	3,093	4,914
Management and administration of the corporation	6	90,443	1,778,886	1,869,329	331,050
Capital expenditure		-	418,404	418,404	452,841
Total resources expended		363,838	2,203,364	2,567,202	1,080,267
Net incoming/(outgoing) resources for the year before cost of capital					
		26,333	-	26,333	16,358
Cost of capital		-	(71,909)	(71,909)	(61,122)
Net movement in funds after cost of capital		26,333	(71,909)	(45,576)	(44,764)
Cost of capital reversed		-	71,909	71,909	61,122
Net movement in funds		26,333	-	26,333	16,358
Balances brought forward at 1 April		16,392	-	16,392	34
Balances carried forward at 31 March	14,15	42,725	-	42,725	16,392

All amounts above relate to continuing operations of the corporation.

The income and expenditure summary is included at Note 8.

Cost of capital at 3.5% has been charged on the average net assets of the corporation.

As this is a notional charge the cost of capital is reversed in the Statement of Financial Activities.

Statement of total recognised gains and losses for the year ended 31 March 2006

There have been no gains or losses other than those recognised in the statement of financial activities.

Armagh Planetarium

Balance sheet at 31 March 2006

	Notes	2006 £	2005 £
Tangible assets	9	2,218,886	1,914,636
Current assets			
Stock	10	14,981	14,330
Debtors and prepayments	11	24,301	15,642
Cash at bank and in hand		51,751	29,331
		91,033	59,303
Creditors: amounts falling due within one year	12	(50,145)	(45,498)
Net current assets/liabilities		40,888	13,805
Total assets less current liabilities		2,259,774	1,928,441
Creditors: amounts falling due after more than one year		-	-
Net assets		2,259,774	1,928,441
Funds			
Unrestricted reserves	14	42,725	16,392
Government grant reserve	13	1,337,692	1,032,692
Designated	16	879,357	879,357
		2,259,774	1,928,441

The financial statements on pages 35 to 47 were approved on 23 June 2006 and were signed by:



Dr Tom Mason, Accounting Officer for the Armagh Planetarium

Armagh Planetarium

Cash flow statement for the year ended 31 March 2006

	Notes	2006 £	2005 £
Net cashflow from operating activities		24,063	(157,907)
Returns on investments and servicing of finance			
Interest received		87	44
Interest paid and similar charges		(1,730)	(1,610)
		(1,643)	(1,566)
Capital expenditure			
Purchase of tangible assets		(418,404)	(452,841)
Capital grants received		418,404	452,841
		-	-
Net cash inflow/(outflow) before financing		22,420	(159,473)
Financing			
Repayment of principal under hire purchase agreements		-	(2,812)
Increase in cash	18, 19	22,420	(162,285)

Net cash flow from operating activities

	2006 £	2005 £
Net incoming resources per statement of financial activities	26,333	16,358
Interest received	(87)	(44)
Interest paid and similar charges	1,730	1,610
Operating surplus for the year	27,976	17,924
Depreciation	114,154	107,596
Deferred credit release	(113,404)	(105,008)
Increase in stock	(651)	(945)
(Increase)/decrease in debtors	(8,659)	6,456
Increase/(decrease) in creditors (excluding hire purchase)	4,647	(183,930)
Net cash inflow from operating activities	24,063	(157,907)

Armagh Planetarium

Notes to the financial statements for the year ended 31 March 2006

1 Accounting policies

These financial statements are prepared on the going concern basis under the historical cost convention, as modified by the revaluation of certain tangible fixed assets, and in accordance with The Audit and Accountability (Northern Ireland) Order 2003, directions made thereunder by the Department of Culture, Arts and Leisure and applicable accounting standards. The principal accounting policies are set out below.

Tangible fixed assets

The cost of tangible fixed assets is their replacement or purchase cost, together with any incidental costs of acquisition. Depreciation is calculated so as to write off the cost, or valuation, of tangible fixed assets, less their estimated residual values, on a straight-line basis over the expected useful economic lives of the assets concerned. The principal annual rates used are as follows:

	%
Digistar	10
Furniture and fittings	10 - 15
Office equipment	15 - 25
Scientific equipment	15 - 25
Land and buildings	2
Exhibits	10 - 25
Vehicles	25

Land and buildings are included in the balance sheet at depreciated replacement cost or, where lower, the estimated value in use.

Government grants

Grants that relate to specific capital expenditure are treated as deferred income which is then credited to the income and expenditure account over the related asset's useful life. Other grants are credited to the statement of financial activities when received.

Pension costs

The corporation participates in the Northern Ireland Local Government Officers' Superannuation Committee Pension Scheme (NILGOSC) which provides benefits based on final pensionable pay. The assets of the scheme are held separately from those of the corporation. The corporation is unable to identify its share of the underlying assets and liabilities of the scheme on a consistent and reasonable basis and therefore, as required by FRS 17 'Retirement benefits', accounts for the scheme as if it were a defined contribution scheme. As a result, the amount charged to the statement of financial activities represents the contributions payable to the scheme in respect of the accounting period.

Leased assets

Where assets are financed by leasing agreements that give rights approximating to ownership ('finance leases') the assets are treated as if they had been purchased outright. The corresponding leasing commitments are shown as obligations to the lessor. Depreciation is charged to the profit and loss account on a straight-line basis over the shorter of the lease terms and the useful lives of equivalent owned assets. Lease payments are treated as consisting of capital and interest elements and the interest is charged to revenue in proportion to the reducing capital element outstanding.

Fund accounting

The corporation has various types of funds for which it is responsible, and which require separate disclosure. These are as follows:

Restricted funds

Grants or donations received which are earmarked by the donor for specific purposes. Such purposes are within the overall aims of the organisation.

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Unrestricted funds

Funds which are expendable at the discretion of the Governors in furtherance of the objects of the corporation. In addition to expenditure on the provision of services, such funds may be held in order to finance capital investment and working capital.

Stocks

Stocks are stated at the lower of cost and net realisable value. In general, cost is determined on a first in first out basis. Provision is made, where necessary for obsolete, slow moving and defective stocks.

2 Grants from the Department of Culture, Arts and Leisure (DCAL)

The accounts reflect the receipt of the following grants from the DCAL:-

	2006	2005
	£	£
Capital (restricted)	6,404	894
Refurbishment of buildings and purchase of equipment (restricted)	2,190,886	492,477
Recurrent (unrestricted)	390,000	390,000
Transfer to deferred income	-	(3,139)
Transfer from deferred income	-	202,561
Transfer between funds	-	-

3 Other grants and receipts

	2006	2005
	£	£
Friends of the Planetarium (unrestricted)	732	399
Donation (unrestricted)	-	100
Travel grant from the European Space Agency	-	873
EU Socrates Programme - Hands on Universe project	11,290	-
British Nation Space Centre - Astrogazers project (restricted)	-	1,999
The Association for Science Education - Dill-Faulkes Project (restricted)	3,000	2,100
UNESCO travel grant	457	-
	15,479	5,471

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4 Direct expenditure of the corporation

	Unrestricted funds 2006 £	Restricted funds 2006 £	Total funds 2006 £	Total funds 2005 £
Salaries and wages	204,419	-	204,419	224,624
Equipment leasing	6,060	-	6,060	6,060
Travelling and subsistence	14,724	4,970	19,694	16,916
Technical maintenance	25,293	-	25,293	13,827
Library and subscriptions	4,287	-	4,287	3,908
Production expenses	-	-	-	15,000
Exhibitions and events	11,399	1,104	12,503	5,326
Training	1,366	-	1,366	1,115
Vehicle expenses	2,754	-	2,754	4,686
	270,302	6,074	276,376	291,462

5 Fundraising and publicity

	Unrestricted funds 2006 £	Restricted funds 2006 £	Total funds 2006 £	Total funds 2005 £
Advertising and brochures	2,658	-	2,658	4,506
Hospitality	435	-	435	408
	3,093	-	3,093	4,914

6 Management and administration of the corporation

	Unrestricted funds 2006 £	Restricted funds 2006 £	Total funds 2006 £	Total funds 2005 £
Insurance	19,480	-	19,480	20,475
Heat, light and power	20,937	-	20,937	13,324
General property repairs	12,223	-	12,223	3,486
Theatre refurbishment	-	-	-	4,586
Refurbishment of buildings	-	1,778,886	1,778,886	247,089
Office and café furnishings	7,952	-	7,952	-
Postage and telephone	10,585	-	10,585	10,699
General expenses	416	-	416	539
Bank charges	913	-	913	866
Audit	4,093	-	4,093	5,219
Other administrative costs	2,880	-	2,880	1,788
Management Committee and meetings	988	-	988	706
Rates	276	-	276	258
Stationery	4,224	-	4,224	4,721
Agency staff costs	1,733	-	1,733	14,706
Recruitment	2,993	-	2,993	-
Depreciation	750	113,404	114,154	107,596
Release from grants reserve	-	(113,404)	(113,404)	(105,008)
	90,443	1,778,886	1,869,329	331,050

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7 Average staff numbers and related costs

Average staff numbers

	2006	2005
	Number	2005
Permanent staff	8	10
Agency staff	-	1
	8	11

Costs

	2006	2005
	£	£
Permanent staff		
Wages and salaries	189,891	213,059
Social security costs	15,385	16,532
Pension costs	18,527	13,556
	223,803	243,147
Agency staff costs	1,733	14,706
Total staff costs	225,536	257,853

Staff costs relating to the corporation's Administrator are apportioned on a 50:50 basis between the Observatory and Planetarium. The post of Administrator is included within the administration staff numbers in the Observatory.

8 Income and expenditure summary

	2006	2005
	£	£
Gross income	2,175,131	643,784
Expenditure		
Direct charitable expenditure	276,376	291,462
Fund raising and publicity	3,093	4,914
Management and administration of the corporation	1,869,329	331,050
	2,148,798	627,426
Surplus for the year	26,333	16,358

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9 Tangible fixed assets

	Digistar £	Buildings and grounds £	Café £	Equipment £	Exhibits £	Vehicle £	Total £
Cost or valuation							
At 1/4/05	906,054	2,751,050	14,081	505,960	191,372	14,202	4,382,719
Additions	-	412,000	-	6,404	-	-	418,404
Disposals	-	(24,750)	-	(767)	(2,100)	-	(27,617)
At 31 March 2006	906,054	3,138,300	14,081	511,597	189,272	14,202	4,773,506
Depreciation							
At 1/4/05	566,266	1,280,679	14,081	430,487	164,955	11,615	2,468,083
Charge for year	37,067	57,177	-	15,811	3,349	750	114,154
Disposals	-	(24,750)	-	(767)	(2,100)	-	(27,617)
At 31 March 2006	603,333	1,313,106	14,081	445,531	166,204	12,365	2,554,620
Net book value							
At 31 March 2006	302,721	1,825,194	-	66,066	23,068	1,837	2,218,886
Net book value							
At 31 March 2005	339,788	1,470,371	-	75,473	26,417	2,587	1,914,636

The net book value of fixed assets includes £nil (2004/2005: £2587) in respect of assets held under hire purchase agreements.

Depreciation on assets held under hire purchase agreements was £nil for the year (2004/2005: £2588).

Tangible fixed asset additions of £418,404 as shown above were funded as follows:

	£
DCAL buildings refurbishment and equipment grant	412,000
DCAL capital grant	6,040
	418,040

The corporation's land and property were revalued at 31 March 2002 on the basis of depreciated replacement cost by Leighton Johnston Associates, Chartered Architects. If land and property had not been revalued, they would have been included at the following amounts:

	2006 £	2005 £
Cost	1,291,239	879,239
Aggregate depreciation	(284,210)	(266,625)
Net book value based on historic cost	1,007,029	612,614

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10 Stocks

	2006	2005
	£	£
Finished goods and goods for resale	14,981	14,330

11 Debtors

	2006	2005
	£	£
Trade and grant debtors	4,930	6,030
Sundry debtors	250	-
Prepayments	5,444	4,557
VAT	13,677	5,055
	24,301	15,642

12 Creditors: amounts falling due within one year

	2006	2005
	£	£
Trade creditors	13,701	30,597
Accruals	18,848	5,978
Deferred income	17,596	8,923
	50,145	45,498

Analysis of deferred income

	2006	2005
	£	£
Balance at 1 April	8,923	208,345
Transfer to statement of financial activities	(1,104)	(202,561)
Transfer from statement of financial activities	9,777	3,139
Balance at 31 March	17,596	8,923

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13 Government grants reserve

	Digistar £	Buildings and grounds £	Equipment £	Exhibits £	Total £
Balance at 1 April 2005	339,788	591,014	75,473	26,417	1,032,692
Additions	-	412,000	6,404	-	418,404
Disposals	-	-	-	-	-
Amortised	(37,067)	(57,177)	(15,811)	(3,349)	(113,404)
					-
Balance at 31 March 2006	302,721	945,837	66,066	23,068	1,337,692

14 Unrestricted funds

	Balance 1/4/2005 £	Incoming resources £	Resources expended £	Transfer from defrd. income £	Transfer to defrd. income £	Balance 31/3/2006 £
Unrestricted funds	16,392	390,171	(363,838)	-	-	42,725

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15 Restricted funds

	Balance 1/4/2005	Incoming resources	Resources expended	Transfer between funds	Transfer from defrd. income	Transfer to defrd. income	Balance 31/3/2006
	£	£	£	£	£	£	£
DCAL grants	-						
Capital	-	6,404	(6,404)	-	-	-	-
Building refurbishment and equipment		2,190,886	(2,190,886)	-	-	-	-
Total DCAL grants	-	2,197,290	(2,197,290)	-	-	-	-
Other grants and receipts							
EU Socrates Programme - Hands on Universe project	-	11,290	(3,053)	-	-	(8,237)	-
Astrogazers project	-	-	(1,104)	-	1,104	-	-
Dill Faulkes project	-	3,000	(1,460)	-	-	(1,540)	-
UNESCO travel grant	-	457	(457)	-	-	-	-
Total other grants and receipts	-	14,747	(6,074)	-	1,104	(9,777)	-
	-	2,212,037	(2,203,364)	-	1,104	(9,777)	-

DCAL capital grant

Funding of £6,404 was provided by the DCAL for the purchase of equipment.

DCAL grant for the refurbishment of the buildings and for new equipment

Funding of £2,190,886 was provided by the DCAL for the refurbishment of the Planetarium's buildings.

EU Socrates Programme

The Planetarium is participating in a project funded by the European Union Socrates Programme, called Hands on Universe, Europe, Bringing Frontline Interactive Astronomy to the Classroom. The main aim of the project is to renew the teaching of science by re-awakening the interest of the young generation in science through astronomy and the use of new technologies. Funding of £11,290 was received in the year for the project.

UNESCO travel grant

The UNESCO provided funds of £457 for travel costs associated with educational projects in Europe.

Dill-Faulkes Robotic Telescope and Astrogazers projects

Astrogazers provides support for school Astronomy clubs and allows pupils to work on projects and to promote their own school and other schools throughout Europe and Ireland.

The Dill-Faulkes Robotic Telescope project will provide schools with observing time on research-grade telescopes in Hawaii and Australia. Funds amounting to £3,000 were received for the project in the year.

16 Designated funds

	2006 £	2005 £
Land and buildings revaluation	879,357	879,357

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17 Analysis of net assets between funds

	Designated funds £	Unrestricted funds £	Restricted funds £	Total funds £
Tangible fixed assets	2,219,013	1,837	-	2,220,850
Current assets	-	91,033	-	91,033
Creditors: amounts falling due within one year	-	(50,145)	-	(50,145)
Net current assets	-	40,888	-	40,888
Creditors: amounts falling due after more than one year	-	-	-	-
Net assets	2,219,013	42,725	-	2,261,738

18 Analysis of net cash funds

	1 April 2005 £	Cashflow £	Non cash movement £	31 March 2006 £
Cash at bank and in hand	29,331	22,420	-	51,751
Hire purchase	-	-	-	-
Net funds	29,331	22,420	-	51,751

19 Reconciliation of net cashflow to movement in net cash funds

	2006 £	2005 £
Increase/(decrease) in cash in financial year	22,420	(162,285)
Decrease in debt	-	2,812
Change in net debt resulting from cash flows	22,420	(159,473)
Non cash changes		
New hire purchase obligations	-	-
Movement in net funds in the year	22,420	(159,473)
Net funds at 1 April	29,331	188,804
Net funds at 31 March	51,751	29,331

20 Pension Costs

The corporation participates in the Northern Ireland Local Government Officers' Superannuation Committee Pension Scheme (NILGOSC). This is a defined benefit scheme but the corporation is unable to identify its share of the underlying assets and liabilities. In accordance with the provisions of FRS 17, the contributions to the scheme are accounted for on a defined contribution basis.

An Actuarial valuation of the scheme was carried out as at 31 March 2004. At this date there was a deficit in the scheme, which will have to be recovered by increasing employers' contribution rates. Since the date of the last valuation in 2001, the scheme has suffered from reduced investment returns arising from the fall in the global stock market and the return on the scheme's assets since 2001 has been significantly lower than the long-term returns anticipated in valuing the liabilities in 2001. The funding level (ratio of assets to past service liabilities) as at 31 March 2004 is 85% compared to 121% at 31 March 2001. This corresponds to a past service deficit of £392 million.

The Planetarium's employer contribution rates for the year ending 31 March 2006 were 10.7%, and will increase to approximately 12.5% in the year ending 31 March 2007 and 14.5% in the year ending 31 March 2008.

	2006 £	2005 £
The charge for the year in respect of this scheme amounted to:	18,527	13,556

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21 Commitments

There were no capital commitments at the 31 March 2005.

22 Related-Party Transactions

None of the members of the Board of Governors, the Management Committee, the Director or other related parties have undertaken any material transactions with the Armagh Planetarium during the year. The Armagh Planetarium has had various material transactions with a number of Government Departments, Executive Agencies and Non-Departmental Public Bodies in Northern Ireland and the UK. Most of these transactions have been with the Department of Culture, Arts and Leisure and the Central Procurement Directorate.

23 Shop and mail order trading and profit and loss account

	2006 £	2005 £
Sales	19,864	20,262
Less: cost of sales		
Opening stock	14,330	13,385
Add: Purchases	12,406	13,536
	26,736	26,921
Less: closing stock	(14,981)	(14,330)
	11,755	12,591
Gross profit	8,109	7,671
Gross profit %	40.8	37.9
Less direct expenses:		
Wages and salaries	19,384	18,523
Travelling and subsistence	561	376
Telephone and postage	1,954	1,943
Advertising	2,400	1,600
Stationery	684	141
Bad debts	-	-
Exhibitions and events	645	645
Bank interest and charges	817	744
Production	-	-
General expenses	-	-
Total expenses	26,445	23,972
Net loss for the year	(18,336)	(16,301)

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