Three Little Essays

Arthur Prior in 1931

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Logic and Philosophy of Time, Vol. 3

David Jakobsen, Peter Øhrstrøm, Martin Prior & Adriane Rini (Eds.)

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Logic and Philosophy of Time, Volume 3

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Preface

Peter Øhrstrøm, David Jakobsen, Martin Prior & Adriane Rini

Arthur Norman Prior was born in Masterton, New Zealand, December 4th, 1914. He went to secondary school at Wairarapa College and according to his younger brother, Ian Prior, Arthur was "one of the brightest people you could imagine. He had a strong intellect, was gentle and great fun." (Prior 2006, p. 44). As he was completing his studies at Wairarapa High School in December 1931, he wrote three essays on science, literature and religion respectively. The essays were all written during September and October 1931. In addition, he wrote a short piece listing what he called *My ideal library*. The present volume contains all three essays, along with his list of the ideal library as well as four chapters analysing and discussing Prior's texts.

Taking Prior's age into account — he was only sixteen-years old when he wrote the essays — their quality is remarkably high. They bear the mark of a young mind, ready to take the toughest questions head on. The essays reveal that Prior read a lot, read recent research and had interests which spanned a wide range, from poetry to quantum mechanics. This volume includes careful discussion of each of the three essays and their importance in light of Prior's later philosophical and logical writings. The essays themselves deal with existential matters. They circle around the topic of determinism, questioning human freedom, and they argue for a 'predestinarian' worldview in which God has control over the minutest of things in reality, and nothing is left

either to chance or to human free choice. Although Prior later changed his view on these matters, the topic of predestination remained central to his thought throughout his life, and it is of particular interest in connection with his pioneering work on tense-logic.

Prior wrote the essays as three small handwritten booklets with his own illustrations. The booklets on Science and Religion are kept at the Bodleian library, Oxford, the Ann Prior collection, box 13. A photocopy of the booklet on Literature resides at the Macmillan Library of the University of Canterbury, Christchurch (Grimshaw 2002, p. 482). For this collection each of the Three Little Essays has been edited separately by teams of scholars who have provided editorial notes to the primary material. In addition, readers will find detailed commentaries of the essays, provided by scholars well acquainted with Prior's early years. In the present edition Prior's illustrations have been reproduced by Julie Lundbak Kofod. In the edition of the Essays we have chosen to keep Prior's page numbers from the booklets — in curly brackets. Prior's page numbers from the booklets will also be used as references in this volume. For instance, p. 115 of E*ssays Religious* is referred to as "ER p. 115" — or just "p. 115" if the reference to ER is evident from the context — should be understood as a reference to page 115 in Prior's booklet on religion.

We want to thank the persons who have contributed to the various parts of this book, Mike Grimshaw, Julie Lundbak Kofod, Jørgen Albretsen, and Fatima Sabir. Furthermore, we also thank the Bodleian Library, the Macmillan Library of the University of Canterbury, and the Danish Council for Independent Research, for making this book possible.

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Prior in New Zealand, 1931

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Abstract

Arthur Prior's Three Little Essays included in this volume were written in New Zealand in the midst of the Great Depression. They provide insight into the mind of a schoolboy from a doctor's family in provincial New Zealand, and reveal to us the teenager's concerns and personal reflections. When viewed against his later writings, these essays enable us to see how themes which interested the precocious schoolboy sometimes carry over into the mature philosopher's work. The essays also reveal that Prior's remarkable ability to discern parallels of reasoning across different areas was a skill present even in his youth.

When scholars offer biographical introductions of Arthur Norman Prior, they typically begin by describing Prior as coming from the small New Zealand town — sometimes it is described as the 'sleepy' New Zealand town — of Masterton, where Prior was born in 1914. After such passing mention of his birthplace, these biographical introductions usually take a large leap forward in time, of some forty years, shifting focus in order to concentrate their attention on the philosophical and logical contributions, from the 1950s and 1960s, for which Prior is best known and studied. The present book is different.

In 2019, scholars working to produce a digital archive of Prior's *Nachlass* gained access to a collection of essays and correspondence preserved by Prior's son Martin and daughter Ann. Included in this collection were three short works by Arthur Prior, each in its own small notebook, each neatly written in longhand, and each curiously making use of three separate colours of ink. The essays are dated September to October 1931. Their author was sixteen years old at the time. These *Three Little Essays* have been transcribed, edited, and reproduced in this volume, along with specially-commissioned commentaries by Prior scholars.

When I first heard of the *Three Little Essays*, my reaction was one of scepticism about their value — yes, it is remarkable to have to hand the unpublished compositions of a teenager who would later become a famous logician and philosopher. Yes, certainly. But these are, after all, the essays of *a sixteen-year old*. To put the point another way, their author was, at the time when he wrote the essays, several years younger than my youngest undergraduates. This new material in the Prior collection, however, is not even the work of an undergraduate — the essays are the work of a schoolboy. Each of the essays has a single focus. One is on religion, one on literature, one on science. Or as young Arthur called them *Essays Religious*, *Essays Literary*, *Essays Scientific*. What could possibly be of scholarly interest in Prior's *Three Little Essays*?

Answering that is the aim of this volume. As the other contributors highlight, deeper themes emerge which reach far beyond the three broad ones indicated by Prior's titles. Social historians will find in the essays a wealth of detail, revealed in the careful but curious musings of a precocious schoolboy growing up in Masterton between the wars. Because some of the themes which we meet in the three essays recur and get more fully developed in Prior's later and more mature works, access to the three essays will now make it possible for scholars to begin to trace from an early stage the development of certain of Prior's favourite philosophical topics. The chief values of this collection are two-fold: First, it

puts into the hands of Prior scholars written material which now makes this kind of extensive exploration of Prior's interests, from his school-days on, possible. Second, it gives unusual insight into what it was like to grow up in provincial New Zealand during the Depression.

Because Prior's *Three Little Essays* are a sixteen-year old New Zealand schoolboy's work, the primary focus of the present chapter is to offer a picture both of the broader early-1930s New Zealand environment and of the smaller, local environment in which Prior was raised. Features of each help to shed light on Prior's interests. Sometimes, however, as discussed below, it is what is *not* mentioned in the essays which is especially revealing.

1 The World Around Him

By 1931, Prior's birthplace, Masterton, was not a sleepy town. It was then a bustling 'borough'. In the *New Zealand Official Yearbook 1932*, the borough of Masterton is listed as having an "estimated population (including Maoris)" of 8600 on 30 April 1931. The *Yearbook* makes it possible to compare various populations: e.g., the New Zealand capital city, Wellington, had at the time a total population of 111,500; Auckland City had a population of 105,600. Nearby Palmerston North had a population of 21,000. Napier had 16,200. Masterton itself is in a region of New Zealand known as the Wairarapa. Other main boroughs in the Wairarapa had considerably smaller populations in 1931 — e.g., Carterton's population was 1910, Greytown's 1120, Featherston's 1100. In the turn from the 19th century to the 20th, the Wairarapa saw a significant shift in its demographics. *Te Ara: The Encyclopedia of New Zealand* describes this as follows:

> Nineteenth-century Wairarapa was a two-class society, with a small landed élite and a large working class. This changed in the 20th century when dairy farmers and professionals

> increased the power and influence of the middle class. Still, aspects of the old social structure remain.
>
> (Schrader 2017)

Prior's father, Norman Prior, a medical doctor, was one of the middle-class professionals who arrived in the Wairarapa early in the 20th century. The local hospital, Masterton Hospital, had been founded in 1879 (Schrader 2017). Doctor Prior took over a vacant medical practice and moved into a house in Perry Street in 1909.[1] Of course, New Zealand, like most of the world, was still in 1931 in the midst of the Great Depression.

The Prior family was comparatively well off. But it was not untouched by tragedy. Norman's wife Bessie (Elizabeth Munton Rothesay Teague) died a few weeks after giving birth to baby Arthur. War service meant that Norman had to leave the baby in New Zealand in 1915, in the care of a family member, only returning home after the war. In 1930, Norman married again. His second wife was Jessica Ann (née Miller). Norman and Jessica had three more children — Elaine, Owen, and Ian. The four children were raised together in a large family home at 46 Perry Street in Masterton. Perry Street itself was then known as "doctors' alley" (*TWairarapa Times-Age*).[2] The Prior home was in fact a grand Edwardian, two-storey brick home with an impressive oriel window projecting from the upper story.

In Prior's youth, New Zealand society was considerably more religious than it is today, and it was principally Christian. Both of Arthur's grandfathers had been Methodist ministers, sent from England to minister in Australia, and religion remained an important part of Prior-

[1] In a recent newspaper article, Owen Prior reports that the medical practice became available to Dr Prior when the previous doctor, a Dr Ross, ran away with the matron of the nearby nursing home, leaving the Perry Street practice and home available (*Wairarapa Times-Age*. https://www.nzherald.co.nz/wairarapa-times-age/news/article.cfm?c_id=1503414).

[2] https://www.nzherald.co.nz/wairarapa-times-age/news/article.cfm?c_id=1503414

family life through the generations. In Masterton, the Priors' closeness to the Methodist Church was not just spiritual but also physical. Arthur's brother Owen recalled that you could easily walk from the family home on Perry Street and "across Lincoln Rd directly into the Methodist Parsonage, so there was a regular exchange of people going to and fro." (*Wairarapa Times-Age*).[3] In this environment it is, perhaps, not surprising to find sixteen-year old Prior concerned to write the *Essays Religious* included in this volume. In his early adult years his interest in religion blossomed into a general interest in theology, where, as a student at Dunedin's Otago University, he embarked for a time on a course of religious study at Knox Theological Hall, with an eye to becoming a Presbyterian minister. This was not a course he continued, but he retained strong links to the church throughout much of his life. His interest in religion and theology is well known from his published philosophical work and from his correspondence from the 1930s and 1940s, and, in particular, from his unpublished work from the 1940s on Scottish religious history. But his interest in religion and theology is perhaps most widely known because of the way in which Prior uses it in his approach to matters in the metaphysics of time, where it is often the case that it is the underlying theological questions which initially pique Prior's philosophical curiosity. In the 1954 Presidential Address at the Second Philosophical Congress in Wellington, the talk in which Prior first introduced his tense logic, it was in fact medieval philosophical theology to which he turned to provide a historical platform for the new tense logic.

What we find in sixteen-year old Prior's *Essays Religious* is nothing so sophisticated. But we do find young Prior concerned to articulate his personal position on various religious matters. We see him questioning Methodism's tenets, subjecting them to scrutiny and examination. He does not limit this scrutiny and examination to his own private reflec-

[3]https://www.nzherald.co.nz/wairarapa-times-age/news/article.cfm?c_id=1503414

tions — in his *Essays Religious* he describes debating about matters of belief with others at his Sunday school classes, and his telling makes it very clear that even at the age of sixteen Prior relished a spirited debate. But such debate is not the mainstay of the essay; rather the essay is on the whole his personal reflections about whether his religious beliefs can stand up to rational critiques and self-analysis.

Given the various themes of the *Three Little Essays* — religion, literature and science — one starts to wonder how aware was sixteen-year old Prior of his environment, of his surroundings and of events around him? By and large, the world which is most explicitly revealed in Prior's *Three Little Essays* is a surprisingly 'intellectual' environment. Prior's personal expositions on the themes of religion, literature and science are a schoolboy's attempt to delineate a highbrow, scholarly realm, and to present indubitable evidence that this realm is where he belongs, his natural habitat. In just the first fourteen, hand-written pages of *Essays Religious*, Prior mentions no less than Augustine, Martin Luther, Ulrich Zwingly, John Calvin, Jacobus Arminius, William Godwin, Percy Bysshe Shelley, John Wesley, George Whitefield, and the Westminster Confession. The *Essays Literary* open with discussions of Shelley and "such lofty thinkers as Plato and Spinoza" and, again, William Godwin. The *Essays Scientific* begin with mentions of Albert Einstein, P.R. Heyl, Ernst Mach, Immanuel Kant, James Clerk Maxwell, Osborne Reynolds, Albert Abraham Michelson, Sir Oliver Joseph Lodge, Hendrik Antoon Lorentz, Fitzgerald (i.e., George Francis FitzGerald), Lord Raleigh (i.e., John William Strutt, 3rd Baron Rayleigh).

Against this multitude of 'lofty thinkers', there are sometimes in the *Three Little Essays* glimpses at least of a more mundane world. In one of the more poignant examples of this, we find Prior mentioning, in the *Essays Religious*, the Hawkes Bay earthquake which occurred in New Zealand on 3 February 1931. The earthquake, with a magnitude of 7.8, was a major historical event whose consequences were felt widely throughout New Zealand, both on the land and on the nation's psyche.

256 people were killed, and many thousands more were injured. Much of the town of Napier was destroyed. If the dates on Prior's essays indicate that he began his writing in September 1931, then the earthquake had occurred just seven months earlier. This makes it unsurprising to find Prior mentioning the earthquake in the essays; it would be more surprising to find Prior *not* mentioning the earthquake. But it is at least a little curious that what appears to be its sole mention turns out to be in the context of a discussion about whether God can be 'exempted' from all responsibility for it:

> In times of great disaster this notion of a finite God often has a run of popularity among Christian thinkers. I have mentioned the case of the New Zealand minister (the Rev. E.O. Blamires) who exempted God from all responsibility of the Hawkes Bay earthquake by divorcing Him from the realm of inanimate Nature and limiting His proper sphere to the mind and heart of man. (ER p. 115)[4]

This passage continues, incorporating what appears to be the only comment in the *Three Little Essays* about World War I:

> During and after the Great War Christian thoughts ran on much the same lines, and in "God the Invisible King" Herbert George Wells gave a most fantastic picture of the deity as a great "Captain of Mankind", putting up a gallant struggle against the blind and unsympathetic forces of Nature hemming us in all around. (ER p. 115)

These passages are typical of what one encounters in the essays, where Prior's interests only very barely touch on the world around him.

[4] Prior claims to have mentioned the case of Blamires earlier, but there does not appear to be any earlier mention of either him or his comments in the *Three Little Essays*.

In his writing, we do not see his thoughts weighed down by the effects of the Hawkes Bay Earthquake. But without a doubt, the earthquake would have been a main point of discussion around him. People would have been busily discussing the earthquake — the deaths, the destruction, the damage to the nation's economy, and of course the continuing danger brought home to everyone in the region by the ongoing aftershocks. Prior's teachers and classmates would have discussed the earthquake too since nearby schools in Napier suffered extensive damage. Some schools had to be closed and students shifted elsewhere. Against this backdrop, in his three essays, Prior demonstrates an ability to step back and to devote his thoughts instead to religion, literature, and science. How could Prior muster the reserve to consider whether when confronting natural disasters such as the earthquake, we ought to 'divorce' God from 'inanimate Nature' and recognise his 'His proper sphere' as one which is solely spiritual? Aristotle says that philosophy requires, among other things, a good degree of wealth and of leisure. And it seems that in Masterton, even in the midst of the Depression, teenage Prior was secure enough and removed enough from the current events of the day to be able to engage in very carefully writing out the three philosophically-minded essays. He shows no obvious signs of having any basic prudential worries — at the time, his 'prudential' worries seem instead to sit at the level of the free will/determinist debate.

Even if this ability to maintain a 'distance' surprises us today, there was a similar distance, as well, which was part of an overall outlook common in post-WWI New Zealand. New Zealand was then still a young colony and newly settled. European settlement in the Wairarapa had only begun in the 1840s. But the land which the settlers found was not uninhabited. New Zealand Māori had arrived several centuries earlier. Rangitane and Ngāti Kahungunu were *iwi* (tribes) in the Wairarapa region when European explorers arrived in the 1770s, and the *iwi* lived there when young Prior was writing. But in the essays, the Māori feature neither as part of a historical backdrop nor as part of Prior's imme-

diate environment. They are not mentioned in Prior's essays.

The *Three Little Essays* are evidence of an undeniable intellectual precociousness — but it is a schoolboy's precociousness, safe and sheltered in a world of scholarship, not yet tied down to the world around him by an adult man's wider concerns. A more mature, thirty-four-year old Prior, reflecting back upon his arrival as a university student in Dunedin in 1932, seems to agree. The following passage comes from "When I was a Fresher", which Prior wrote in 1948, and which is published in his *Nachlass*:

> Well, to Dunedin then I came. Was, to begin with, a med. And did the summer exams, and changed over. Was very interested in organic chemistry. Also in religion. Had figured out a sort of religion of my own. Probably very well read for a fresher. But one thing I hadn't really thought about was social and political responsibilities. Was an unthinking young conservative. And these were the days of the depression. Men were rioting, and special police were called for — at physics lecture — early in first term. Went to enrol, but they had gone away for lunch. And started to think about it.
>
> Asked Father Jansen.[5] Decided against it and a little later Paddy asked me to a week end camp — Miller and Richards. Then political outlook coloured by (1) depression (2) failure of disarmament conference.
>
> Odd memories of the depression. I didn't see any riots. But I remember a curious scene in Queens Garden. A place like the fountain, only a bit larger. Several old cannons there. (Kennedy and the cannon). During depression, crowds of people sometimes addressed from cannon. On this occasion,

[5] Father Jansen was not a Catholic priest, but rather the Presbyterian ordinand, Paddy Jansen (1904-1979). Jansen was also from Wairarapa High School. He trained as an ordinand during 1931-34.

a lot of unemployed. Addressed by Geddes. And Goldsmid and McArthur — "Popoffski" — then the police — about 40 strong — to tell this man to get off this cannon. It was laughable. McArthur – brother of a Presbyterian minister. Himself knew his bible backwards. Loved to quote it in the paper. A Communist. Had a wife and family, a dole of 27/6 a week and 20/' for rent. Other men with families being sent out to public works camps. I remember a meeting addressed by the dean about the breaking up of family life involved. (Crookshank) Clergy often talk a good line — Percy Paris. Open season. Students asked to beat up men old enough to be their fathers. Miller dead against capitalism. But disbelieved in violence. This brings me to another point. — failure of disarmament conference. That was a great disappointment. And it seemed to many people very senseless. What where the armament being built up for? Air bombardment Lord Londonderry said we must keep bombing planes to keep the NW frontier tribes in order. Such a thing that made people ashamed to be British. The same man later one of the Cliveden set. — the use of our warships. Machinations of armament rings in the air. Nationalism, imperialism and exploitation not worth defending. And if the governments can't agree not to fight then the people should. It was about this time that the Oxford union resolution shocked people. Miller a pacifist as well as a socialist and gave both a Christian trial. The New Testament against violence and private property. — Miller and Co aware that was not the only use of force. The police — shouldn't have them and Xtians. Shouldn't appeal to them. At weekend camp all these things put forward very forcefully. And the logic of it appealed to me. I was a quick convert, and a keen one. Lost a bike.

(Prior 1948, pp. 1-2)

The difference in outlook between the schoolboy of 1931 and these later reflections is stark, and the reflections show that Prior had become more immediately aware of his environment by the time he was seventeen and 'a Fresher' at Otago. These reflections also show that by his mid-30s Prior had developed a much broader social conscience. It was something which he retained throughout his adult life, and which drives some of his earliest philosophical work where he is often found attending directly to themes involving ethics and social justice. The preciousness of the sixteen-year old softens into something gentler as he matures into an adult.

Prior never tells whether he intended his essays to ever be read by anyone else. Nor is it clear whether he had any particular audience in mind. It is possible that the *Three Little Essays* were simply Prior's own personal expositions during September and October 1931, a cerebral diary of sorts. It seems unlikely that they were somehow connected to his schooling.

2 Wairarapa High School

The Martin Prior Collection at the University of Aalborg contains an undated photograph of Arthur in a jacket, long pants, waistcoat, school tie, and school cap. In the photograph, the 'nob' on top of the cap is not visible — so Arthur may have been 'denobbed'. Removing the nob is an old 'rite of passage' for New Zealand schoolboys. Arthur is looking squarely at the camera, with a confident half-smile. He had good reason to be confident. He was an excellent student — in fact, Prior was the 'Dux' of Wairarapa High School in 1931 — i.e., the school's top scholar in that year.

If the *Three Little Essays* represent part of a schoolboy's personal and ambitious intellectual project, it is important to note that such intellectual ambition was by no means out of place in 1930s New Zealand. The history of New Zealand secondary education in the 1920s and 30s re-

veals some careful balancing between, on the one hand, the public's enthusiasm for what we might call a 'high, classical' British education for their children, and, on the other hand, the need for financial constraints, sometimes severe ones, as a result of the Great Depression. Certainly, the government records show that New Zealand was, in the 1920s and 30s, closely discussing the importance of its secondary schooling. The government sought to target certain areas as a matter of special economic importance — agriculture was one such area — and this meant that many leaders preferred a stratified approach to secondary schooling. There were, in fact, three different types of public secondary schools in New Zealand. Smaller centres would sometimes have Technical Schools. There were also District High Schools, which taught to both primary and secondary students, and which were usually co-educational. At the top of the social hierarchy were High Schools, most often found in larger urban centres, most focused on a traditional curriculum, and most closely linked to the New Zealand Universities. In the *New Zealand Parliamentary Papers: Appendix to the Journals of the House of Representatives*, we are told that "The Chief Inspector of Secondary Schools reports that the process of the liberalization of the curricula continues at a steady pace" (*New Zealand Parliamentary Papers: Appendix to the Journals of the House of Representatives* 1931, Session I-II, p. 24). But the government's predicament was that liberalization was not what the public wanted. The effect of these pressures can be seen in Masterton itself. There had been secondary schooling in Masterton since the establishment of a technical school in 1896. The district high school opened its doors in 1902. By 1923, the secondary component of the district high school was separated from the primary component in order to form Wairarapa High School, which Prior attended as a student. (In 1938 the technical school and the high school merged to become Wairarapa College, which continues today.) This shift from a district high school to the establishment of Wairarapa High School shows that the borough of Masterton was part of the push towards greater public access to what

was understood to be the best and most desirable sort of secondary schooling.

New Zealand's connection to England also affected the discussions about education – for New Zealand often explicitly measured the quality of its secondary education against that of other parts of the British Commonwealth. It was, for example, a source of pride that, as against other parts of the Commonwealth, a comparatively high proportion of New Zealand teachers were certified, and a comparatively high proportion of New Zealand secondary school teachers had undergraduate degrees. The 1932 Report of the Minister of Education (R. Masters) to the Governor-General "upon the progress and condition of public education" (for the year ending December 1931) shows how boldly comparative was the New Zealand outlook:

> Further evidence of the rise in the standard of education in the Dominion is given by the following statistics: In 1914 there were no fewer than 579 uncertificated and unlicensed teachers in schools above Grade 0 — that is, in schools with an average attendance of nine and over, while in 1920 there were 329, in 1925 about 230, and in 1930 only 43. In all cases teachers in training have, of course, been excluded. Expressed in another way, the figures show that whereas in 1914 74 per cent. of the adult teachers in primary schools were certificated, in 1930 the percentage had risen to over 93. It is worth remarking here that in the elementary schools in England 73 per cent. of the teachers are certificated…The number of University graduates among primary-school teachers in 1920 was 244, or only 4.9 per cent. In 1925 the number rose to 329, or 5.7 per cent., and in 1930 to 385, or 6.2 per cent. The corresponding percentage in England was 3.19, in Scotland 27.11, in New South Wales 8.95, and in Victoria 9.47. Out of 1,237 teachers employed in 1930 in

> secondary schools, technical schools, and manual-training centres, 748, or 60 per cent., were University graduates. Taking primary and secondary teachers together, New Zealand had in 1930 14.7 per cent. of graduate teachers, while England had 14.2 per cent.
>
> (*New Zealand Parliamentary Papers: Appendix to the Journals of the House of Representatives* 1932, E-01, p. 4)

In fact, one of the polarizing topics during 1930-1932, concerning New Zealand secondary school reform was "the home universities' decisions not to accept accredited passes for matriculation" (*New Zealand Parliamentary Papers: Appendix to the Journals of the House of Representatives* 1931, E-01, p. 25).[6] The 'home universities' were not New Zealand ones, but British ones — a clear indication of New Zealand's outlook and ambitions.

3 Prior at Wairarapa High School

As the school dux, Prior received a special prize. He was presented with his own copy of *The Complete Plays of Bernard Shaw*, published by Constable and Co. Ltd, London. The plate affixed in the front of the book reads as follows:

Wairarapa High School.
MASTERTON, N.Z.

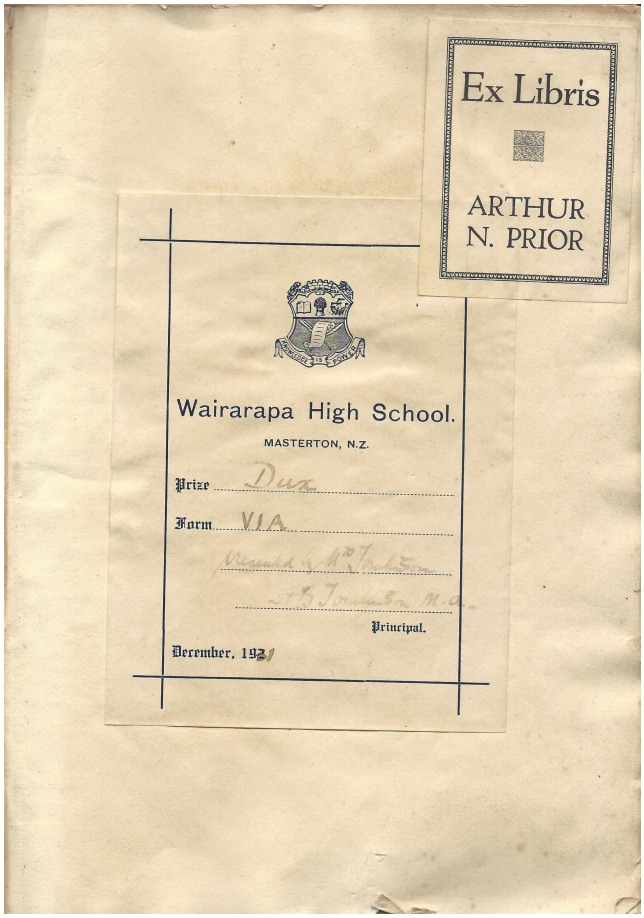
Prize *Dux*
Form VIA
presented by Mr Tomlinson

[6] School principals had the power to accredit students on the basis of their own assessment of the students' work, but the 'home universities' did not accept this and insisted instead that an examination must be the basis for university entrance. A system of accreditation would of course have been less costly to maintain than the administration of a nation-wide examination.

HB Tomlinson M.a.

Principal.

December, 1931



The plate was originally printed for use in the 1920s, with the numerals 192 printed, and a blank space left for the final numeral to be added by hand, but in Prior's book, the 2 in 192 has been written over and converted to a 3, and a final 1 added. The principal of Wairarapa High School, and the one who presented the gift, was Harold Bruce Tomlinson, MA 1920, a graduate of the University of Otago. Tomlinson had earlier taught at Wellington (Boys) College.

The Complete Plays of Bernard Shaw would have been a tremendous and fine prize for any New Zealand school dux in 1931 — for the book had only been published earlier that year, and it had to be shipped from Britain to New Zealand. The shipping was just one of several things which conspired to make books very expensive in New Zealand. But *The Complete Plays of Bernard Shaw* was, foremost, a gift well chosen for Arthur Prior, and it was clearly one which he appreciated. He kept the book all his life and eventually passed it to his children. Prior's copy of Shaw appears to have been very thoroughly loved and used. It has made at least two trips half-way around the planet — from Britain to New Zealand and then back again. Its cover is now completely missing. (The book was stored in a hard cardboard 'Box File with Lockspring'. The box file's original price tag still visible – the box file itself cost £2.47p from Hunts, Broad St, Oxford.) Page 1119/1120 of Shaw's *Plays* has fallen fully out and has spent what must have been many years stuffed in elsewhere, out of order, and upside down. A large sprig of sage sits pressed between pages 50 and 51, within the pages of 'The Philanderer'. And — in each of 'Man and Superman', 'Major Barbara', 'Androcles and the Lion', and 'Back to Methuslah' — various passages have been neatly underlined in blue ink, and, in some places, in what must have once been red ink which has now faded to pink.

The book plate gives the Form as VIA. The VI is, here, the Roman six, indicating the Sixth Form. The A stands for the top 'stream' of the Form. It means that Prior was then in his fourth year of high school, and he was in the top class. These labels are not currently used in New Zealand schools, but when they were used, the first year of high school was called Form III, the second year was Form IV, the third year Form V. In 1930, Prior was one of 4567 Form V students who sat the University Entrance Examination conducted by the University of New Zealand. Prior was one of 2038 who passed it. There were 2529 who failed. Passing the University Entrance Examination entitled a student to begin university once they had turned sixteen.

> By far the most popular means of obtaining free University education is to qualify for a University Bursary. These bursaries are awarded to those who secure a credit pass in the University Entrance Scholarship Examination or a higher leaving certificate.
>
> (*New Zealand Parliamentary Papers: Appendix to the Journals of the House of Representatives* 1931, E-01, p. 30)

In 1931, the Government's Department of Education awarded 1376 higher leaving certificates to students who were at the end of Form VI.

Also in 1931, Prior was one of 166 students who sat the Entrance Scholarship Examination conducted by the University of New Zealand. Of these, 105 'obtained at least a pass with credit', and 46 'qualified only for university entrance as a result of the examination'. The remaining 15 students failed. Those who passed with credit were entitled to the same bursary as students with a higher leaving certificate, but of these 105 students with credit passes, only 30 in the whole of New Zealand, were awarded a University Entrance Scholarship. Prior was one of these thirty.

As Prior explains in his "When I was a Fresher" (1948), he went to the University of Otago in Dunedin initially with plans to study medicine. Instead he graduated with a degree in philosophy. The University of New Zealand Roll of Graduates 1870-1961 lists each graduate's highest degree. It lists Arthur Norman Prior as having been awarded the MA in 1938, as a student at the University of Otago. Next to his name is the code 'ba2'.

The 'a' in 'ba2' indicates that Prior was an Entrance Scholar — that is, the examinations he sat at Wairarapa High School earned him a scholarship which covered at least his fees for three years of study towards his BA.

The 'b' in 'ba2' indicates that Prior was also awarded a subsequent Senior Scholarship – that is, his undergraduate work at Otago was

judged good enough to support an additional 'senior' year of study, a postgraduate-level of study. So, the University of New Zealand Roll of Graduates indicates that Prior was awarded total scholarships which covered four years of university study, BA through MA.

The '2' in 'ba2' indicates that his MA was awarded with Second-Class Honours. In Prior's day, after a three-year BA one could go on to complete an extra year of study. At the end of that extra year, a student who passed could be awarded the degree of MA with First-Class Honours, Second-Class Honours, or without honours. Sometimes the Second-Class Honours are divided into an upper division and a lower division (2.i or 2.ii). The Roll of Graduates does not make the distinction between upper and lower seconds so we know only that Prior's MA was awarded with Second-Class Honours.

Today, in 2020, the University of Otago awards Dux Scholarships "to any student who is named Dux (the top scholar) of their school".

4 Conclusion

The primary concern of this chapter has been to provide insight into the historical setting of 1930s New Zealand — and specifically into the New Zealand secondary-school education system of the early 1930s — in the hope that these essays will have a much wider appeal than simply to philosophers for whom Prior's importance is unquestionably his later logic work.

If my initial reaction to the *Three Little Essays* was one of scepticism, one point which emerges in the essays is that even at the age of sixteen Prior had found a sort of analytical method which we can see him beginning to employ. Prior is exploring the theme of determinism, and he does so by tracing it across a wide collection of literary, religious, and scientific texts. Prior's chosen texts range, e.g., from Calvinist writings, to Shelley's "Queen Mab", to Einstein's discussions of relativity. Wherever Prior detects a whiff of determinism, he pounces on it, carefully

noting it in his essays. As a consequence of this, the T*hree Little Essays*, when taken as a whole, stand as what my old comparative literature professors would have called a study in 'inter-textuality' — a study in which Prior is asking how the concept of determinism fares when it is put to use here in this text and there in that one. We can already see a mind which delights in exposing parallels. We see this same delight in his early philosophical work — e.g., in "The Nation and the Individual" (1937) and in *Logic and the Basis of Ethics* (1949). Prior was so adept at discovering parallels of reasoning that when, sometime in 1950-51, he finally sat down and learned modern symbolic logic, he could only have been enthralled. In particular, when he met modal logic he found the ideal vehicle for articulating his views about time and tense.

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From Flower-Show to 'Praying Scientist': the Early Thought of Arthur Prior

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Abstract

Abstract: Arthur Prior's *Essays Literary* (1931) is one of three long essays he wrote when 16 years of age. This paper situates the essay in the context of Prior's early writing and his schooling at Wairarapa High School and also his later thought as expressed in his letters to the Christian poet Ursula Bethell.

In 1931, Arthur Prior (1914-1969) wrote three long essays, including *Essays Literary*. While these are impressive works of scholarship, expression and insight for a 16-year old in provincial New Zealand, they can be understood as part of an on-going undertaking by Prior to pursue essay writing that continued throughout his life. Prior wrote essays from an early age. Considering these essays and his other activities while at high school enables a new insight into the early life and thought of Prior as well of the context that gave rise to his writing *Essays Literary* and the other essays.

1 Earliest Writings

The earliest published reference to Prior's writing I can discover is a note in the *Wairarapa Daily Times* for 16 November 1925 that records Arthur Prior "placed fourth in discussion B (secondary) in the S.P.C.A's competition for an essay on the humane treatment of domestic animals". Alas, there is no record of the essay surviving. The earliest surviving essay by the young Arthur Prior occurs in the following year when he tied with Dorothy Green in the essay competition for the Masterton Flower Show, November 23, 1926. The subject for the competition was "The Cultivation of Flowers and the Work of the Masterton Horticultural Society." Prior's brief essay (written when he was 11) is as follows:

> What an important asset is the cultivation of flowers in making a better place of New Zealand. How much less beauty there would be in our country if our beauty-loving citizens did not cultivate their extensive gardens! New Zealand is exceptionally fortunate in having a climate which permits certain flowers to grow in each and every season of the year. Annuals, such as chrysanthemums, dahlias, and asters, biennials, such as stocks and wallflowers, and perennials, such as roses, calcolarias and lavenders, grow plentifully. Some flowers, such as marigolds, thrive all the year round. We can cultivate flowers that thrive in the shade and flowers that thrive in the sunshine; alpine flowers and tropical flowers; flowers that grow thickly and flowers that grow far apart. Therefore, it is but reasonable to expect us to take full advantage of our temperate climate and privileged [sic] conditions, and cultivate our gardens, however small they be, in the best possible way, in order to make "Glorious New Zealand" even more worthy of its title. In winter we should prepare and fertilise the ground to the proper extent; in

> spring we should sow the seeds in the right way; and afterwards we should tend the plants carefully and well. The "Masterton Horticultural Society has organised spring and autumn shows and has given prizes for the best flowers, fruits, and vegetables shown. These shows benefit not only the prize-winners, but also all who enter or attend. They can see the plants other people are growing, and try to produce better themselves.
>
> (*Wairarapa Daily Times*, 27 November 1926)

This is exactly the type of settler nationalism and civic pride enthusiasm that the Horticultural Society were obviously seeking to reward.

Arthur's half-brother, Owen Prior, records in his memorial celebration of Arthur that, when at Wairarapa High School, Arthur, was recalled "as a brilliant eccentric" who created an exploding powder used on the headmaster's chair. The headmaster, Dr Uttley, apparently realised at once that Arthur was the only student intelligent enough to have created such a powder. While academic, Arthur was not sports-minded, retiring to the school boiler room to study when the rest of the school was playing sports (Prior 2015).[1] He was however noted in the 1927 school magazine report of Form IIIa as having "been distinguished at football as an immovable fullback." (*The Wairarapa High School Magazine* 1927, p. 26).[2] Arthur was involved in many non-sporting school activities, first recorded as a speaker in the Debating Club as a third former in 1927, perhaps understandably participating in the debate "That New Zealanders devote too much time to Sport" (*The Wairarapa High School Magazine* 1927, p. 57). In that same year, Arthur had perhaps his first and only piece of fiction[3] published, with his short story "How

[1] I thank Owen Prior for sending me a copy of this in 2019.

[2] I gratefully thank Gareth Winter for all his work in tracking down these magazines and combing through them for any mention of Arthur Prior.

[3] Owen Prior's compilation includes a copy of the 23-page handwritten and illustrated bloodthirsty "Tales of the King of the Sea" that the 12-year old Arthur wrote for

Kejak Outwitted Mr Cayman" appearing in the school magazine. This macabre story of the quick-witted spider monkey seems to owe a great deal Rudyard Kipling's *Just So Stories*, relocating the action to South America:

> HOW KEJAK OUTWITTED MR CAYMAM
>
> It was long, long ago – aeons ago– when the Little people lived unmolested in the forest, in houses. No, not quite unmolested, for they had to beware of old Cayman, the great alligator, who lived in the river. Oh, but there were many Little People in those days – Kejak the Spider-Monkey, Gurgo the Sloth, Hsu the Agouti, Fizurk the Cabybara, Felix the Puma, Spak the Tiger-cat, and many others. But Kejak, the Spider-Monkey, was the smallest and cleverest of them all.
>
> Such a queer little fellow was Kejak! He was only about nine-inches high, with an inch and a-half head, two-inch body, and great long arms and legs which gave him the name of "spider"-monkey. Then he had a long, long tail which was longer than himself. His face was round and black and grinning.
>
> Keejak was very fond of crabs. He liked best the crabs with no hard back that used to float just under the surface of the

---

the 5-year old John Sinclair in 1926. It concludes with "The Pirate's song":

Blood, blood, blood!
Give us a boose(sic) of blood,
From a dead man's head, where he bled –
Oh, a boose of blood is good!

Blood, blood, blood!
Blood is life to me;
Chop off his head and swallow his bloody!
Doodle, dardle, de!

river. Every morning he used to come and poke in his long arms for crabs.

But one day the news came to him that Mr Cayman, the alligator, was in the part of the river that Kejak came to. He thought, and thought, and thought, until he thought of a plan by which he could find out whether Mr Cayman was in the water or not. So next day, before little Kejak poked his arm in, he thought aloud, which was a little habit he had got into.

"How strange it is, 'he said to himself, 'that I cannot see the crabs' backs sticking out of the water!"

"Huh!" thought the alligator, who was really under the water listening all the time. "I can easily stick the end of my nose out of the water, and it will look just like a crab's back."

So he stuck the tip of his nose out of the water.

Then Kejak knew that crabs didn't show their backs above the water, and that Mr Cayman was in the water. So he ran away as quickly as he could.

Next day the Spider-Monkey came along to the river again, and looked all around him. No Mr Cayman anywhere. Then he looked deep into the water, but Mr Cayman was hidden in the slime at the bottom. Kejak was just about to poke his hand in, when he thought: "No, I had better not take any chances."

So he said aloud: "How strange it is that I can't see the bubbles the crabs make when they breathe!"

"Who can't blow bubbles?" said Mr Cayman, giving a mighty blast.

Kejak, knowing that crabs can't blow bubbles such as

these, ran away like the wind to his little house, and decided not to hunt for crabs any more.

But one day he found a grove of fig-trees, with thousands of figs lying on the ground. Now, if Kejak liked anything better than crabs, it was figs, so he considered himself lucky.

But the news got round that he had found the grove, and eventually reached Mr Cayman, who determined to get him. So one day the alligator dragged his heavy, scaly body from the river to the fig-grove. He lay down under a tree, and shook it until he was covered in figs from head to tail.

After a while, along skipped Kejak. He looked around him for a time, and then stared at the "pile" of figs.

"Strangely like my friend, Mr Cayman!" he thought. Then he stared harder. "Very like him!"

Then he said aloud: "How strange it is that the wind does not make those figs roll about!"

"Bother him!" thought Mr Cayman. But still, if I shake a little, the figs might roll about."

So he shook a little, and all the figs rolled off his back, and Kejak knew who he was, and ran off as fast as his legs could carry him.

The old alligator was beside himself with rage; but he was determined to get the spider-monkey.

Little Kejak thought he would pay a visit to his uncle, Gurgo, the sloth. Such a queer fellow was Gurgo. He lived, walked, slept, and did everything upside down! He was all topsy-turvy! Nevertheless, Kejak always had a good time at his uncle's.

After a joyful day, he looked at the sun, and decided it was

time to go home. When he reached his little house he stared at the ground in amazement. It was all torn up, as if something heavy had been dragged over it. Then he looked at the house. The door was broken off, and by his bedroom window the wall bulged outward. A terrible fear crept over him when he realized that Mr Cayman was inside; but, knowing it was best to appear calm, he said out loud: "I wonder why my little house doesn't talk to me. Perhaps it is ill. Are you ill, little house?"

The alligator put on as nice a voice as he could, and replied: "No, little Kejak, I am not ill. I was just thinking. Aren't you coming in?"

"No, little house. I must first bring some firewood and put it outside the door, so that it will be within my reach to put on the fire to-night."

Kejak then ran away to the forest to all his friends, and told them to help him get some firewood to put against his house, and burn their enemy, Mr Cayman. So they got firewood, and more firewood, and still more firewood, and laid it against the house. Then they set it alight, and in a few minutes, the wood, the house, the house, and the alligator were burnt to ashes.

(A.P., IIIa, *The Wairarapa High School Magazine* 1927, pp. 60-62)

The reason to include such early writing is not just to enable a sense of the transition in Prior's thought and writing over the 5 years between these pieces and *Essays Literary*. These early writings also provide us with a sense of Prior as a child: on the one hand the serious settler nationalist of the horticultural show essay; and on the other, the child of empire with the wicked sense of humour many of his contemporaries, friends and family have commented on.

The school magazine of 1928 records that Prior continued to be a member of the Debating Club, including speaking against both "That Compulsory Military Training Should be Abolished" (*The Wairarapa High School Magazine* 1928, p. 20) and "That Strikes should be Prohibited by Law". Not only do these topics give a sense of the issues of the time – even in provincial New Zealand – they were also topics that were to be centrally important to Prior's identity and politics over the next decades, with his move into Christian Pacifism and his Christian Socialist politics. Prior also acted in his class (IVa) production of the one act play "A Night at an Inn", by Lord Dunsany; a melodrama about sailors who steal the eye of the idol Klesh and are pursued the idol's priests (*The Wairarapa High School Magazine* 1928, p. 51).

In 1929, as a member of Form Va, Prior became secretary of the Debating Club and a member of the Magazine and Library Committees (*The Wairarapa High School Magazine* 1929, p. 2, 4). As part of the Debating Club he argued for "That Males (Humans) are Naturally More Polite than Females (Human)" and for "That Wars are Inevitable"; and he acted in "The Warming Pan" by W.W. Jacobs and also in "The Safety Match". The magazine also records that at the end of 1928, Prior had passed his Senior Free Place examination which entitled him to free education in the senior school. In New Zealand, 'free, compulsory and secular' education had been guaranteed by the 1877 Education Act; however, up to 1901, the leaving age was only 13 years of age, and, in 1901, it was increased to 14. Secondary education above the age of 14 was fees-based, even in the secondary state school system (Stawbrick 2012). Prior was second prize winner in Form IVa, with certificates in English and Chemistry (*The Wairarapa High School Magazine* 1929, p. 11). As a new member of the senior school he participated in the "new boys' concert", where "Prior set the ball rolling with an opening speech, in which, owing to one or two not-too-veiled innuendos, he gained the disapproval of boys from various parts of New Zealand." (*The Wairarapa High School Magazine* 1929, p. 14).

In 1930, Prior retained his role as secretary of the Debating Club and as member of the Magazine Committee (*The Wairarapa High School Magazine* 1930, p. 2). The magazine for that year records that in the Examinations for 1929, Prior won the General Proficiency Prize for Form Va with Firsts in English, Latin & French (*The Wairarapa High School Magazine* 1930, p. 10). He also won "Mr C.E. Daniell's essay prize" (*The Wairarapa High School Magazine* 1930, p.11), which was the first bequest to the new High School. (Prior, 2015) The debates Prior participated in were: speaking for, "That the Woman of the Victorian Age was superior to the Woman of Today"; and against "That Compulsory Military Training be Continued". He also took part in impromptu speeches and acted as counsel in a mock trial where the defendant was charged with polyandry (*The Wairarapa High School Magazine* 1930, p. 25).

Prior was successful in another competition in 1930, this time winning a very realistic child's pedal car in an essay competition run by the Masterton No-Licence League to celebrate the 21st anniversary of the 1909 vote by Masterton for "no licence" for the selling of alcohol — this was the vote which made Masterton 'dry'. The result meant that the 15 pubs in Masterton closed on 1 July 1909, and remained closed until Masterton voted to restore liquor licences in 1946 (*Ministry for Culture and Heritage* 2014). The No-Licence League was primarily an alliance of Protestant churches, in the main composed of Presbyterians, Methodists, Baptists, and the Salvation Army. Prior's family were ardent Methodists and so it is not surprising that Arthur entered such a competition which was also an expression of civic pride and identity. Prior's successful essay outlined "the best three reasons why motorists should be total abstainers, and how New Zealand would benefit by national prohibition." (*Wairarapa Daily Times* 24 September 1930) Unfortunately, the newspaper report carried no details of Prior's entry.

Prior also passed his University Entrance exam, being one of only 2 pupils in the school to also gain a University Entrance Scholarship with Credit (*The Wairarapa High School Magazine* 1931, p. 30) with sufficient

marks to also pass the Medical Preliminary Examination (*The Wairarapa High School Magazine* 1931, p. 56). This success enabled him to go to Otago University in 1932, initially to study medicine, but as is well known, he soon abandoned this for a B.A. in philosophy and psychology.

In 1931 Arthur Prior won an Essay Competition, run New Zealand wide by the Women's Christian Temperance Union the prize being a pedal car. Here is Arthur with 3 year old Owen in the car.

In 1931, his last year at high school, Prior was one of 22 members of Form VI (out of a school roll of 266 pupils) (*The Wairarapa High School Magazine* 1931, p. 27) and continued his duties as Secretary of the Debating Club, but did not become a prefect (*The Wairarapa High School Magazine* 1931, p. 2). He was however Dux of the school, winning first prize for English, French and Science, and second prize for Latin and Mathematics (*The Wairarapa High School Magazine* 1932, p. 5). It is therefore not

surprising that he also was awarded a University National Scholarship in 1931, one of three at the school to do so (*The Wairarapa High School Magazine* 1932, p. 37). For the Debating Club, he again took part in the afternoon of impromptu speeches, the debate "That Hockey is a Better Game than Football", a "Kipling afternoon" of "readings, recitations and songs" and a Mock parliament (*The Wairarapa High School Magazine* 1931, p. 25).

Prior continued his association with his school after he left, being recorded within a list of ex-students in 1932 who donated money and books to the school library (*The Wairarapa High School Magazine* 1932, p. 28) as well as being a member of an "old Pupils" debating team that arranged an event in the last week of the school year engaging the school debating team on the motion "That the World is Going from Bad to Worse." (*The Wairarapa High School Magazine* 1933, p. 17). In 1933, Prior is also recorded in the school magazine as having passed Medical Intermediate at Otago University, and he provided a report outlining the activities of 10 past Wairarapa High School pupils who were then studying at Otago University. In this, Prior describes himself and two other ex-Wairarapa students Paddy Jansen and Jim Linton (who were also at Knox College) all as "aspiring divinity students of Calvinistic persuasions, now doing various stages of Arts." (The Wairarapa High School Magazine 1931, p. 46). It is clear that by going to Otago and to Knox Theological Hall, Prior entered a world that continued associations based around Wairarapa High School, and in this way transitioned smoothly from one world he understood and excelled in to another. For example, this entry in the "Past Pupils" section of the 1935 school magazine gives an idea of Prior's life at Otago:

> Arthur is editor of the Knox Collegians, Associate-Editor of the Critic, Vice President of the Arts' Faculty Debating Society and on the Executive of the Students' Christian Movement. He reports that he was approached to join the

> "Slackers Club", an unofficial body, but decided it would be too much trouble."
>
> (*The Wairarapa High School Magazine* 1935, p. 68)[4]

Every year, the school magazine provided an update of the jobs, tertiary education and marriages of its past pupils. Masterton was a small, tightknit community and those who left to study tended to return each summer vacation. Prior was no exception, in his case spending at least part of his time back in Masterton as a lay preacher on the Masterton Methodist circuit, preaching from February 1933 to February 1936 each summer vacation. This is both interesting and important for two reasons. The first is that, as we know, Prior was raised within the Methodist Church and so had family and personal connections to the local Methodists. Yet as Kenny reports, "Shortly after arriving at university he [Prior] became a Presbyterian." The reason given by Kenny is that Prior "became dissatisfied with Methodism, finding its theology too unsystematic, and disliking its stress on the felt experience of conversion." (Kenny 1970, p. 322). Yet if a Presbyterian by identity and theology in Dunedin (and a radical Christian Socialist member of the Army of Reconciliation) (Grimshaw 2018, p. 17), upon returning to Masterton, Prior seems to have been a Methodist by practice — even when in 1935-1936 a Presbyterian theological student. In fact, Prior's Methodist lay preaching in Masterton seems to have only stopped once he married Clare Hunter. While we know he and Clare were in Masterton over Christmas and summer of 1936-1937, there is no record of his undertaking any lay preaching for the Methodists. Prior's deep and longstanding links to the Masterton Methodist Church are in fact a crucial link to *Essays Literary*.

When I first discovered this ms in the Macmillan Brown Library at University of Canterbury back in 2001, and then wrote my article 'The

[4]The 'Knox Collegians' is the annual magazine of the Knox College Students' Association; *Critic* is the Otago University student weekly newspaper.

Prior Prior' (Grimshaw 2002), I transcribed its dedication as being to "Mrs F.J. Hardy and other non-Shelleyans who will not appreciate it". Prior's handwriting was never the clearest and my reading of the ms back in 2001 was my first introduction to his script. Since then however, I have spent many months working through the 39 handwritten letters and the theological fragment that I transcribed and edited for *Arthur Prior: a young progressive*. (Grimshaw 2018) Therefore my ability to decipher the more arcane flourishes of his penmanship has greatly improved. That said, I did not consider I had made a mistake when first transcribing the dedication to *Essays Literary*.

However, when I returned to *Essays Literary* this year I realised that I needed, if at all possible, to explain who "Mrs F. J. Hardy" was. She was obviously someone well known to Prior and therefore most likely someone from Masterton and, I thought, perhaps a teacher at his high school. The Macmillan Brown research library holds a couple of issues of the *Wairarapa High School Magazine* for 1927 and 1936, and holds the 75th anniversary publication of Masterton High School. This included a list of every teacher who taught there and yet there was no F.J. Hardy.

I then contacted Gareth Winter (the District Archivist, Wairarapa Archives, Masterton District Council) to see if he could help me on this question. Gareth searched for any mention of a F.J. Hardy in the Masterton archives and was unable to locate any such individual, however he did locate a Rev. F.J. Handy who was a Methodist Minister in the Wairarapa. At this stage I thought the dedication could have been to the wife of F.J. Handy but then Gareth, upon further searching, informed me that Handy did not get married until 1932 — and *Essays Literary* is from 1931. I retuned again to the hand-written dedication and discerned, on close inspection, that it was "Mr. F.J. Handy". As I noted in an email to Gareth, "Prior was prone to what could be termed 'an excessive r' in his hand-writing" — and, now, I might add, also prone to 'a reductive n'.

I have been able to therefore identify that the dedication is in fact

to "Mr F.J. Handy...." and this was Rev. Francis Joshua Handy (1900-1961). Handy first undertook Home Mission work on the Masterton Methodist circuit in the 1920s, was accepted as a candidate for the Methodist ministry in 1924 and left in March 1925 for Dunholme, the Methodist training college in Auckland. It seems that he retained strong links to Masterton, returning to the district to preach in breaks from his training.

Prior's family were pillars of the Methodist church and so it is not surprising that Arthur would dedicate his essay to Handy. Yet it is also obvious that the dedication is expressed as part of his thinking his way out of Methodism, an exit that was enabled by his university studies in Dunedin and, in particular, his residence in the Presbyterian Knox Theological Hall.

2 Essays Literary

The essays in this collection run to 150 handwritten pages and cover a variety of topics. They reveal the thoughts and beliefs of a young man already finding great limitations in the constraints of provincial New Zealand, Methodism and his schooling. It needs to be noted that Prior made two slightly different drafts of his *Ideal Library*. This discussion is based on the copy held in the Macmillan Brown Library.

Prior begins with a list of his *Ideal Library* which signals a young mind seeking to hold together interests in religion, science and literature. The list is impressive in its interests and scope and it is difficult to imagine a 16-year old, let alone a New Zealand 16-year old in a provincial town, having access to such a list of works, not to mention reading, or wishing to read such a list. Yet Prior appears to have been a serious bibliophile; in his letters to Ursula Bethell he mentions selling off most his private library to help fund the trip he and Clare would make to Europe (Grimshaw 2018, pp. 112-114); he also frequented Newbold's Book Shop in Dunedin, a four-storey, second-hand book shop that was

started by a Methodist Cleric, Rev. Thomas W. Newbold in 1917 and run by his wife.

The four central texts of Prior's library are telling. The Bible with the Apocrypha is the first text listed. This is understandable as Prior was, at this time, a pious Methodist whose whole life was framed by his Methodist faith. The Apocrypha, while not recognized as authoritative Scripture for Methodists or most other Protestants, is often included in Protestant study and reading as providing insight into the milieu of the books included in the Bible. Next are the complete essays and poetical works of Shelley, and it can be conjectured that it was this double emphasis of the Bible and Shelley as together comprising the heart of the young Prior's ideal library that drew comment from Rev. F.J. Handy. As is well known, Percy Bysshe Shelley (1792-1822) is perhaps the major English Romantic poet, as well as a major philosophical poet. Shelley's politics would also have caused comment in conservative, small town Methodist circles. It would be interesting to learn just how much Prior's pacifism and wider Christian Socialist politics, soon to be expressed on his relocation to Dunedin, were also influenced by his reading of Shelley.

Shelley is followed by Goethe's *Faust* (both parts), and this helps us understand why Prior also includes an essay on *Job* — because the prologue of *Faust* Book One is a transposed paraphrase of the book of *Job*, and the wager of what can waver the man of faith. What Prior is emphasizing in taking these three texts — plus the dialogues of Plato — as the basis of his ideal library is the knowledge (too often in decline these days) that the Bible and literature centrally inform the reading and understanding of each other. The dialogues of Plato are here because they too act as a central underlying base of Western thought and culture, alongside the Bible. It is here, based in these 4 choices, that Prior the theologian and Prior the philosopher coexist. They would continue to coexist for the next 20 years.

Section 1 of the *Ideal Library*, comprising texts on science, philos-

ophy and religion already identify Prior as a thinker concerned with concepts of time that again will inform his theology and his soon-to-be-emphasized Calvinism, but also, further ahead in his career, the centrality of time to tense logic. The philosophers mentioned are perhaps not surprising, even for a youth in provincial New Zealand, for we need to remember that at this time, such thinkers and their books were discussed (albeit often somewhat superficially) in newspapers and journals in a way we may find hard to imagine today. We also need to note how recent many of these texts were when Prior was compiling this list in 1931, which in turn alerts us to the way in which such works of science and philosophy were far more a part of a wider conversation and discussion — even at school level — than such texts are (or rather, could be) today. This was a time of two main sources of information: reading, and listening to the radio. At this time there were serious discussions of books and ideas on the radio that were listened to by those seeking to expand their knowledge; and, it must be said, seeking a way out of the limitations of provincial and wider New Zealand life. What is therefore more surprising in this list is the inclusion of Jonathan Edwards, the New England revivalist theologian. Yet Prior's Methodism is already en route to a Calvinism that in Dunedin found expression in Presbyterianism and Barthianism; and Edwards' Calvinism, deeply steeped in philosophy, is a central part of this move. Prior would, understandably, come to revise some elements of this list as he advanced in his studies, perhaps most notably we see this in his attitude towards Jeans, who he dismisses in a letter to his 'communist cousin' Hugh Teague in 1938 as someone who attempts "to 'philosophise' without any real philosophical ability". (Grimshaw 2018, p. 169).

The list of texts compiled under 'Poetry and Drama' are far more straightforward and expected, being choices one would in many ways assume a young man who won the English prize as Dux would value. It is interesting to note however that Samuel Taylor Coleridge came to assume a greater role in Prior's thought once he went to study Philoso-

phy and Theology, with Coleridge replacing Shelley as a core resource of religious and political thought. I base this on the repeated references to Coleridge in Prior's letters; Shelley is mentioned only in passing, and then in reference to his translation of Plato's "Banquet". (Grimshaw 2018, p. 66). For Prior, Coleridge comes to supplant Shelley because of Coleridge's influence on the theologian and philosopher F.D. Maurice who, throughout the 1930s, would act as a crucial counter-balance of Karl Barth in Prior's theology. Prior also came to see Coleridge as offering a way to pursue his theological vocation once he had withdrawn from theological training, a withdrawal he thought necessary because of his marriage to Clare Hunter. In July 1936, writing to Ursula Bethell of his upcoming marriage to Clare and their plans "to depart to England and earn our living as best we may by free-lance writing of various kinds", Prior states "And instead of my theologizing from pulpit and lecture-hall, I shall do it, like Coleridge, on paper & in conversation", annotating this with the ambition: "I have hopes one day of ending up the editor of a religious periodical." (Grimshaw 2018, p. 93). This youthful ideal library — and these essays — can and should also be read and understood as laying the foundation for this ambition as well as enabling his ventures into freelance journalism throughout the 1930s and 1940s.

Other names on this Library list would soon be jettisoned by Prior the philosopher and theologian, for example the Irish mystic and theosophist George William Russell was exactly the type of writer and thinker that Prior attacked in the pages of the New Zealand journal *Tomorrow* (Grimshaw 2020). Included in such attacks were the ideas expressed in *The Rubiyat of Omar Khayyam* and Sir William Arnold's *The Light of Asia*. We can understand these texts as expressions of what Prior in 1938, writing en route to England from Columbo, described as "such knowledge of these religions as I had acquired in my school-days , at which time I went all Syncretist & avidly read a book called "'Indian Myth & legend', Sir Edwin Arnold's 'Light of Asia' & lots of Encyclopedia articles."(Grimshaw 2018, p. 144). The Library list concludes with

an aptly named 'miscellaneous' collection of texts and resources read for interest and amusement. Overall, this is an impressive ideal library for one so young, but it is also the ideal library of a young man seeking to think his way into a wider world. Most of us would not want to be measured against whatever ideal library we would have assembled at the age of 16, but I argue that Prior's library stands up better than most others would — then and now.

What is perhaps surprising for those most acquainted with Prior the tense logician is the strength of his teenage romanticism focused upon the works and thought of Percy Shelley. Prior describes the appeal of Shelley: "It may be all summed up as firstly the beauty of his poetry and the beauty of his thought." Yet it can also be conjectured that the young Prior felt an affinity with Shelley, for as he notes of Shelley's 'Queen Mab': "When Shelley wrote this he was but a youth of 19" and the changes and development of Shelley's thought can be clearly seen in these essays as, at this time, providing a frame for how Prior hoped his own life and thought would develop. What interested Prior in Shelley's attacks upon Christianity is the question of time as expressed in the notion of freewill. Here we can see why Jonathan Edwards is a type of counterbalance to Shelley for, as Prior observes, the arguments that Shelley advanced against freewill to attack Christianity had been stated half a century before by Jonathan Edwards — but in defence of Calvinism.[5]

What we can term the romantic tendency of the young Prior is expressed when, in the section describing 'The Cloud', he proclaims Shelley "the true poet of nature" and this is because in reading Shelley's poetry Prior is able to "feel" nature in his poems. Furthermore, what Prior values most in Shelley's poetry is neither his political nor his anti-religious poetry but rather that poetry in which he "lets the breath of Na-

[5] As Adriane Rini noted, here Prior is describing an approach to philosophy that we find later in *Logic and the Basis of Ethics* (1949), where Prior is arguing that Moore's Naturalistic Fallacy can be found in much earlier philosophical writers (Rini 2020).

ture blow through him". Surprisingly, for those who have read Prior's attacks upon the Oxford Group's mystical piety, the German Christians' mystical volkgeist and his opposition to theosophical mysticism in his writings and letters once at University, here, in Essays Literary, it is precisely the "mystical union" with nature in Shelley that Prior so appreciates; see (Grimshaw 2018) and (Grimshaw 2020). It is obvious that at this stage Prior is not a yet a fully formed Calvinist — but then, neither should we expect him to be one. Yet in his response to Shelley's 'The Cloud', Prior makes a statement which helps us understand how he views himself, a statement that helps make clear why his *Ideal Library* has so many texts focussed on 'Science, Philosophy and Religion':

> The above poem, while imaginative to the highest degree, and permeated with the most beautiful touch of fancy, has yet an accuracy of detail which cannot fail to delight the *praying scientist*. [italics added].

That is, Prior saw himself at this time as 'a praying scientist', able to balance science and Christian faith, and so his response to the world is not yet the opposition to Natural Theology as it is expressed by his soon-to-be theological mentor Karl Barth. Unlike Barth, the youthful Prior is unable to say "Nein" to natural revelation (Brunner & Barth 1946). Yet also in Shelley, Prior found a hope for the future regeneration of Man that is contrasted to the despair of Keats and the scorn of Byron, and it is this hope that Prior so admires in Shelley's 'Prometheus Unbound'. Prior proclaims this poem Shelley's "greatest contribution to the literature of the world" and this is not just because of its content but is also due to its being in Prior's "studied opinion" that "finest form" of long poetry, the lyric poem.

Prior lists the three finest lyric poems as Shelley's 'Prometheus Unbound', Goethe's 'Faust' and the book of Job – and this explains not only why Shelley and Faust are part of this *Ideal Library*, but also why, as part of *Essays Literary*, he wrote on Job. For, as he proclaims, "These three

I would place on the topmost pinnacle of the literature of the world" because they are not only poems of "Man's conquest of evil" but also "complete expressions of the philosophy of life of their respective authors". These statements in turn help us understand why Prior writes on these texts, for in doing so he is aligning his own philosophy of life alongside that expressed in these poems, a philosophy of life focussed on the 'conquest of evil'.

It is this philosophy of life that Prior articulates in his discussion of Shelley's 'Essay on Christianity', which in turn expressed Shelley's move from atheism to a type of Christ-centred philosophy, if not an orthodox, theological Christianity. As elsewhere in his essays, Prior makes use of long quotes from his source to act as the expression of his own thoughts on the matter, for the extracts from Shelley's writings are not in the main used to provide either a critique or a launching pad for Prior's own views; rather they tend to be used as a way to align his own thoughts with those expressed by the source. In this, these essays are in fact less essays but rather commentaries in support of the source. That is, they show a young mind using writers and thinkers he admires as the basis on which to build and articulate his own thoughts and beliefs. For example, Prior notes that Shelley "goes on to expound a theory which perhaps echoes his old Determinism and may well be termed a kind of glorified Predestination"; here is a type of bridge between Prior the romantic and Prior the emerging Calvinist, finding support in his position not just from theology but, importantly for him, in literature.

We can also see the role that Shelley played upon the development of Prior's emergent religious philosophy via his discussion of Shelley's 'Adonais' which allows Prior to explore his own views regarding personal immortality. Prior notes that, for Shelley (and it can be conjectured, Prior), this is perhaps most strongly expressed in how "our human thoughts and actions produces chains of effects which go on through all eternity" which is "compensated for by an acute realisation

of the immortality of Nature and of beauty". This is what Prior discusses in his quoting at length from Shelley's 'Adonais' and the central issue of what the death of Keats means — not only for Shelley, but also, in questions of personal immortality, for Prior. Here Prior aligns himself with Shelley's conclusion where the personal is, in the end, enfolded in "the one great Spirit of Beauty and Love" which for Prior — if not for Shelley — is the Christian God.

Prior next turns to discuss the book of Job and begins by listing "the greatest thinkers the world has known"; a list headed, without hesitation, by Jesus of Nazareth, followed by Plato, then Albert Einstein, Spinoza, St Francis of Assisi and Buddha. Here, again, is the basis of his ideal library, which which we can see continues to frame and reinforce his thought. Turning to the list of literary masterpieces, Prior includes works by Shelley, Goethe, Plato and Shakespeare, but assigns highest place to the book of Job, for "in it we feel the very beat of the Heart of Being." Prior contrasts Job to what he terms the great poem, but a failure, of Milton's 'Paradise lost' for only in Job are we left with "an ineradicable conviction of the great order of purpose that is behind all of God's creation". That is, as he states after some discussion of the text of Job: "I like to think, with the author of 'Job', that God has the whole universe under his control, and even the things that we call misery and evil play their part in the working-out of His eternal purposes." For Prior, Job affirms his belief in the purpose and meaning of existence, a belief that God continues to order existence, that theodicy is answered by theology. But just as importantly, for Prior 'the praying scientist': "God, too, insists that Job should not question His justice or righteousness; but does not force this upon Job as a mere article of faith without reason. He makes the whole army of nature's phenomena march before Job's eyes, and Job, at length perceiving the wonderful order and purpose working behind them all, is satisfied."

Prior's theology, Prior's faith, as expressed in these essays is therefore not only that of a youthful romantic seeking mystical truth in na-

ture, but also that of a religious faith based in reason, a reason that enables recognition of God's order and purpose. It is this that in turn allows us to understand why so many of texts of Prior's ideal library are works of cosmology, because: "The great lesson that Job learnt, and that we should learn, from God's final speech is that true happiness can only come to us if we shift our viewpoint from the personal to the cosmic." Therefore, the 'praying scientist' finds God in cosmic order and "if the order of Nature conflicts with our idea of happiness, that is our lookout." This is why Shelley's poetry on nature exists as a theological text for Prior, for the beauty and truth that Shelley expresses are to be found in nature, and this is, for Prior, nothing less than the beauty and truth of God.

Yet these are 'Essays Literary' not just essays theological or essays religious, for it is in the 'beauty and majesty' of the language of God that Prior can likewise discern divine intent and purpose. For Prior, great literature — and for him at this time, great literature meant, in the main, great poetry — is an expression of the 'beauty and truth' of God expressed through the intelligence and mind of man.

What is interesting in providing an insight into Prior's theology at this time is that not only does he hold Job as "the greatest book in the Bible" but that the only books to be compared to it are the other Old Testament books of *Psalms*, *Proverbs* and *Isaiah*. But then as he confesses: "Although there are few passages in the Bible which I do not read with enjoyment, my taste for scripture is perhaps limited in so far as I read with avidity only such passages as express the majesty and glory of God and the beauty and wonder of His creation." Given his discussion on Shelley's poetry, and his self-identification as a 'praying scientist' with a focus on the cosmic, this is again understandable; and he goes as far as to compare the religious writings of Albert Einstein, especially Einstein's 'cosmic religion' to the book of Job, reading in them very similar ideas regarding the order to be found in nature. Yet what can be termed Prior's romantic-scientific natural theology would, once in Dunedin, soon be

confronted by the neo-orthodoxy of Karl Barth's theology, a theological position to be underscored by the politics of Prior's opposition to the *Volkgeist* religion of German Christianity that supported Nazism.

As for the New Testament, for Prior it lacks the poetical and noble literature which can be found in the Old Testament, again reinforcing his view that great poetry exists as a form of revelatory text in and of its itself. What is also lacking in the New Testament is a "stress on the cosmic idea of God" and so it lacks an emphasis on "God's power"; but what it does offer is "an altogether new and beautiful conception of His love". For Prior, as a Christian, it is God's love as revealed in the New Testament that enables us to fully understand God's power as expressed in the Old, and there is no contradiction between God's love and God's power. It is this that enables Prior to conclude by again emphasizing "the fact that I am a Christian rather than a Jew does not give me any cause to hesitate in saying that the Old Testament Book of Job is by far the noblest achievement in all the literature of the world."

Essays Literary is a remarkable achievement of a young mind attempting to express itself in primarily religious terms. While labelled "essays literary" they are in fact more so 'essays theological' and signal that for Prior, steeped in English literature, theology was also often a poetics. Yet the essays are also the expression of that most telling self-label, the 'praying scientist' whose theology arises and is expressed in cosmic terms. It is from within this cosmic theology that the focus on time, arising from Shelley and then first expressed as Calvinism and then finally as tense logic emerges.

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Arthur Prior's Early Thoughts on Predestination

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Abstract

In 1931 the then 16-year old Arthur Prior wrote a booklet, Essays Religious, which is mainly a discussion of the conceptual and logical analysis of the relation between the doctrines of divine foreknowledge and human freedom. Prior found great inspiration in the works of Jonathan Edwards who had argued that if God has complete foreknowledge there is no human freedom. All his life, Prior defended Edwards' claim that at least one of the two doctrines (divine foreknowledge and human freedom) has to go. In 1931 he argued that predestination holds and that the claim of free will has to be rejected. Later on he rejected the doctrine of divine foreknowledge and claimed that the there is human freedom.

In 1931 the then 16-year-old Arthur Prior wrote a booklet presenting a defence of the logical foundation of Calvinism in the tradition of

Jonathan Edwards. His text presents 150 pages of careful investigation and discussion of the theological topic of predestination, aimed at convincing the reader that it is only possible to maintain Christian orthodoxy within the deterministic theological framework provided by Edwards' version of Calvinism. While the title of the booklet, *Essays Religious*, suggests a broader discussion, it is evident that Prior's focus in this text is the topic of predestination conceived in the perspective of divine foreknowledge and time in general. This topic stands as one of the main dominant themes in his writing right up until his death in 1969, and it is a telling discovery to find that he worked with it already in 1931, when he was just 16 years old.

Prior's view on divine foreknowledge and human freedom changed significantly during the 1950s, but in 1931 Prior, in *Essays Religious*, suggested the following argument:

1. If God has complete foreknowledge, then we do not have a free will.

2. God has complete foreknowledge.

3. Hence, we do not have a free will.

Prior later investigated premise 1 of the above argument carefully. He knew that some have questioned it, but he found the reasons for doing so unsatisfactory. For this reason, he kept defending this premise. However, during the late 1950s and 1960s he used the *modus tollens* to draw a conclusion:

1. If God has complete foreknowledge, then we do not have a free will.

2. It is not true that we do not have a free will.

3. Hence, God does not have complete foreknowledge.

The booklet of Prior's *Essays Religious* is a useful source documenting in fact his early reading of Jonathan Edwards' Calvinism, which is important for Prior's later development of tense-logic, and for his later discussion of the tension between the doctrines of divine foreknowledge and human freedom of choice.

1 A booklet on Predestination

In the foreword Prior makes it clear that it is the subject of Predestination, "which forms the principal topic of this booklet" (ER p. {vi}).[1] It is well known that Prior published on the topic in the early 1940s, e.g. the papers "Reaction to Determinism" (1940) and "Of God's plan and purpose" (1942b). However, the discovery of the booklet shows that he worked seriously with the topic, even before he began his university studies in Otago in 1932. His views on predestination may also be the reason why Prior changed his general theological orientation. Although he was brought up in the Methodist Church, he became very attracted to the Presbyterian Church during the 1930s. People he met at Otago, such as Alexander Miller, who became a great inspiration to Prior in the 1930s and early 1940s, definitely played a role in Prior's change of church. As did his reading of the Neo-orthodox Calvinist Karl Barth. In addition, *Essays Religious* reveals that Prior's reading of Jonathan Edwards was a significant factor in his change of denomination and in his underlying acceptance of Calvinism. His reading of Edwards appears to have taken place in the months leading up to September – October 1931, when he was composing his *Essays Religious* . In that period, while reading up on orthodox Christianity, primarily Jonathan Edwards, it had become clear to Prior that Orthodox Christianity was a more reasonable religion than he had hitherto supposed (ER p. {ii—iii}). He had indeed been a sceptic, and even an atheist, until he had discovered the predestinar-

[1] Editors' note: We refer to the page number in the original, put in curly brackets in the transcribed text.

ian determinism which showed him, that what he liked in Shelley and Einstein's determinism, could be equally found in Jonathan Edwards' "merciless Calvinistic orthodoxy", which Prior found to have a "perfectly sound, logical and reasonable basis." (ER p. {22}). Predestination is thus, in *Essays Religious* , discussed in the same manner in which Prior would subsequently discuss other contemporary treatments of ancient, medieval and early modern literature, i.e. as a demonstration that what needs to be said has already been well, if not better, said by earlier writers.

> In his attempt to place strict Calvinistic orthodoxy on a logically consistent footing, Edwards, so far as the light of his day could show, met with full success. But we have moved a long way from the intellectual standpoint of the eighteenth century, and have learnt since then a number of things which make many of his ingenious explanations hardly acceptable today. Yet I believe most strongly that there may still be found a firm logical and reasonable basis for the most rigid orthodoxy; and I have presumed to take upon my shoulders the mantle of JONATHAN EDWARDS {29} in an attempt to find and to show that basis. (ER, p. 29)

It is evident from the booklet that Prior, even though he grew up in a Methodist church, didn't believe in the free will which is in fact a traditional Methodist position to hold. He had, rather surprisingly, "always been a Determinist of one sort or another" and writes that free will had "always seemed to me logically inconceivable." (ER, p. iii) In light of his dedication of the booklet to his "Father and other Arminians who will not agree with it" (ER, p. i), it is not difficult to understand why his acceptance of determinism could cause scepticism, and why, once he had discovered Edwards' coherent system, he became an eager convert. Much of this was to change, and his scepticism would emerge again later. When he looked back in 1948 to the time he was a fresher in

1932, he admits that he had made a sort of religion up of his own (Prior 1948). All of this being said, Prior's treatment of the topic of Predestination is masterful for a 16-year old with regard to its inclusion of the important historical voices of the theological debate such as Augustine, Luther, Calvin and Edwards on the side of determinism, and its inclusion and discussion of secular philosophers and thinkers on the side of free-will such as Bergson, William James, Heisenberg, Schopenhauer and George Bernhard Shaw.

2 Prior's argument

Prior based his argument for determinism on historical theological orthodoxy tracing back the position to Augustine's discussion of Pelagianism. It is also a theological argument in which Prior argues that the Arminian view on God's foreknowledge is irreverent. However, at its core his case rests on a what he calls Cause and Effect Philosophy. As such the booklet enters into the tradition of philosophical theology in which he would later, in 1942 publish the paper "Can Religion be Discussed?", and in 1962 the paper "Formalities of Omniscience". In his booklet, Prior is using a rather different type of presentation. He is aware of the problems of such an approach:

> Another probable source of confusion to the unwary reader is my constant change of idiom — at one moment I use the jargon of the very orthodox preacher, at another that of the Cause & Effect philosopher, & sometimes I even break into broad colloquialisms which some might even term slang. However, I must ask the reader to excuse the slang; & as to the other, I {viii} can only say that this continual jumping from the blunt assertions of orthodox leaders to the plausible ratiocinations of the philosophers should prove good mental exercise for him! (ER, p. vii-viii)

While such a tradition had to be apologized for in 1931, his own analytical discussion of theology has contributed to the current state of affairs in which analytical philosophical studies in theology can be published without excuse. His philosophical case has the following structure:

1. If the laws of Nature are unchangeable, then it follows that the Destiny of the universe is fixed from [past] eternity. (ER, p. 62)

2. The laws of Nature are unchangeable. (ER, pp. 71-73)

3. Hence, the Destiny of the universe is fixed from eternity.

Apart from a reference to Scripture, Prior draws support for (1) from 'modern Science':

> Modern science leads us to think that God plays a deeper part in the workings of Nature, for it teaches us that all natural phe-{60}-nomena are the logical and necessary effect of natural Causes — all the events that occur in Nature are linked up by science into one vast and ordered chain of Causes and Effects following one another with perfect mathematical precision according to unchanging natural laws.
>
> (ER, p. 59-60)

It is especially Einstein that he has in mind here. Prior quotes the following statement from Einstein:

> Everything is determined, the beginning as well as the end, by forces over which we have no control. It is determined for the insect as well as the star. Human beings, vegetables and cosmic dust, we all dance to a mysterious tune intoned in the distance by an Invisible Piper. (ER, p. 73)

Prior considers an objection to (1) on the basis of God's omnipotence (p. 72): should it be considered possible that God is able to break his own laws if he so chooses? Prior's reply, and perhaps the very fact that he raises this objection, shows his adherence to (2). The laws of nature are unchangeable by virtue of being instantiations of God's own being which is unchangeable.

> In the first place, I do not think He ever would choose to do so; as I have said, perfect consistency is the first thing we should expect of the very Spirit of Perfection; and in any case the Scriptures assure us that God {67} is not only infinite and eternal, but unchangeable. (ER, pp. 66-67)

When modern science, according to the young Prior, doesn't leave God out of the picture, it is because it needs God's nature and being to assert order and necessity into a universe that would otherwise be chaotic and devoid of order. For Prior the "uniformity of nature" is "identical with what the preachers call Divine Providence." (ER, p. 61). Prior has a further reply to the objection. One that points forward to his later discussion, in tense-logic, of the same topic.

> But even supposing that God <u>did</u> choose to break His own laws by some sort of miraculous intervention would that take away the 'fatalism'? Not a bit of it. For from the Absolute nothing of past, present or future — is hidden — in the sight of God events are set in time as surely as material objects are located in space — and God must have foreknown and predetermined the miraculous intervention from eternity, and the destiny of the Universe is as fixed and certain as ever. (ER, p. 67).

The assumption here, which is the same in Edwards's (1969), is that if there are facts to be known by God about the future, then such facts

are fixed and predetermined. While he changed his view later on free will, he maintained the core assumption evident in this quote from 1931. Three decades later he writes in *Formalities of Omniscience*:

> And in fact if we like to say that it is because X will be that it can be known that it will be, rather than vice versa, this means more than ever that X's future coming to pass is beyond prevention, since it has already had consequences which its opposite could not have (I take this point from Jonathan Edwards, who reproduced this Objection 7 in the eighteenth century for a different purpose — not to show that God cannot know future contingencies, but to show that, just because God does know all the future, none of it can be contingent). (Prior 2003, p. 50-51)

Thus, while Prior later changed his mind on the free will, *Essays Religious* makes Edwards' influence on Prior's thinking evident. It was from reading Edwards that Prior came to be convinced that if there are facts known about the future, then it is impossible to prevent these from taking place.

3 The alternatives

In *Essays Religious* Prior explores two Arminian responses to the philosophical argument for determinism. While he comments briefly on the teaching of Jacob Arminius and John Wesley, these views are never considered as genuine alternatives to Jonathan Edwards' determinism. The alternatives are instead the views of Heisenberg, Henri Bergson, Schopenhauer, George Bernhard Shaw, William James and others who, according to Prior, fall into one of two categories, neither of which has a claim to orthodoxy: either they do not think God exists, or if he exist he is imperfect and chance plays a considerable role in Nature's workings. The view he ultimately ended up with himself in the 1960s, after

the invention of tense-logic, is similar to the view that he in *Essays Religious* ascribes to William James, whom he categorizes as a a 'modern Arminian'. The idea is of a God who cannot foresee the future:

> James's conception of God is, however, immeasurably loftier than certain more recent notions which I shall deal with in a moment. God, according to James, is like a chess player, and the universe is at once his "game" and his "opponent." We creatures have free wills which we can exercise for or against him, and he cannot foresee what is coming next; but when it does come, he is wise enough to meet it with such moves as will bring the universe towards a safe conclusion in spite of it, knowing that "no matter how much it might "zig-zag", he could surely bring it safely home at last.
>
> (ER, p. 114)

It is evident that Prior was not the first to formulate a theory of the future as open, but by his invention of tense-logic he was capable of formulating a rigid theory of the open future that could form the basis of the ongoing discussion about foreknowledge and freedom.

4 The timeless and changeless God

Essays Religious takes us back to the time when Prior was a firm believer in the strict Calvinism of Jonathan Edwards. His later studies at Otago from 1932 brought him into contact with Barthian theology, and he seems to have rather quickly distanced himself from much of his thinking in *Essays Religious*, when he joined the Presbyterian Church. When Prior, in "When I was a Fresher", describes his religion in 1932 as self-made (Prior 1948), the reference is most likely to *Essays Religious* which, with his statement of faith at the end, certainly comes close to such a title. The most startling feature of Prior's 'early figured' out religion is its a-personal view on God. His religion was a view on God in

which he "freely permitted [himself] to substitute for the term 'person' the term 'spirit', and for the term 'personal' the term 'spiritual' where it seem[ed] to [him] fit and advisable to do so." (ER, p. 29). By doing this Prior meant to distance himself from describing God as a being or a person. For Prior, "person" has a "smack of the concrete, the worldly, the finite, which is distasteful to me." Furthermore, "only where concreteness, worldliness and finitude are obviously implied" can the term "person" be rightly applied. Prior argued that "a person, in the only sense in which I can understand the word, is an isolated, finite, individual being", and it would be a contradiction to claim that God is a person, infinite, eternal and unchangeable (ER, pp. 33-34). Prior's discussion of the topic of predestination appears to have been influenced by his view of God's relationship to change and the passage of time. These are, according to Prior, an illusion from God's perspective, with the conclusion that "events are set in time as fixedly and as surely as material objects are located in space." (ER, p. 129-130). When Prior later developed tense-logic, it was evident to him that God could not timelessly know tensed facts, and hence had to be within time in order to know them. In "Formalities of Omniscience" (1962) Prior analyses what timeless knowledge might mean. He writes:

> God could not, on the view I am considering, know that the 1960 final examinations at Manchester are now over; for this isn't something that He or anyone could know timelessly, because it just isn't true timelessly. It's true now, but it wasn't true a year ago (I write this on August 29th, 1960) and so far as I can see all that can be said on this subject timelessly is that the finishing-date of the 1960 final examinations is an earlier one than August 29th, and this is not the thing we know when we know that those exams are over.
>
> (Prior 1962, p. 116)

The discovery of *Essays Religious* is important, since it demonstrates

that Prior's strong adherence to tensed realism was not the beginning, but constituted a change of mind concerning the reality of God, the reality of change and the passage of time. When this happened we cannot know, but it suggests that Prior not only considered it impossible that God should have foreknowledge and humans have a free will, but even that God should exist in time.

5 Scepticism and atheism

Even though Prior grew up in a home with strong Methodist tradition, he was none the less, from early on, struggling with scepticism as is evident from *Essays Religious*:

> Those readers who have previously known me only as a bit of a sceptic, frequently lapsing into atheism, will be rather surprised to find me here a bigoted champion of strict orthodoxy. (Prior 1931 , p. i)

It turns out that Prior, upon encountering Jonathan Edwards' Calvinism had become convinced that orthodox tenets could be established on a firm logical basis. *Essays Religious* does indeed make it clear that the firm logical foundation is the deterministic system of Edwards' determinism. Prior had "always been a Determinist of one sort of another" (ER, p. i) and free will had "always seemed to me logically inconceivable" (ER, p. i). Within the tradition of Methodism however, Prior had not encountered a theological system to match his adherence to determinism. Instead, he appears to have been inspired by Shelley, and we learn from *Essays Religious* that Shelley seems to have had an influence on Prior's atheism. He had, he writes, "long been a follower of Shelley", and was "once a Shelleyan anti-Christian". The influence of Shelley is evident at several places in the essay, especially concerning Prior's rather unorthodox denial of God's personhood. Indeed, it seems

that, while he had become a convert to Jonathan Edwards' views on determinism, he was still leaning toward atheism in his denial that God is a being:

> I cannot, then, imagine God to be a literally personal being, because to take such a description literally would be to put unjustifiable limitations on God's nature; and for the same reason, I am rather inclined to think that God is not a "being" at all. If my first assertion savours of Nestorianism, my second doubtless savours of Atheism; (ER, p. 34)

What remains of his atheism is not quite much. God is not a person, and not a being, but is "the Source and Fount from which all Being ceaselessly flows" (ER, p. 37). In his foreword, he describes his development from being a "Shelleyan anti-Christian" to a Shelleyan "pro-Christian", and Shelley thus continued to play an important role, in shaping his view on God:

> Formerly I have been all too eager to appreciate the destructive aspect of the teaching of men like Shelley & Einstein; but now I use the ideas I have derived from them as an instrument, not for the destruction of orthodox tenets, {vi} but the establishment of orthodox tenets upon a firmer logical basis. (Prior 1931, p. v-vi)

Shelley's influence, in shaping Prior's view on God as a non-person, is missing in his later writings on theology, and appears to have been quickly corrected by his reading of Karl Barth's neo-orthodoxy. What remains then, was his appreciation of mysticism as it is evident from his 1937 review of St. Bonaventura's philosophy. In 1942, Prior was going through a crisis of faith, while his marriage to Clare dissolved. From a letter to Mary Wilkinson (Mary Prior), we learn that his crisis began toward the end of 1941, and lasted until June 4th, 1943 (see Jakobsen

2020). After the war Prior became an active member of the Presbyterian church and wrote many theological articles which he published in various theological journals. His return to Christianity in 1943 seems to have been a rather strong experience in which, on the 18th of July, 1943, he "made his peace with God". Until 1954 Prior served as an elder in the Presbyterian church, but from the correspondence between him and Mary in 1954 we learn that scepticism had returned again:

> I don't know there's isn't a God; but I don't know there is either, and I don't know as much as by being a Kirk elder and implicitly claim before the world to know – I don't 'know that my Redeemer liveth' – and I don't think my state of mind can be rightly described even as believing the things I implicitly profess to believe. (Prior to Mary 21st May, 1954)

In the beginning of 1954 Prior was working out the foundation of tense-logic and applying it to the question of determinism and free-will. *Essays Religious* gives us good reasons to think that at the root of Prior's doubts about God, was what can be described as the following *modus tollens* argument:

1. If Christianity is true, then a God must have foreknowledge of all future events.
2. If God has foreknowledge of all future events then determinism is true.
3. Determinism isn't true.
4. God does not have foreknowledge of all future events.
5. Christianity is not true.

In *Essays Religious* we find Prior affirming something like the first premise of the argument:

> Calvinism, as opposed to Arminianism, seems to me the only form of Christianity which can satisfy our truest and deepest religious feeling — to wit, our sense of complete dependence on God for everything in our lives — nay, for existence itself. (ER, p. 128)

And

> A God who is not in all things Supreme, whose sovereignty and foreknowledge is not absolute, does not seem to me worthy of worship, and to say that the true God is not all-powerful and all-knowing seems to me, to say the least of it, highly irreligious. (ER, p. 124)

His discovery of Edwards' theology gave him the firm logical basis on which he could affirm the truth of Christianity, but as its influence waned it became clear to him that the God of Edwards lacked humanity. His discovery of tense-logic gave him a strong logical reason to reject determinism as such, and by consequence Protestant versions of determinism. It gave him a reason to choose a humanism that could not make room for determinism. In an interview conducted by Per Hasle, Mary Prior comments on her husband's struggle between the logical Calvinistic system and its lack of room for the free will:

> I have never felt quite sure how seriously Arthur really took the Calvinism which intellectually attracted him. It was rigorous and logical, unlike the Methodism of his childhood. But its God lacked humanity. I think sometimes he entertained Calvinism in its various forms rather than quite believing it. (Prior 2003, p. 302)

With the discovery of tense-logic, freedom of the will, which he in *Essays Religious* calls meaningless, was no longer so. Prior demonstrated

this in his tense-logical analysis of the views on future contingency suggested by William of Ockham and Charles Sanders Peirce (Prior 1967). It was clear to him however, that neither Ockham, as he understood him, nor Peirce, could save a version of future contingency that would allow for foreknowledge without determinism. This meant that the second premise in the above *modus tollens* was confirmed. By 1958 it was evident that Prior's views on foreknowledge had changed. Foreknowledge entails determinism, and therefore foreknowledge had to go:

> Or we might use Jonathan Edwards's argument against those who think God's foreknowledge consistent with freewill because foreknowledge doesn't cause a thing to happen any more than any other knowledge does. Edwards said that just because knowledge is the effect rather than the cause of the thing known, what is foreknown is to that extent as if it had already been (for it already has effects), and as inevitable. Edwards's moral was 'So much the worse for freewill', mine 'So much the worse for omniscience', but the argument's the same for both of us. (Prior 1958, p. 4)

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Arthur Prior's Early Thoughts on Physics and Cosmology

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Abstract

Arthur Prior's *Essays Scientific* (1931c) is a handwritten booklet in which he explained key ideas of post-Newtonian physics for the 'enquiring layman'. After some preliminary remarks, I sketch the contents of the two essays, *On Relativity* and *Sweet Nothings* that make up the booklet. I then discuss how certain themes important in Prior's later career (notably A-series versus B-series accounts of time, and whether the order of events is observer independent) are prefigured in this booklet. I then take a close look at Prior's use of diagrams to present special relativity, and close with some remarks on the editing.

One of the booklets included in this volume is *Essays Scientific*, but what kind of booklet is it? Like *Essays Literary* and *Essays Religious*, the original was a handwritten notebook that Arthur Norman Prior (1914-1969) wrote in 1931 when he was 16 years old. The choices the editors made in transforming the handwritten material to the version you have in your hands are discussed below in Section 5. For now, it is sufficient to note that it consists of two essays: 1) *On Relativity* and 2) *Sweet Nothings*. I

will discuss the contents of these essays in Section 1 and 2, but before doing this let us ask: who is this booklet for? And what might one expect to get out of it?

Prior writes on the very first page that it is dedicated to:

> Uncle Dick and other "enquiring laymen" who will not understand it.

This sentence is peculiar in several ways — but first things first. Uncle Dick was Prior's uncle, and he was a carpenter, not a scientist. So the booklet is for laymen unfamiliar with science, but interested in finding out more. However Prior himself was only 16 years old when he wrote this, and still attending school; he was by no means someone with a specialized knowledge of modern physics. He too was a layman, albeit a young one. Did he include himself among the 'enquiring layman'? Is he modestly admitting that he too did not fully understand these exciting new ideas either? Or did he see himself as bringing youthful energy and enthusiasm to spread new ideas to those around him — ideas that in his youthful confidence he felt he understood, while being well aware that his elders did not? Or is the "who will not understand it" simply an admission that some parts of his explanation were not as clear as he would have liked? It is an intriguing dedication, open to multiple interpretations.

But let us move beyond the dedication to the contents: if this 'enquiring layman' were to read the booklet (let us assume that *some* understanding is possible!) what might he or she get out of it? First, we should note that it is not about science in general, for with the exception of a few places where topics within chemistry and biology are mentioned in passing, these two essays are very much about *physics*. Moreover, it is also very much a booklet about *post-Newtonian* physics. That is, it is about the revolutionary ideas that transformed classical physics towards the end of the 19th Century: relativity theory, atomic physics, and quantum mechanics. Post-Newtonian physics became standard in

the 20th and 21st centuries, but back in 1931, the exciting (and strange) new ideas on which it was built were probably not as widely known as they are today.

The young Prior clearly found these ideas interesting, and the dedication shows that he hoped to share these ideas with other enquiring minds, but another impulse seems to lie behind this booklet: he wanted to *learn* these ideas as well. As he writes in the preface:

> My father has pointed that one needs to study a subject fairly fully to get a reasonable grasp of it, and a "condensed" treatment of the subject is usually difficult to follow. However, I have done as well as I can. (Prior's Preface.)

Some of the ideas that Prior includes in his condensation have long since been abandoned in favour of better ones. I will shortly point out one of these (the move from models with infinite pasts and futures, to Einstein's spherical universe), and in Section 4 I look closely at one of the less clear passages of the booklet, so that the contemporary enquiring layman can understand it better — and better assess the extent of the young Prior's own understanding.

Which brings us to a key question: why should a contemporary enquiring layman bother with this booklet? Nowadays, in the form of books, blogs, YouTube videos, and so on, there is an abundance of superb expositions of post-Newtonian physics. Thus contemporary readers are unlikely to approach Prior's booklet for insight into this subject. Rather, if you have found this booklet, and decided to read it, it is highly likely that you did so because you knew something about its author, and what he achieved in his later work in logic and philosophy. It is also likely that you are curious about the early Prior's thoughts, and want to know whether the ideas and perspectives that he tried to teach himself at the age of 16 recur in his later work, and whether they played some role in the development of tense logic. I will discuss this further in Section 3.

Prior does not have many references to specific articles or books, though he diligently notes the names of the major scientists associated with each theory. But he does mention one article from *Scientific American*, namely "The Perspective of Modern Physics", which appeared in September 1931 (Heyl 1931). In 1931, *Scientific American* was already a well-established popular science magazine (it was founded in 1845), and Prior lists it, together with the multidisciplinary journal *Nature* (founded in 1869), as part of *My Ideal Library*, which also appears in this volume. In the introduction Prior writes:

> For the idea of my essay on "Sweet Nothings" I am indebted to an article by Dr. P.R. Hayl[1] on "The Perspective of Modern Physics", though my arrangement and treatment of the subject differs much from his. (Prior's Preface)

1 On Relativity

This first essay begins by describing the state of physics around 1905 when Einstein's special theory of relativity was published. The theory ended the attempt to measure the motion of light with respect to the "ether". Following this, Prior leads the reader through the (then very recent) history of physics: how time and space had to merge into *space-time*, and how fundamental objects changed from solid material objects to *events*, taking place in time *and* space. He then leads the reader into the general theory of relativity which had become a world-wide sensation in 1919. Here the actors he notes are Albert Einstein, Willem de Sitter, Hermann Weyl, Arthur Eddington, James Jeans and Georges Lemaître, and the main theme he tries to explicate is what shape (geometry) the universe might have, and what follows from this.

The essay then shifts from being primarily an explication of special relativity to being more like a physics news bulletin. Prior writes (in the

[1] In fact, the author was Dr. P.R. Heyl, not Hayl.

section *The Electromagnetic Theory*) about how the universe has to extend infinitely into both the past and future as if this was a well established truth. Later, however, in *Addendum: A New Cosmology* he reports that this view has been abandoned and replaced with the spherical universe, due to Einstein, that has a "bottom" and a "top", representing a beginning and an end of the universe and space-time. So it is clear that Prior was not only interested in these topics, but that he tried to keep himself up-to-date with what was happening in contemporary research in physics.

2 Sweet Nothings

The first essay discused big things, such as planets and galaxies; in the second, Prior turns to tiny things, such as atoms, electrons and photons. Its first five sections explain how the theory of quantum mechanics evolved, beginning with models of the atom (developed by Ernest Rutherford, from New Zealand, and Niels Bohr, from Denmark) which described how atoms were built out of protons and electrons. The main point made here is that these models were based on *particles*. Moreover light, which for most of the 19th century had been understood as waves, was now considered to consist of particles (called photons) too. This new understanding of light, of course, raised an obvious problem: how could light behave both like a wave and like a stream of particles? Prior describes the physicists' attempt to combine these two understandings into one: the starring character in this act is Schrödinger, who showed that what we understand as particles is really a collection of interfering waves.

The last two sections of the essay are less focused on the history of science; they are more philosophical, more literary, verging at times on the mystical. Prior in these two sections (*Time in Atomic Physics* and *Nothing*) deals with two quite different subjects: the first is time and its (ir)reversibility; the second (which is where the mysticism starts to

emerge) is about the greatness of nothingness; I will discuss both of these in more detail later.

Furthermore, it is here that Prior makes a specific reference to the essay that he mentions in the introduction to the booklet (indeed it is the only specific reference in the booklet). The reference is to the 1931 article from *Scientific American* already noted: "The Perspective of Modern Physics" (Heyl 1931). This article, both in its selection of topics and in its tone, does indeed seem to have helped the young Prior in the writing of *Sweet Nothings*, where a wide range of topics in atomic physics and quantum theory has to be discussed. In this respect, *Sweet Nothings* is in sharp contrast to *On Relativity*, where much of the writing is devoted to explicating a single topic, the special theory of relativity. The wider range of topics covered in *Sweet Nothings* demands a different, more episodic, structure, and Prior seems to loosely follow the trajectory used in the *Scientific American* article.

3 Themes from *Essays Scientific* in later works

In the first part of this section I focus on the discussion of two topics — time and religion — that were to play a substantial role in Prior's later career. There is another topic — namely logic — that would become central to Prior's later work, that is *not* discussed in this booklet at all. As is well known, Prior became a logician rather late in his career (Copeland 2020); Prior's first work in tense logic was written (though not published) in 1951, when Prior was 39. But this booklet is no logic book; its relevance for Prior's later logical career lies in the other topics it discusses, the most important being time. Time, and different understandings of time, certainly *are* discussed in this booklet. Furthermore, Prior's interest in religion, which found more detailed expression in *Essays Religious* (1931b), occassionaly finds expression in *Essays Scientific* (1931c).

Moreover, there is another topic discussed in this booklet that we find in his later career, namely physics. Physics did not play a major

role in Prior's later work, but he did write both philosophical and logical texts about the special theory of relativity, and he occasionally mentions the general theory of relativity.

So let us jump right into the biggest theme of Prior's career: time. Time dominated Prior's career. A short look at the titles of his most famous publications tells its own tale: *Time and Modality* (1955), *Papers on Time and Tense* (1968), *Past, Present and Future* (1967), and the posthumously published *Worlds, Times and Selves* (1977). In these books (and other publications) Prior mounted a detailed and robust defence of the A-series view of time, in which *now* is privileged and dynamic; the contrasting B-series view, in which there is no unique *now* and time is a static tapestry of events laid out in an unchanging pattern, is consistently rejected in his later philosophical work.

Does time appear in the young Prior's booklet? And if so, do we already see an awareness of the A versus B distinction? The answer to both questions is yes. There are two places in the booklet where time is discussed in some detail, and his awareness of the distinction between the A and B conceptions of time (though not the philosophical terminology) is evident, most notably in the section *The Special Theory of Relativity* in *On Relativity*, and in the section *Time in Atomic Physics* in *Sweet Nothings*. The discussion in *The Special Theory of Relativity* emphasizes the B-theoretic view, which Prior seems to have acquired from Einstein, whereas the discussion in *Time in Atomic Physics* emphasizes a more A-theoretic perspective. Let us take a closer look.

For most of *On Relativity*, time plays a bystander role in Prior's discussion. That is, time is by and large only implicitly present (as part of the concept of velocity, for example), and there is no explicit discussion of its nature. This changes in the concluding paragraphs of the section *The Special Theory of Relativity*. Here Prior gives three quotations by Einstein and Eddington. Here is the first one, from Einstein: "[...] events

do not happen — we simply come across them" (p. 27).[2]

This has a static, B-theoretic flavour, and it is immediately followed by an even more explicitly B-theoretic description due to Eddington:

> The past and future may be regarded as lying mapped out — as much available to present exploration as the distant parts of space. Events do not happen; they are just there; and we come across them. 'The formality of taking place' is merely the indication that the observer has on his voyage of exploration passed into the absolute future of the event in question; and it has no important significance.
>
> (p. 27-28)

We then return to Einstein, who this time emphasizes the deterministic quality of his static view:

> Everything is determined, the beginning as well as the end, by forces over which we have no control. It is determined, [...] for the insect as well as the star. Human beings, vegetables or cosmic dust, we all dance to a mysterious tune intoned in the distance by an invisible player.
>
> (p. 28)

All three quotes exhibit a clearly B-series perspective on time. In this part of the text it seems that Prior accepts this position, though there is an intriguing comment that hints at the A-theorist that would emerge in later years:

> From the Absolute point of view, Time is not something that passes or flows, but is merely an aspect of a fixed entity Space-Time. The idea of the passage of Time is just one of

[2]Editors' note: We refer to the page numbers in the original, put in curly brackets in the transcribed text.

> our many delusive sense-impressions (*from the point of view of physics at least*) and even the distinction between past and future is treated by Einstein as a mere *"convention based on light-signals."* A strange picture indeed, but we must not forget the distinction that exists between the impression we receive and the real things that make them — the distinction between Relative and Absolute. (p. 29)

Here Prior emphasizes the point that, despite special relativity, we do at least have the *impression* that we can distinguish the past and the future, that there is a passage, a flow, of time. This is small and somewhat unclear comment, but later in his career Prior strongly disputed the B-series. Here is an example (from 1958) taken from *Some Free Thinking about Time*, where Prior forcefully argues against the quote from Eddington earlier:

> [...] there are things about the future that God doesn't yet know because they're not yet there to be known, and to talk about knowing them is like saying that we can know falsehoods. God cannot know that 2 and 2 are 5, because 2 and 2 aren't 5, and if He's left some matter to someone's free choice, He cannot know the answer to the question 'How will that person choose?' because there isn't any answer to it until he has chosen. (Prior 1959b)

However it is in *Time in Atomic Physics* that we find the most explicit discussion of time. Prior begins by stating that it is the Einsteinian view of time that he has taken in this booklet. By this he means the Einstein-Minkowski image of a static, four-dimensional combination of space and time, a fundamental concept underlying special relativity, and one which is almost a blueprint for the B-series view of time.

Intriguingly, however, in this section Prior also presents an alternative view proposed by Alfred North Whitehead, a dynamic view that emphasizes process:

> [...] who teaches that *the fundamental combination of Space and Time is not to be called Space-Time, but Process; and Space and Time though united in Process, are fundamentally different in nature, Space being a mere mathematical abstraction and Time a substantial reality.* (p. 150)

According to Prior, Max Born and Pascual Jordan, both pioneers in the development of quantum mechanics, subscribed to this alternative theory, and they say that:

> Time enters into the laws of nature as explicitly as do Matter and Energy, its chief effect being to give these laws *irreversibility* (p. 151)

These quotes, with their mention of *process* and *irriversibility* suggest the A-series (and dynamic) view of time. Prior immediately continues by classifying the laws of nature into four types, the first item being those where dynamical time (A-series time) is least marked, namely in "The great field-laws, e.g. Gravitation, and the simple laws of mechanics applying to the large and clumsy inanimate objects of our everyday experience." (p. 151-152), and the last item being those where dynamical time is strongest, namely in "chemical action, organic growth and evolution" (p. 154). It is the irreversibility of these phenomena that places these theories in the A-series view of time. It is also worth noting that in his best known works on the topic (and in particular, in "Thank Goodness That's Over" (1959)) Prior is thinking about time and its relation with human activity. So it might be said that as he got older he kept on adding more "irreversible" components to his youthful subdivision of theories. But it is already clear from the discussion in *Sweet Nothings* that, even at the age of 16, Prior was aware that time could be thought about in two very different ways.

Another major theme in Prior's career was religion. Prior was raised in a Christian Methodist home, and the year after he wrote *Essays Sci-*

entific he moved to study at Otago University, where he became a member of the Presbyterian Church (Jakobsen et. al. 2017). So it is clear that religion was important for him at the time of writing. Prior also published on religion relatively early (see, for example (Prior 1942) and (Prior 1944); for a discussion of Prior's early work on theology see (Grimshaw 2002)). Another booklet in this collection, *Essays Religious* (1931b) demonstrates his interest in religion at roughly the same time as *Essays Scientific* was written.

In *Essays Scientific* Prior doesn't show a clear religious position. Indeed, even though we know that Prior at this time was religious, he adopts a slightly skeptical tone towards religion. In the Section *The Electromagnetic Theory* in *On Relativity*, for example, he argues that there cannot be a beginning of the universe, because that would mean that there has been a creator of the universe:

> Such a time would represent the Creation, before which there was no Universe. To see the fallacy in this [...] (p. 70)

Prior goes on to provide an explanation of the fallacy involved.

Religion also comes up in *Sweet Nothings* in the section called *Nothings*. This section is different in tone from the rest of the booklet — it is a more self-consciously 'literary', indeed it veers towards the mystical:

> The fact that *Nothing* does not exist is in no way a thing for it to be ashamed of; for it does not exist simply because it is too great, too good, too beautiful to exist. All that is greater than the greatest, all that is better than the best, all that is lovelier than the loveliest, is comprised in the term *Nothing*. That is why the Buddhists are so attracted by the idea of non-existence and why so-called atheists have the noblest idea of God. (p. 124-125)

and

> Yet the Reality which lies beyond the senses is just what he is always seeking — what he calls *The Absolute*. His religious instincts, if he has any, bringing him into close touch with it, and he knows that it is God, but if he approaches it from the purely physical point of view, all he finds of the Absolute is *Nothing*. (p. 125)

But it may well be a mistake to attribute too much mystical (let alone religious) intent to these passages — it seems clear that these passages are partly there for their literary effect (and as *Essays Literary* attests, the young Prior was deeply interested in literature). As I have already remarked, in *Sweet Nothings* Prior seems to have been partly guided by the structure of the *Scientific American* article *The Perspective of Modern Physics*. Now, the last paragraph of this article also uses more elevated 'literary' language, and indeed concludes by citing the best known lines (*We are such stuff as dreams are made on*...) from one of William Shakespeare's most poetic plays, *The Tempest*. So the two "mystical" quotations from Prior given above might reflect little more than a youthful ambition to end the booklet on a suitably elevated note.

For the remainder of this section I will discuss more specific themes from this booklet that return later in Prior's career. By far the most important of these is relativity. Prior wrote about relativity, and in particular the special theory of relativity, several times in his career (e.g. (Prior 1957, 1958a, and 1958b)), but the most famous and the most thorough (apart from this youthful essay) is Appendix B.5 of his best known book *Past, Present and Future*, which was published in 1967, two years before his death. It is curious that Prior gave relativity his most thorough treatment in one of his very first books, and in his very last.

The section *The Special Theory of Relativity* in *On Relativity* is the most detailed discussion of a single scientific theory in the whole booklet. Prior draws a diagram to illustrate an example where two stars are moving at different velocities and therefore have two differently inclined

world-lines (see Figure 1). He describes how an event happening on each star will lead to observers on the two stars disagreeing on the order of the events. (Actually, as I will explain in Section 4, Prior's illustration is not a particular good portrayal of the special relativity.) Now, when writing at the age of 16, this conclusion does not seem to bother him. In *Past, Present and Future*, on the other hand, we see that the disagreement on the order of events bothers Prior somewhat more:

> [...] a distant event *b* might be earlier than an event *a* in the frame of reference associated with one such 'proper time', and later in another. This however is only true within limits, and in some cases an event *b* is earlier or later than an event *a* with respect to *all* frames of reference, and so may be said to be 'absolutely' earlier or later. (Prior 1967, p. 203)

Moreover there are numerous examples throughout his career where Prior expresses deep dissatisfaction with the notion that different frames of reference can disagree on the order of events. For example, in the text from 1958 quoted earlier, we have:

> So it seems to me that there's a strong case for just digging our heels in here and saying that, relativity or no relativity, if I say I saw a certain flash before you, and you say you saw it first, one of us is just wrong — or misled it may be, by the effect of speed on his instruments — even if there is just no physical means whatever of deciding which of us it is.
>
> (Prior 1958b, p. 4)

So when he wrote his little booklet, Prior clearly accepted that the order of events might be observer dependent, however he disputes it strongly in (Prior 1958b), and then, near the end of his career, grudgingly accepts it some cases in (Prior 1967). So this is an issue that Prior circled around for nearly 40 years, and as the following quotation from

Appendix B.4 in *Past, Present and Future* demonstrates, it is not an issue he managed to resolve:

> [...] like someone who, having delivered a Berkeleian attack on the differential calculus, will shortly be nevertheless using it. Point-instants (and even events) seem as mythical to me as matter did to Berkeley; and what I understand of the theory of relativity leaves me about as happy as the calculus left him. Still, it's Science, so in the meantime we can only try (as I shall be trying in the next section) to do our sums right, however obscure their meaning; and wait for Weierstrass. (Prior 1967, p. 200)

While special relativity is the only physical theory discussed in this booklet that played an important role in his later work. The general theory of relativity is mentioned shortly in the above mentioned Appendix B.5 of (Prior1967). But given the above quotation from Appendix B.4, it does not seem strange that Prior did not dive into the deeper waters of general relativity, when he already found the *special* theory obscure in its meaning. As for topics within quantum theory and particle physics, there are only sporadic references, such as the one given in (Prior 2003).

To sum up: important topics from Prior's career *are* prefigured in this booklet. Perhaps the most important of these is his early awareness of different views on time, A-theoretic and B-theoretic, which was to play such a big role in his motivation for tense logic. Furthermore, one of the biggest topics in this booklet, the special theory of relativity, was to feature several times later in his later work.

4 Helping the ``enquiring laymen''

In this section I will focus on the diagram on page 20 in *The Special Theory of Relativity*. Prior gives this diagram as part of his explanation of the special theory of relativity, and I focus on it for two reasons. First,

as mentioned earlier, the special theory of relativity is one of the most interesting points of intersection between this early booklet and Prior's later work. The special relativistic conclusion that Prior drew from this diagram in this booklet (namely that two observers can disagree on the order of events) was something that Prior would question in his later work, and we find a more sophisticated version of this diagram, accompanied by a more sophisticated understanding of special relativity, in *Past, Present and Future* (1967).

The second reason I want to focus on this diagram is connected with Prior's opening dedication: maybe one reason that *Uncle Dick* will not understand the booklet is simply because the young Prior (as I shall show) is rather unclear about how his diagram links to the special theory of relativity. Although the conclusion Prior draws is relativistic orthodoxy, there is a puzzling feature in the diagram which makes it hard to link Prior's argument with the ideas of special relativity. Here I will try to make the link clearer for "Uncle Dick and other 'enquiring laymen'", by going through the argument carefully. This will, I hope, lead Uncle Dick and others away from the diagram given in the booklet, to the more sophisticated Minkowski diagram given in *Past, Present and Future* (Prior 1967).

As already mentioned, Prior concludes in *On Relativity* that two differently inclined *world-lines* do not agree on the order of events. Let me now follow Prior's argument. Consider Figure 1, about which he concludes that for world-line A, e_1 happens before e_2, and for world-line B, e_2 happens before e_1.[3]

To try and make this clear to his readers, Prior writes that what lies on the axis perpendicular to A's world-line happens *simultaneously* with e_1, and where this line intersects B's world-line is *earlier* than e_2 with respect to A's world-line (you can see this by drawing another line perpendicular to A's world-line that goes through e_2; the point where this

[3]World-lines A and B are marked in Figure 1.

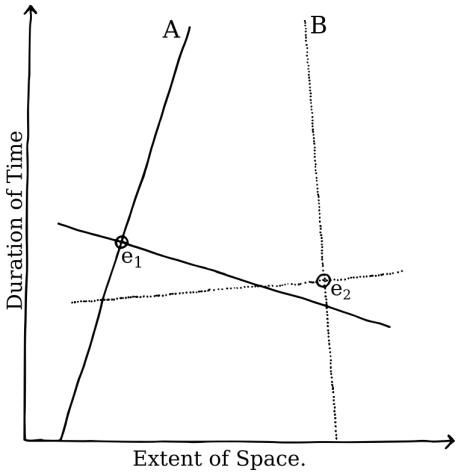

Figure 1: A's world-line (full), B's world-line (dotted), e_1 and e_2 represent events.

line intersects A's world-line will be later than e_1). Using a symmetric argument, we can argue that an observer at B would see e_1 later than e_2.

So, with this attempted reconstruction of Prior's explanation, the conclusion that Prior draws seems convincing for someone unfamiliar with the special theory of relativity, which we might assume is the case for Uncle Dick. Prior does indeed reach the conclusion that one would reach in special relativity; but there is a problem with the diagram, as I shall now explain.

The two world-lines, A and B, represent two observers: let A be Arthur and B be Uncle Dick. Arthur is sitting on one star and Uncle Dick on another. The stars are at different positions in space, and if the two observers simply stayed put as time passed, their world-lines would be vertical lines, only moving in time and not in space. In this situation, Arthur and Uncle Dick could wave to each other from their own stars for eternity, but they would never meet. But, as Prior has drawn the diagram, the two observers are moving in space *and* in time, creating the inclined world-lines, so eventually Arthur and Uncle Dick will

cross each other's path and doubtless shake hands when they do.

So far I have deliberately ignored the line drawn perpendicular to the two world-lines. This is because the diagram *without* the perpendicular lines is a meaningful diagram. However *with* them, its purpose is less clear. First, in classical physics, we have no problem saying that two events can happen simultaneously — let us think of an event as being when Arthur and Uncle Dick each light a torch. In fact, in classical physics this would be the case if we could draw a line perpendicular to the 'duration of time' axis that passed through Arthur's and Uncle Dick's world-line at the point where they lit the torches.

Now, in Figure 1, Arthur lit his torch at the point e_1 and Uncle Dick lit his torch at the point e_2. However, since we *cannot* draw a perpendicular line from the 'duration of time' axis going through both these two points, Arthur and Uncle Dick do *not* light their torches simultaneously. Indeed, everybody in classical physics would agree that Uncle Dick lit his torch first, and Arthur later, as seen in figure 2. This is because, as the diagram shows, if we drew a perpendicular line from the 'duration of time' axis that passed through Uncle Dick's torch lighting event, then this would be *lower* in the diagram than the perpendicular line that passed through Arthur's torch lighting.

But Prior wants to draw a conclusion from special relativity, and not from classical physics; this seems his motivation for drawing the perpendicular lines. He does not, of course, draw his lines in the way they would be drawn for classical physics, that is, as perpendicular on the 'duration of time' axis. Instead he draws them as perpendicular to the two world lines — and, unfortunately, he does not explain *why* he thinks this is correct. To avoid speculating on his reasons for drawing theses lines in this way, I will delete his two perpendicular lines, and stop following Prior's description at this point. Indeed, I will also delete the 'duration of time' axis and the 'extent of space' axis, since we only want to conclude something about what Arthur and Uncle Dick perceive, and their time line *is* their world line. This stripped-down version of Prior's

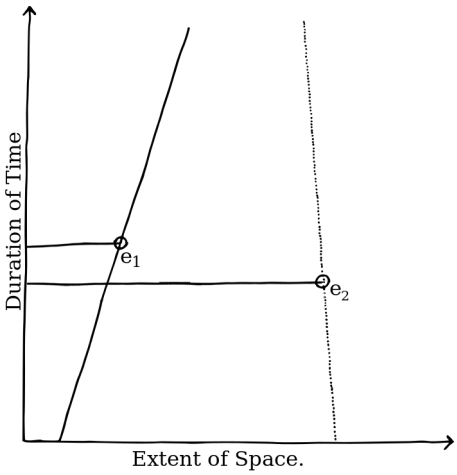

Figure 2: In classical physics $e_2 < e_1$ is unambigous.

original diagram can be seen in Figure 3.

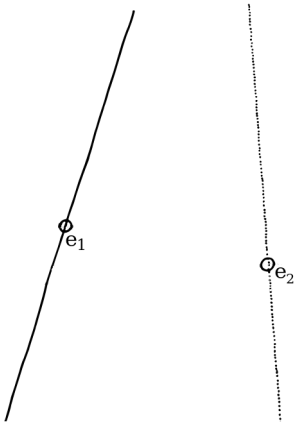

Figure 3: A's world-line (full), B's world-line (dotted), e_1 and e_2 represent events.

Suddenly, all we have are two inclined world-lines — however, we also know one very crucial fact from special relativity, namely that *the speed of light is the same for all observers*, so it must be the same for both

Arthur and Uncle Dick. Using this crucial fact, we can now build up a diagram where the path of light is invariant for every world-line. We do so by adding a *light-cone* to each world-line. Crucially, although both world-lines are inclined, neither light-cone is; they both point straight up. The light-cones indicate all the possible paths the light can take from the point of emission, and what would be outside the light-cones would be moving faster than the speed of light, and nothing can do that. In Figure 4 I have drawn these paths of light with dashed lines.

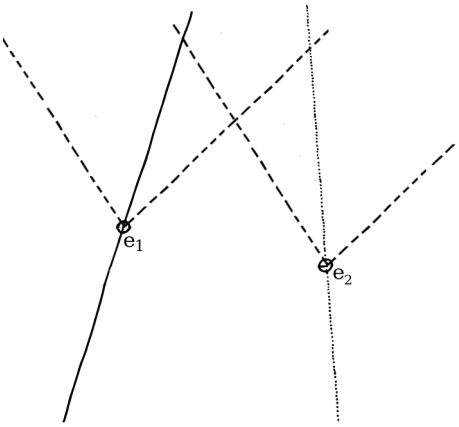

Figure 4: A's world-line (full), B's world-line (dotted), e_1 and e_2 represent events.

This shows that only when the dashed line extending from e_1 (when Arthur lit his torch), crosses Uncle Dick's world-line, will Uncle Dick see that Arthur has lit his torch. This does indeed mean that for Uncle Dick, e_2 happens earlier than e_1. Similarly, when the dashed line extending from e_2 (when Uncle Dick light his torch), crosses Arthur's world-line, will Arthur realize that Uncle Dick has lit his torch too. That is, Arthur sees e_1 is happening earlier than e_2.[4]

[4]The way the I have presented the construction of the diagram is somewhat simplified; for more details on the construction of relations between frames of reference in the special theory of relativity, consult (Feynman et al. 2010) or (Carroll 2019).

So Prior did indeed reach the right conclusion, but his reason for constructing the diagram and the accompanying argument do not seem to be fully based on the physics he wants to explicate. In particular, Prior does not mention the invariance of the speed of light even once in this section, and this is not because he does not know about it; he spent the preceding section explaining how exactly this was discovered. Thus the motivations for perpendicular lines remain mysterious.

I will now alter the diagram a little more, as I want to compare Prior's early diagram with his later diagram from *Past, Present and Future* (1967). Consider Figure 4 again. If we erase Arthur's and Uncle Dick's world-lines, and extend the dashed lines downwards, we will just get two dashed crosses representing the light cones stretching out from the events, towards both the past and the future; you can see this in Figure 5.

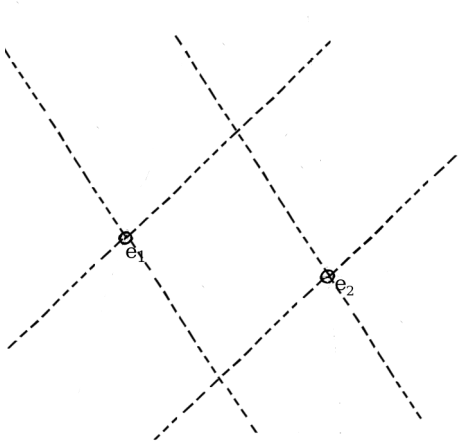

Figure 5: Light cones exenting from event e_1 and e_2

Arthur's world-line will always lie within the light cone stretching out from the point e_1 and Uncle Dick's world-line will always lie within the light cone stretching out from e_2, therefore it does not matter where these world-lines are placed within the light cones. They cannot lie out-

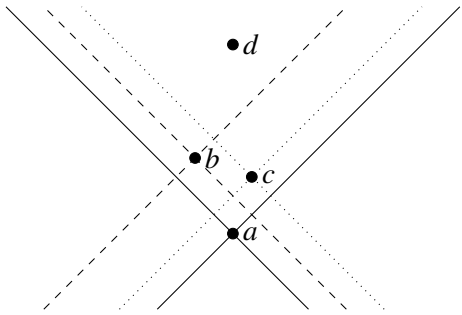

Figure 6: Illustration from (Prior1967)

side the light-cones because then Arthur and Uncle Dick would be moving faster than the speed of light — which is impossible. So we do not lose a lot of information by removing the world lines.

If we now compare Figure 5 with Figure 6 and let $e_1 = b$ and $e_2 = c$, we see that the two diagrams are quite similar. In fact, they are both *Minkowski diagrams*. [5] And that is how to transform Prior's youthful diagram to the one presented 36 years later in *Past, Present and Future*.

5 Editorial Choices

The editors aimed to keep this edition as close to the original while maintaining readability. Thus Arthur Prior's notes have been obeyed, and chapters moved to where he would have put them, had he had as easy access to editing tools as we do. The major move required was the two sections now included in *Addenda*, which contains material that Prior added later. At the beginning of each section in this chapter, Prior writes in the original where these additions were supposed to be placed. By the section *A New Cosmology* he writes "To be added on to p. 77" and by the section *Time in Atomic Physics* he writes "To be added on to p. 119", and this is where they can be found in this edition (this is also

[5] Prior does not call either of Figure 1 or Figure 6 a Minkowski diagram, though he does write in this booklet that the concept of world-lines comes from Minkowski.

why they are called *Addendum: A New Cosmology* and *Addendum: Time in Atomic Physics*). Notice that these page numbers are to the original page numbers from his handwritten manuscript. These numbers are kept in footnotes throughout the text; we have kept the original page numbers since Prior makes cross-references to pages in the manuscript, and to keep things as close to the the original as possible, we kept it this way.

In the original there are various minor and major things that have been crossed out. Most of the minor things have simply been left out of the published edition to maintain readability. The major deletions can be found in footnotes.

Prior drew a few illustrations in the manuscript, but due to copyright restrictions we cannot print these illustrations in this edition. I drew the illustrations that you can see in this edition; I tried to capture the intent of the original, while allowing myself some latitude for artistic freedom. The most radical change is that the original illustrations are coloured: red and green were used to mark different frames of reference, whereas in this edition you will see that the different frames of reference are marked with either a full line or a dotted line. The illustrations have been kept as hand drawings in the hope that the reader will get some feeling of the handwritten notebook that the original is.

Acknowledgements

Patrick Blackburn for input and proof reading. Juste Brikaite for discussing with me the modern state of the universe among other physics related subjects — again.

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Essays Literary*

(Sept. - Oct. 1931)

by

Arthur N. Prior

Dedicated to Mr. F.J. Handy and other non-Shelleyans who will not appreciate it.

Contents

*Editors' note: This text has been transcribed, edited and annotated by Jørgen Albretsen, David Jakobsen, Aalborg University, Denmark and by Mike Grimshaw, University of Canterbury, Christchurch, New Zealand. The manuscript in photocopy is kept in the Macmillan Brown Library, University of Canterbury, Christchurch, New Zealand. Labelled "Manuscript 194", Accession Number 729. 150 numbered pages. The manuscript starts with seven unnumbered pages. Transcriptions of the first and seventh are retained here as title page and Contents, respectively, the remaining five have been moved to form part of the Appendix, pp. 283-289. In the transcribed text, page numbers are placed where the text on that page starts, put in curly brackets: {xxx}.

{1}

On Shelley

Of all the books in my little Library, there is none which I may be found reading more often than the Poetical Works of Percy Bysshe Shelley. Shelley is one of the four writers of whom I never tire — other writers I read, put their books aside, and after an interval read again; Shelley's poems I can read continuously. In this essay I shall attempt to put into a few words what I find in Shelley to attract me. It may be all summed up as firstly the beauty of his poetry and secondly {2} the beauty of his thought.

The beauty of his poetry rests on many things, but chiefly upon its lyrical qualities and upon the nature of its imagery. What do I mean

[2]Editor's note: Prior has deleted a section in the original with the title 'On other poets' where he intended to include Keats, 'Omar Khayyám, Moore and Poe.

by "lyrical qualities"? There is a current legend that "lyrical" is a vague term impossible to define, but to my mind it implies at least two fairly definite ideas. Firstly, since the word is derived from "lyre", all truly lyrical poetry must be, if not musical, at least extremely harmonious. And secondly, it must be, not merely a description, but the expression of the poet's deepest emotions and should indeed so express them as to communicate them to a greater or lesser degree to the reader.

As for Shelley's imagery, its most characteristic feature is its ethereal {3} quality. Shelley dealt not in substantiality of any kind, but built up all of his most beautiful pictures from pure abstractions. And this, after all, is the highest beauty — beauty untrammelled by anything that is "of the earth, earthy". The beauty that appealed to Shelley was the beauty of pure song, or pure light, or pure feeling, or pure thought. Almost all of Shelley's creations are "such stuff as dreams are made on"; and it is Shelley above all poets who "gives to airy nothings a local habitation and a name".

From the point of view of the underlying thought, Shelley's works may be divided up fairly definitely, into a number of types. Firstly, we may consider his earlier destructive and rebellious ideas, finding {4} their most complete expression in "Queen Mab". Then we may consider his attitude to Nature, contained in his most purely poetic works; and his natural mysticism. From this grew the third development of his thought, his constructive philosophy - comprehensive, wonderful, beautiful — contained chiefly in "Prometheus Unbound", his noblest work. Fourthly we may consider his attitude to Christianity — how his earlier hatred of all that is Christian changed to a deep appreciation of the pure and noble life and teachings of Christ himself contained in his "Essay on Christianity". Finally, we may consider his meditations on death, comparing and contrasting the scepticism of his "Essay on a Future {5} Life" with the tentative speculations on the subject in "Prometheus Unbound", "The Sensitive Planet" and other poems, developing into the glorious faith and hope expressed in "Adonais".

I. QUEEN MAB

All his life Shelley was a rebel — the age he lived in was one which needed radical changes, and his ideas were far ahead of his time — but, whereas in his later years (not that he ever lived to middle age) his message to the world was of a constructive and creative kind, in his youth he bent his energies to the destruction of the {6} old order of things. Also, the views he expressed in his later years were his own, and where they were not entirely original were derived from such lofty thinkers as Plato and Spinoza; but in his earlier years he was the faithful disciple of William Godwin, and the views he then expressed were more Godwin's than his own. I doubt if Godwin's political and philosophical teachings have ever found a better epitome than Shelley's "Queen Mab" and the accompanying Notes; at any rate, "Queen Mab" is in its essence little more than a political exposition of Godwin's principles.

Godwin's attack on religion, especially on the Christian {7} religion, he carried on in this poem with great fervour. His summary in the "Notes", of what he imagined to be "Christianity", was devastating, and is well worth quoting: "A book is put into our hands when children, called the Bible, the purport of which is briefly this: That God made the earth in six days, and there planted a delightful garden, in which he placed the first pair of human beings. In the midst of the garden he planted a tree, whose fruit, though within their reach, they were forbidden to touch. That the Devil, in the shape of a snake, persuaded them to eat of this fruit, in consequence of which God condemned both them and their posterity yet unborn to satisfy his justice by their eternal misery. That, four thousand years {8} after these events (the human race in the meanwhile having gone unredeemed to perdition), God engendered with the betrothed wife of a carpenter in Judea (whose virginity was nevertheless uninjured), and begat a son, whose name was Jesus Christ; and who was crucified and died, in order that no more men might be devoted to hell-fire, he bearing the burden of his Father's dis-

pleasure by proxy. The book states, in addition, that the soul of whoever disbelieves this sacrifice will be burned with everlasting fire."[3]

When Shelley wrote this he was but a youth of 19; as we shall see in considering his "Essay on Christianity", he learned later to penetrate to the beautiful truths enshrined in the Bible symbolism; yet the picture given above is by no means an unfair {9} summary of the crude literalism adopted by many so called "Christians" of his day. The small-mindedness of these men is shown up in another of Shelley's Notes to "Queen Mab", dealing with the wonders of the skies: "The plurality of worlds — the indefinite immensity of the universe is a most awful subject of contemplation. He who rightly feels its mystery and grandeur is in no danger of seduction from the falsehood of religious systems, or of defying the principle of the universe. It is impossible to believe that the spirit that pervades this infinite machine begat a son upon the body of a Jewish woman; or is angered at the consequences of that necessity, which is a pseudonym of itself. All that miserable tale of the Devil, and Eve, and {10} an Intercessor, with the childish mummeries of the God of the Jews, is irreconcilable with the knowledge of the stars. "The works of his fingers have borne witness against him."[4]

While "Queen Mab" is levelled principally against Christianity, it is not only that, but is an indictment of all religions. The very name of God — whatever God He be — was hateful to Shelley:

"The name of God
Has fenced about all crime with holiness,
Himself the creature of his worshippers,
Whose names and attributes and passions change,
Seeva, Buddh, Foh, Jehovah, God, or Lord,
Even with the human dupes who build his shrines,

[3]Editor's note: The quote is from *Notes to Queen Mab* in Shelley, P.B. (1831) *Queen Mab with Notes,* Wright & Owen, New York, p. 97.

[4]Editor's note: Shelley (1831), p. 67.

Still serving o'er the war-polluted world {11}
For desolation's watchword; whether hosts
Stain his death-blushing chariot-wheels, as on
Triumphantly they roll, whilst Brahmins raise
A sacred hymn to mingle with the groans;
Or countless partners of his power divide
His tyranny to weakness; or the smoke
Of burning towns, the cries of female helplessness,
Unarmed old age, and youth, and infancy,
Horribly massacred, ascend to heaven
In honor of his name; or, last and worst,
Earth groans beneath religion's iron age,
And priests dare babble of a God of peace,
Even whilst their hands are red with guiltless blood,
Murdering the while, uprooting every germ
Of truth, exterminating, spoiling all,
Making the earth a slaughter-house!"[5]

In place of the God whom he {12} denounced so bitterly, Shelley wished to enthrone a kind of vague abstraction he addressed as the Spirit of Nature, which, so far as we can make out, he pictured as the Time as being a kind of blind Fate or Necessity:

"Throughout these infinite orbs of mingling light
Of which yon earth is one, is wide diffused
A Spirit of activity and life,
That knows no term, cessation or decay;
That fades not when the lamp of earthly life,
Extinguished in the dampness of the grave,
Awhile there slumbers, more than when the babe
In the dim newness of its being feels

[5]Editors' note: Shelley (1831), pp. 47-48.

The impulses of sublunary things,
And all is wonder to unpractised sense;
But, active, steadfast and eternal, still
Guides the fierce whirlwind, in the tempest {13} roars,
Cheers in the day, breathes in the balmy groves,
Strengthens in health, and poisons in disease;
And in the storm of change, that ceaselessly
Rolls round the eternal universe and shakes
Its undecaying battlement, presides,
Apportioning with irresistible law
The place each spring of its machine shall fill;
So that, when waves on waves tumultuous heap
Confusion to the clouds, and fiercely driven
Heaven's lightnings scorch the uprooted ocean-fords,
Whilst, to the eye of shipwrecked mariner,
Lone sitting on the bare and shuddering rock,
All seems unlinked contingency and chance: {14}
No atom of this turbulence fulfils
A vague and unnecessitated task,
Or acts but as it must and ought to act.
Even the minutest molecule of light,
That in an April sunbeam's fleeting glow
Fulfils its destined though invisible work,
The universal Spirit guides; nor less
When merciless ambition, or mad zeal,
Has led two hosts of dupes to battlefield,
That, blind, they there may dig each other's graves
And call the sad work glory, does it rule
All passions; not a thought, a will, an act,
No working of the tyrant's moody mind,
Nor one misgiving of the slaves who boast
Their servitude to hide the shame they feel,

Nor the events enchaining every will,
That from the depths of unrecorded time
Have drawn all-influencing virtue, pass {15}
Unrecognized or unforeseen by thee,
Soul of the Universe! eternal spring
Of life and death, of happiness and woe,
Of all that chequers the phantasmal scene
That floats before our eyes in wavering light,
Which gleams but on the darkness of our prison,
Whose chains and massy walls
We feel but cannot see.

"Spirit of Nature! all-sufficing Power,
Necessity! thou mother of the world!
Unlike the God of human error, thou
Requirest no prayers or praises; the caprice
Of man's weak will belongs no more to thee
Than do the changeful passions of his breast
To thy unvarying harmony; the slave,
Whose horrible lusts spread misery o'er the world, {16}
And the good man, who lifts with virtuous pride,
His being in the sight of happiness,
That springs from his own works; the poison-tree,
Beneath whose shade all life is withered up,
And the fair oak, whose leafy dome affords
A temple where the vows of happy love
Are registered, are equal in thy sight;
No love, no hate thou cherishest; revenge
And favoritism, and worst desire of fame
Thou knowest not; all that the wide world contains
Are but thy passive instruments, and thou
Regard'st them all with an impartial eye,

Whose joy or pain thy nature cannot feel,
Because thou hast not human sense,
Because thou art not human mind."[6]

This idea is elaborated in the Notes, {17} where Shelley writes, "He who asserts the doctrine of Necessity means that, contemplating the events which compose the moral and material universe, he beholds only an immense and uninterrupted chain of causes and effects, no one of which could occupy any other place than it does occupy, or act in any other way than it does act. The idea of necessity is obtained by our experience of the connection between objects, the uniformity of the operations of nature, the constant conjunction of similar events, and the consequent inference of one from the other. Mankind are therefore agreed in the admission of necessity, if they admit that these two circumstances take place in voluntary action. Motive is to voluntary action what cause is to effect in the material universe. The word liberty, {18} as applied to mind, is analogous to the word chance applied to matter: they spring from an ignorance of the certainty of the conjunction of antecedents and consequents. Every human being is irresistibly impelled to act precisely as he does act: in the eternity which preceded his birth a chain of causes was generated which, operating under the name of motives, make it impossible that any thought of his mind, or any action of his life, should be otherwise than it is[7] ... The advocates of free-will assert that the will has the power of refusing to be determined by the strongest motive: but the strongest motive is that which, overcoming all others, ultimately prevails; this assertion therefore amounts to a denial of the will being ultimately determined by that motive which does {19} determine it, which is absurd."[8] Exactly similar arguments had been advanced against free-will half a century before Shelley's time by Jonathan Edwards, but while Edwards used them to defend Calvinism, Shelley

[6]Editors' note: Shelley (1831), pp. 44-46.
[7]Editors' note: Shelley (1831), p. 82.
[8]Editors' note: Shelley (1831), pp. 83-84.

used them as an instrument of attack upon the type of religion which teaches that "God made man as he is, and then damned him for being what He made him."[9]

"Queen Mab", however, not only served as a vehicle for Godwin's atheistic determinism, but also for his social and political notions. The keynote of the Godwin-Shelley system is that happiness is regarded as the highest good, and simplicity as conducive to the greatest happiness. Their great cry was "Back {20} to the simple, natural life." And to get back to this ideal state, many political and social systems would have to be swept away. Even such personal matters as our diet would have to be revolutionised, and some parts of "Queen Mab" would lead to think that Shelley regarded Meat as the cause of all troubles and Vegetarianism as the panacea for all ills. Marriage also is as system denounced by the Shelley-Godwin school, and in his Notes to "Queen Mab" the poet makes out quite a plausible case for "free love".

"Love", he writes, "withers under constraint: its very essence is liberty: it is compatible neither with obedience, jealousy, nor fear: it is there most pure, per-{21}-fect and unlimited where its votaries live in confidence, equality and unreserve[10] ..... A husband and wife ought to continue so long united as they love each other: any law which should bind them to cohabitation for one moment after the decay of this affection would be a most intolerable tyranny, and the most unworthy of toleration[11] ... The connection of the sexes is so long sacred as it contributes to the comfort of both parties, and is naturally dissolved when its evils are greater than its benefits. There is nothing immoral in this separation. Constancy has nothing virtuous in itself, independently of the pleasure it confers, and partakes of the temporising spirit of vice in proportion as it endures tamely moral defects of magnitude in the object

[9]Editors' note: Shelley (1831), p. 86.
[10]Editors' note: Shelley (1831), p. 76.
[11]Editors' note: Shelley (1831), p. 76-77.

of its {22} indiscreet choice[12] ...

"The present system of constraint does no more, in the majority of instances, than to make hypocrites or open enemies. Persons of delicacy and virtue, unhappily united to one whom they find it impossible to love, spend the loveliest season of their life in unproductive efforts to appear otherwise than they are, for the sake of the feelings of their partner or the welfare of their children: those of less generosity and refinement openly avow their disappointment and linger out the remnant of that union, in a state of incurable bickering and hostility. The early education of their children takes its colour from the squabbles of their parents; they are nursed in a systematic school {23} of ill-humour, violence, and falsehood. Had they been suffered to part at the moment when indifference rendered their union irksome, they would have been spared many years of misery: they would have connected themselves more suitably, and would have found that happiness in the society of more congenial partners which is for ever denied them by the despotism of marriage. They would have been separately useful and happy members of society, who, whilst united, were miserable and rendered misanthropical by misery."[13]

Shelley, it may be added, put the above principles into practice in his own life, openly defying the conventions of society. His {24} first marriage, with one Harriet Westbrook, was a most unhappy mistake, and when he found it intolerable, without more ado he went off with Mary, the daughter of his Mentor, William Godwin, and (marrying her when Harriet committed suicide) she proved one of the best and most understanding wives he could have chosen. William Godwin, incidentally, was furious at his own daughter putting his principles into practice!

Another feature of the Godwin-Shelley scheme for the regeneration of mankind was the levelling of political and social differences. Shelley did not, however, "insult common sense by insisting on the doctrine of

[12]Editors' note: Shelley (1831), p. 77.
[13]Editors' note: Shelley (1831), p. 78.

the natural equality of man." He believed that that was the ideal state, {25} and should be the goal at which we aim, but he realised that it was at the time impracticable. He did insist, however, on a fair distribution of labour and leisure among the different classes. "There is", he asserted, "no real wealth but the labour of man," and, elaborating this, "Labour is required for physical, and leisure for moral improvement: from the former of these advantages the rich, and from the latter the poor, by the inevitable conditions of their respective situations, are precluded. A state which should combine the advantages of both would be subjected to the evils of neither. He that is deficient in firm health, or vigorous intellect, is but half a man: hence it follows that to subject the labouring classes to unneces-{26}-sary labour is wantonly depriving them of any opportunities of intellectual improvement; and that the rich are heaping up for their own mischief the disease, lassitude and ennui by which their existence is rendered an intolerable burden."

One of the most terrible evils which Shelley seized upon as resulting from the false ideals and principles of his day was War. All through "Queen Mab" are scattered denunciations of war —

> "When merciless ambition, or mad zeal,
> Has led two hosts of dupes to battle-field,
> That, blind, they there may dig each other's graves
> And call the sad work glory"[14]

and elsewhere in the poem he writes

> "War is the statesman's game, the priest's delight, {27}
> The lawyer's jest, the hired assassin's trade,
> And to those royal murderers whose mean thrones
> Are bought by crimes of treachery and gore,
> The bread they eat, the staff on which they lean.

[14] Editors' note: Shelley (1831), p. 45.

Guards, garbed in blood-red livery, surround.
Their palaces, participate the crimes
That force defends and from a nation's rage.
Secures the crown, which all the curses reach
That famine, frenzy, woe and penury breathe.
These are the hired bravos who defend
The tyrant's throne–the bullies of his fear;
These are the sinks and channels of worst vice,
The refuse of society, the dregs {28}
Of all that is most vile; their cold hearts blend.
Deceit with sternness, ignorance with pride,
All that is mean and villainous with rage
Which hopelessness of good and self-contempt
Alone might kindle; they are decked in wealth,
Honor and power, then are sent abroad
To do their work. The pestilence that stalks
In gloomy triumph through some eastern land
Is less destroying. They cajole with gold
And promises of fame the thoughtless youth
Already crushed with servitude; he knows
His wretchedness too late, and cherishes
Repentance for his ruin, when his doom
Is sealed in gold and blood!"[15]

The same passages continues and concludes {29} with a hit at lawyers, which some might take to heart:

"Those too the tyrant serve, who, skilled to snare
The feet of justice in the toils of law,
Stand, ready to oppress the weaker still,
And right or wrong will vindicate for gold,

[15]Editors' note: Shelley (1831), pp. 32-33.

Sneering at public virtue, which beneath
Their pitiless tread lies torn and trampled where
Honor sits smiling at the sale of truth."[16]

II. THE CLOUD, etc.

In his late life Shelley condemned "Queen Mab" as "villainous trash", which I think is not quite a fair judgement, for "Mab" is a remarkable effort {30} from all points of view. However, as poetry pure and simple "Queen Mab" is much inferior to his later work, for the simple reason that in "Queen Mab" Shelley, as it were, sits down and explains, but in his later poems he simply soars. Naturally enough, Shelley's most beautiful poetry is not the poetry in which he expounds some political principle, or makes an attack upon some religious system, but is that in which he gets out and lets the breath of Nature blow through him.

To my mind, Shelley, and not Wordsworth, was the true Poet of Nature, and for this reason: The mere power to describe in harmonious language the actual things in the world around and about us does not constitute {31} a poet of Nature; the true Nature-poet does not merely observe Nature, but feels her, and reading his poetry we should feel her too. It would, of course, be totally unfair to say that Wordsworth does not do this, for who has not read his "Intern Abbey", wherein he says,

"And I have felt
A presence that disturbs me with the joy
Of elevated thoughts; a sense sublime
Of something far more deeply interfused,
Whose dwelling is the light of setting suns,
And the round ocean and the living air,
And the blue sky, and in the mind of man;
A motion and a spirit, that impels

[16] Editors' note: Shelley (1831), p. 33

All thinking things, all objects of all thought,
And rolls through all things."[17]

But that is not "feeling Nature in the way, or to the extend, that I mean — it is not the mystical union with {32} Nature so typical of Shelley. Wordsworth seemed to feel Nature as a being outside of him, though often closely communicating with him, and he never lost his sense of independent existence. To Shelley, on the contrary, "Nature" was not merely the "outer world"[18] but was a great Unity from which he was inseparable; and Shelley at his highest moments so completely lost his sense of individual identity that he could say it was Nature expressing herself, not he. Who but Shelley, for instance, could have identified himself with a Cloud, as he did in wonderful poem of hat name? {33}

I BRING fresh showers for the thirsting flowers,
From the seas and the streams;
I bear light shade for the leaves when laid
In their noonday dreams.
From my wings are shaken the dews that waken
The sweet buds every one,
When rocked to rest on their mother's breast,
As she dances about the sun.
I wield the flail of the lashing hail,
And whiten the green plains under
And then again I dissolve it in rain
And laugh as I pass in thunder.

I sift the snow on the mountains below,
And their great pines groan aghast;

[17]Editors' note: Wordsworth, W., (1837) The Complete Poetical Works of William Wordsworth, Boston: James Munroe and Company, p. 160.

[18]Editors' note: Crossed out: "but was a kind of ineffable beauty and harmony that seemed to enter his own being and become a part of him that he could never lose"

And all the night 'tis my pillow white,
While I sleep in the arms of the blast.
Sublime on the towers of my skiey bowers, {34}
Lightning my pilot sits,
In a cavern under is fretted the thunder,
It struggles and howls at fits;
Over earth and ocean, with gentle motion,
This pilot is guiding me,
Lured by the love of the genii that move
In the depths of the purple sea;
Over the rills, and the crags, and the hills,
Over the lakes and the plains,
Wherever he dream, under mountain or stream
The Spirit he loves remains;
And I all the while bask in heaven's blue smile,
Whilst he is dissolving in rains.

The sanguine sunrise, with his meteor eyes,
And his burning plumes outspread,
Leaps on the back of my sailing rack,
When the morning star shines dead, {35}
As on the jag of a mountain crag,
Which an earthquake rocks and swings,
An eagle alit one moment may sit
In the light of its golden wings.
And when sunset may breathe from the lit sea beneath,
Its ardours of rest and of love,
And the crimson pall of eve may fall
From the depth of heaven above,
With wings folded I rest, on mine airy nest,
As still as a brooding dove.

That orbèd maiden with white fire laden,
Whom mortals call the moon,
Glides glimmering o'er my fleece-like floor,
By the midnight breezes strewn;
And wherever the beat of her unseen feet,
Which only the angels hear,
May have broken the woof of my tent's thin roof,
The stars peep behind her and peer; {36}
And I laugh to see them whirl and flee,
Like a swarm of golden bees,
When I widen the rent in my wind-built tent,
Till the calm rivers, lakes, and seas,
Like strips of the sky fallen through me on high,
Are each paved with the moon and these.

I bind the sun's throne with a burning zone,
And the moon's with a girdle of pearl;
The volcanoes are dim, and the stars reel and swim,
When the whirlwinds my banner unfurl.
From cape to cape, with a bridge-like shape,
Over a torrent sea,
Sunbeam-proof, I hang like a roof,
The mountains its columns be.
The triumphal arch through which I march
With hurricane, fire, and snow, {37}
When the powers of the air are chained to my chair,
Is the million-coloured bow;
The sphere-fire above its soft colours wove,
While the moist earth was laughing below.

I am the daughter of earth and water,
And the nursling of the sky;

I pass through the pores of the ocean and shores;
I change, but I cannot die.
For after the rain when with never a stain,
The pavilion of heaven is bare,
And the winds and sunbeams with their convex gleams,
Build up the blue dome of air,
I silently laugh at my own cenotaph,
And out of the caverns of rain,
Like a child from the womb, like a ghost from the tomb,
I arise and unbuild it again.[19] {38}

The above poem, while imaginative to the highest degree, and permeated with the most beautiful touch of fancy, has yet an accuracy of detail which cannot fail to delight the praying scientist. Nor is "The Cloud" merely a creation of the fancy and the intellect; it is also pervaded with feeling and emotion — emotion, it is true, of a gentle kind, as befits such a subject, but enough to make the poem truly lyrical, and enough to make the reader feel how Shelley felt his very soul caught up by the passing cloud, and felt his very being one with it. Wordsworth was seldom, if ever, like that, and perhaps that is why Wordsworth is the easier poet to understand, though our feelings cannot respond to him as to Shelley. {39}

Yet Wordsworth was not only less of a mystic than Shelley; his whole viewpoint was far closer to everyday realities than Shelley's. Wordsworth may be called the poet of the green fields, and Shelley the poet of the blue sky. To see this fundamental difference between the two great Romanticists we need only consider their respective treatment of the common subject "To a skylark". To Wordsworth the skylark was a bird, a thing of flesh and blood, living in a nest —

"Thy nest which thou canst drop into at will,

[19] Editors' note: Shelley, B, P., (1914) *The Complete Poetical Works of Percy Bushy Shelley,* London: Humphrey Milford, pp. 595-596.

Those guivering wings composed, that music still!"[20]Boston: James Munroe and Company, p. 154.

But not so for Shelley — such commonplace facts meant nothing to him when the thrill of the skylark's song {40} pulsated through him, and cried,

"Hail to thee, blithe spirit!
Bird thou never wert -
That from heaven or near it
Pourest thy full heart
In profuse strains of unpremeditated art."[21]

A bird indeed! No — to Shelley the skylark was a being far removed from all that is "of the earth, earthy" the invisible and intangible source of an outburst of pure melody that seemed to dissolve away all who heard it. Shelley's "The sensitive Plant", "To the West Wind", "To Night" are all surpassing beautiful, but his "To a Skylark" is, as Francis Thompson said, "the absolute virgin-gold of song." Almost every stanza is a gem of a loneliness unsurpassed by any other passage in English poetry; here are some {41} of the best:

In the golden lightning
Of the sunken sun,
O'er which clouds are brightning,
Thou dost float and run,
Like an unbodied joy whose race is just begun.

The pale purple even
Melts around thy flight;
Like a star of heaven,

[20]Editors' note: Wordsworth, W., (1837), p. 154.
[21]Editors' note: Shelley (1914), p. 596.

In the broad daylight
Thou art unseen, but yet I hear thy shrill delight.

Keen as are the arrows
Of that silver sphere
Whose intense lamp narrows
In the white dawn clear,
Until we hardly see, we feel that it is there. {42}

"What thou art we know not;
What is most like thee?
From rainbow clouds there flow not
Drops so bright to see,
As from thy presence showers a rain of melody."

Like a glow-worm golden
In a dell of dew,
Scattering unbeholden
Its aërial hue
Among the flowers and grass which screen it from the view.

Sound of vernal showers
On the twinkling grass,
Rain-awakened flowers—
All that ever was
Joyous and clear and fresh—thy music doth surpass. {43}

Waking or asleep,
Thou of death must deem
Things more true and deep
Than we mortals dream,
Or how could thy notes flow in such a crystal stream?

We look before and after,
And pine for what is not:
Our sincerest laughter
With some pain is fraught;
Our sweetest songs are those that tell of saddest thought.

Yet, if we could scorn
Hate and pride and fear,
If we were things born
Not to shed a tear,
I know not how thy joy we ever should come near. {44}

Teach me half the gladness
That thy brain must know;
Such harmonious madness
From my lips would flow,
The world should listen then, as I am listening now.[22]

III. "PROMETHEUS UNBOUND"

Make me thy lyre, even as the forest is:
What if my leaves are falling like its own!
The tumult of thy mighty harmonies

Will take from both a deep, autumnal tone,
Sweet though in sadness. Be thou, Spirit fierce,
My spirit! Be thou me, impetuous one!

Drive my dead thoughts over the universe
Like withered leaves to quicken a new birth! {45}
And, by the incantation of this verse,

[22]Editors' note: Shelley (1914), pp. 597-598.

Scatter, as from an unextinguished hearth
Ashes and sparks, my words among mankind!
Be through my lips to unawakened earth

The trumpet of a prophecy! O, Wind,
If Winter comes, can Spring be far behind?

("Ode to the West Wind", V)[23]

THE world's great age begins anew,
The golden years return,
The earth doth like a snake renew
Her winter weeds outworn;
Heaven smiles, and faiths and empires gleam
Like wrecks of a dissolving dream.

A brighter Hellas rears its mountains
From waves serener far; {46}
A new Peneus rolls his fountains
Against the morning star;
Where fairer Tempes bloom, there sleep
Young Cyclads on a sunnier deep.

A loftier Argo cleaves the main,
Fraught with a later prize;
Another Orpheus sings again,
And loves, and weeps, and dies;
A new Ulysses leaves once more
Calypso for his native shore.

Another Athens shall arise,

[23]Editors' note: Shelley (1914), p. 575.

And to remoter time
Bequeath, like sunset to the skies,
The splendour of its prime;
And leave, if naught so bright may live,
All earth can take or Heaven can give. ("Hellas", Chorus).[24]

Some astute critic has said that {47} "Keats looked back and sighed; Byron looked around and criticised; but Shelley looked forward and hoped."[25] I think it puts the matter quite accurately; Keats took refuge from the evils of his time in the glamour of a past age; Byron's scorn for his contemporaries was expressed in uncertain terms; while all his life Shelley was buoyed up by an unshakeable faith that Man, for his present imperfections, would at length rise free from all the oppressive limitations which now hedge him in — free, regenerate, and perfect. This regeneration of Mankind is the main theme of his great lyrical drama "Prometheus Unbound."

It is interesting to note here that at the time when he wrote "Queen Mab", all that Shelley could see {48} in the story of Prometheus was a vindication of Vegetarianism! In the Notes to that poem, he writes, "Prometheus (who represents the human race) effected some great change in the condition of his nature, and applied fire to culinary purposes; thus inventing an expedient for screening from his disgust the horrors of the shambles. From this moment his vitals were devoured by the vulture of disease. It consumed his being in every shape of its loathsome variety, inducing the soul-quelling sinkings of premature and violent death. All vice arose from the ruin of healthful innocence. Tyranny, superstition, commerce and inequality were then first known; when reason vainly attempted to guide the wanderings of exacerbated passion." These polemics against {49} meat-eating gave place to a nobler interpretation when Shelley read the story in the original Greek (by Alschylus)

[24]Editors' note: Shelley (1914), p. 472.

[25]Editors' note: Prior seems to have taken this from W.R. Goodman, *A History of English Literature*.

and had visited Italy, where he wrote "Prometheus Unbound", which is undoubtedly his greatest contribution to the literature of the world.

It is my studied opinion that the finest form in which long poetry can be cast is the lyrical drama. The noblest poems in the world are of this form, the most outstanding being Shelley's "Prometheus Unbound", Goethe's "Faust" and the Biblical Book of Job. These three I would place on the topmost pinnacle of the literature of the world. It is interesting to note that they are all on the subject of Man's conquest of {50} evil, and all these are also complete expressions of the philosophy of life of their respective authors. That is what makes "Prometheus Unbound" not only the loveliest, but also the most wonderful, long poem in the English language — it is the symbolic expression of Shelley's entire philosophy at its highest development.

The classical story of the chaining of Prometheus is, I think, quite well known. The universe was first under the rule of Saturn, and all its creatures lived in an idyllic state — the "Golden Age" — of happy simplicity, but were denied independent knowledge and power. Prometheus ("fore-sight") then aided Jove to overthrow Saturn, on the condition that he should leave man his independence. {51} Jove's reign, however, proved worse than Saturn, for with knowledge came misery to man. Prometheus attempted to alleviate this in various ways, and for this purpose stole fire from the Gods. The theft was discovered, and Prometheus chained to a rocky mountain in Caucasus, where an eagle came day after day to eat away his heart, which grew again and so prolonged his torture indefinitely. Prometheus, however, knew that if Jupiter married one Thetis, their offspring would dethrone his father; Jove, vaguely aware that Prometheus alone could save him from final disaster, offered to free him if he told his secret. Prometheus refused, and his torments were redoubled.

This last is rehearsed in the {52} opening scene of Shelley's drama, where Prometheus is seen chained to a precipice in a "ravine of icy rocks in the Indian Caucasus", with the Oceanides Panthea and Ione seated

at his feet. The three Oceanides Panthea, Ione and Asid may be taken as representing Faith, Hope and Love, the first two comforting Prometheus throughout his years of agony, and the last being his consort, separated from him during his bondage, but reunited to him on his liberation. Prometheus, on being approached by Mercury with regard to this secret of his, refuses to divulge it, and hosts of Furies are loosed on to him. They torture him physically and mentally, haunting him with the worthlessness and ingratitude of {53} the humanity for whom he is suffering. When Prometheus declares that he pities those whom these facts do not hurt, the Furies leave him in disgust, and his Mother Earth comforts him by calling forth a cloud of spirits representing the unmortal thoughts of man.

The second act takes us from Prometheus to Asia, wearing out a lonely exile in a "lovely vale in the Indian Caucasus", transformed by her very presence from a "rugged, desolate and frozen" ravine. Panthea has been moved to leave Prometheus and Ione for a while and visit her sister, and in the opening scene Panthea and Asia, discussing certain cryptic dreams and visions are drawn down into the depths of the valley {54} by the echoes of their voices, crying "Follow, follow!" Spirits lead them right to the bottom of the abyss to the realm of Demogorgon.

Demogorgon is a spirit whose name is not found in any of the classical Greek or Roman mythology, but the 4th century Christian writer Lactantius mentions him as identical with the terrible infernal Power of the ancients, the very mention of whose name was supposed to bring death and disaster. In Lucan, for instance, this Power is mentioned in the following terms,

"Must I call your master to my aid, At whose dread name the trembling furies quake,

Hell stands abashed, and earth's foundations shake?"[26] {55}

[26]Editors' note: Lucanus, L, M., (1779) *Rowe's Lucan: Volume 2*, H Baldwin, p. 182.

Milton also, in his "Paradise Lost", refers to the "dreaded name of Demogorgon"[27], while in Spenser's "Faery Queene" {Faerie Queene} he is mentioned as dwelling in the abyss with the three Fates —

"Down in the bottom of the deep Abyss,
Where Demogorgon in dull darkness pent,
Far from the view of Gods and heavens bliss
The hideous Chaos keeps, their dreadful dwelling is."[28]

Shelley's conception of Demogorgon is based mainly on the above, but he may also have had in mind the statement of Ariosto that Demogorgon was a king of the elves and fays who lived on the Himalayas, since {56} the scene of this drama is laid in the "Indian Caucasus", Shelley identifies Demagorgon with the son of Jove and Thetis who is to overthrow his father, and makes him, before his actual birth as this son, the inscrutable "primal power" of the universe, a kind of merciless Destiny.

Asia and Panthea make their way into his cave and see Demagorgon as

"a mighty darkness,
Filling the set of power, and rays of gloom
Dart round, as light from the meridian sun,
Ungazed upon and shapeless; neither Limb,
Nor form, nor outline, yet one feel it is
A living Spirit."[29] {57}

Upon being invited to ask what they would know, Asia asks various questions gradually leading up to the supreme riddle of the cause of evil and misery and all the sorrow she has found about her. Demogorgon

[27]Editors' note: Milton, J., (1920) *Paradise Lost*, London: Dent, p. 92.
[28]Editors' note: Spenser, E., (1903) *Faerie Queen*, New York: Crowell, p. 303.
[29]Editors' note: Shelley (1914), p. 232.

replies that God, that is, Jove, is omnipotent for a time, and that he is responsible for all things; yet, all-powerful as he is, he is but a slave for his heart is evil. When Asia asks, "Who is the master of the slave?" we get the epitome of Shelley's philosophy in Demogorgon's reply:

"If the abysm
Could vomit forth his secret ....
But a voice.
Is wanting, the deep truth is imageless;
For what would it avail to bid the {58} gaze
on the revolving world? What to bid speak
Fate, Time, Occasion, Chance and
Change? To these
All things are subject but eternal Love.

Much the same idea is expressed by St. John when he says, "No man hath seen God at any time "and goes on to conclude "God is Love, and he that dwelleth in Love dwelleth in God, and God in him."[30] This is Asia's own innate conviction, for she is herself the personification of this eternal Love, which is soon to shine through her in a most beautiful transfiguration scene.

Finally she asks Demogorgon the crucial question, "When is the destined hour of Jove's fall {59} to arrive?"[31] She has hardly put the question when the Spirit of the Hour glides towards them in a chariot in which Demogorgon is borne away while Asia and Panthea are also carried by a chariot to the upper world. Following this comes the most beautiful scene in the whole play, in which the eternal, all-pervading Spirit of Love is revealed in the Transfigured Asia. The car in which she and Panthea is carried pauses "within a cloud on the top of a snowy mountain", and Panthea in wonderment asks the guiding Spirit "where

[30]Editors' note: 1. John 4:16.
[31]Editors' note: Shelley (1914), p. 235.

is the light which fills the cloud? The sun is yet unrisen?"
to which the Spirit replies, {60}

"The sun will not rise until noon.
Apollo
Is held in heaven by wonder; and the Light
Which fills this vapour, as the aerial hue
Of fountain-gazing roses fill the water
Flows from thy mighty sister."

Panthea: "Yes, I fell —
Asia: "What is it with thee sister? Thou art pale."
Panthea: How thou art changed! I dare not look on thee; I feel but see thee not.
I scarce endure. The radiance of they beauty.
Some good change
Is working in the elements, which suffer
Thy presence thus unveiled. The Nereids tell {61}
That on the day when the clear hyaline
Was cloven at thy uprise, and thou didst stand
Within a vein'd shell, which floated on
Over the calm floor of the crystal sea,
Among the Aegean isles, and by the shores
Which bear thy name,–love, like the atmosphere
Of the sun's fire filling the living world,
Burst from thee, and illumined earth and heaven
And the deep ocean and the sunless caves
And all that dwells within them; till grief cast
Eclipse upon the soul from which it came.
Such art thou now; nor is it I alone,
Thy sister, thy companion, thine own chosen one, {62}
But the whole world which seeks thy sympathy.
Hearest thou not sounds i' the air which speak the love

Of all articulate beings? Feelest thou not
The inanimate winds enamoured of thee? List! (Music)
Asia: "Thy words are sweeter than aught else but his
Whose echoes they are; yet all love is sweet,
Given or returned. Common as light is love,
And its familiar voice wearies not ever.
Like the wide heaven, the all-sustaining air,
It makes the reptile equal to the God;
They who inspire it most are fortunate,
As I am now; but those who feel it most {63}
are happier still, after long sufferings,
As I shall soon become."
Panthea: "List! Spirits speak."[32]

The song of the spirits which follows is perhaps the most wonderful of all of Shelley's Poems. Addressed to the universal Spirit of Love and Beauty which alone he worshipped, it is highly mystical and, while to some it may seem hopelessly incomprehensible, it cannot but make the deepest impression on those who have the slightest sympathy and understanding of Shelley's mysticism:

Life of Life, thy lips enkindle
With their love the breath between them;
And thy smiles before they dwindle
Make the cold air fire; then screen them {64}
From those looks, where whoso gazes
Faints, entangled in their mazes.
"Child of Light! thy limbs are burning
Through the vest which seems to hide them;
As the radiant lines of morning
Through the clouds, ere they divide them;

[32]Editors' note: Shelley (1914), p. 235-236.

And this atmosphere divinest
Shrouds thee wheresoe'er thou shinest.

Fair are others; none beholds thee,
But thy voice sounds low and tender
Like the fairest, for it folds thee
From the sight, that liquid splendor,
And all feel, yet see thee never,
As I feel now, lost forever!

Lamp of Earth! where'er thou movest
Its dim shapes are clad with brightness, {64}
And the souls of whom thou lovest
Walk upon the winds with lightness,
Till they fail, as I am failing,
Dizzy, lost, yet unbewailing![33]

The scene closes as Asia is borne on, singing, to witness the liberation of Prometheus.

Act III opens with the wedding of Jupiter and Thetis, the "birth" of Demogorgon, and the immediate fall of Jove. Jupiter is under the impression that the coming of Demogorgon among the Gods will add immeasurably to his own power, and will finally put man in a state of utter subjection.

"Even now," he says, "have I begotten a strange wonder,
That fatal child, the terror of the earth,
Who waits but till the destined hour arrive, {66}
Bearing from Demogorgon's vacant throne
The dreadful might of ever-living limbs
Which clothed that awful spirit unbeheld,

[33] Shelley (1914), p. 237.

To redescend, and trample out the spark."

Having called on the other Gods to celebrate his coming Triumph over the last "spark of freedom left in man, he addressed Thetis:

"And thou
Ascend beside me, veil'd in the light
Of the desire which makes thee one with me,
Thetis, bright image of eternity!
When thou didst cry, 'Insufferable might!
God! spare me! I sustain not the quick flames,
The penetrating presence; all my being,
Like him whom the Numidian seps did Thaw {67}
Into a dew with poison, is dissolved,
Sinking through its foundations,'— even then
Two mighty spirits, mingling, made a third
Mightier than either, which, unbodied now,
Between us floats, felt, although unbeheld,
Waiting the incarnation, which ascends,
(Hear ye the thunder of the fiery wheels
Griding the winds?) from Demogorgon's throne.
Victory! victory![34]

But when Demogorgon arrives in the car of Hour it proves to do anything but Victory for Jove, who in spite is his cries for mercy, is dragged down by his dread offspring into the abyss, never to rise again. Then Hercules unbounds Prometheus, who is joyfully reunited to Asia – symbolizing {68} the final complete union of Man with the Spirit of Nature and Love, which Shelley regarded as the consummation of human destinies. In the fourth act the rejoicings of the whole universe are celebrated – even the earth and the moon chant love-songs as they move

[34] Shelley (1914), p. 239.

through the heavens in perfect harmony. For a moment this outburst of joy is stilled, as Demogorgon arises from the depths to say the "last word" in an impressive speech that would do credit to Milton. After calling all his hearers by name – the Earth, the Moon the Sun, the Stars, Daemons and Gods, the Dead, the Genii of the elements, the Living and Man – the great "primal Power of the universe" says,

"This is the day, which down the void abyss {69}
At the Earth-born's spell yawns for Heaven's despotism,
And Conquest is dragged captive through the deep;
Love, from its awful throne of patient power
In the wise heart, from the last giddy hour
Of dread endurance, from the slippery, steep,
And narrow verge of crag-like agony, springs
And folds over the world its healing wings.
Gentleness, Virtue, Wisdom, and Endurance,
These are the seals of that most firm assurance
Which bars the pit over Destruction's strength;
And if, with infirm hand, Eternity,
Mother of many acts and hours, should free
The serpent that would clasp her with his length, {70}
These are the spells by which to reassume
An empire o'er the disentangled doom.

To suffer woes which Hope thinks infinite
To forgive wrongs darker than death or night:
To defy Power, which seems omnipotent
To love, and bear; to hope till Hope creates
From its own wreck the thing it contemplates;
Neither to change, nor falter, nor repend
This, like thy glory, Titan, is to be
Good, great and joyous, beautiful and free,

This is alone Life, Joy, Empire, and Victory.[35]

IV. "ESSAY ON CHRISTIANITY" —

The "religion" of Shelley's youth was a frank and indeed aggressive Atheism; and in fact he was expelled from Oxford {71} University through his circulation of a pamphlet entitled "The Necessity of Atheism". A few weeks later, in defending his position he mentioned that he had *once* been an "enthusiastic Deist, but never a Christian." In his youth his aversion to Christianity was intense, as we have seen in considering "Queen Mab". Later, however, these views became considerably modified. Although he never became a "Christian" "in the theological sense of that word, he deeply reverenced the personal character of Jesus, and his militant ardour against the historical developments of Christianity to some degree waned as he became better acquainted with the literature and art of mediaeval Italy."

As Shelley grew older, he felt more and more strongly the purity, the nobility {72} and the heroism of Christ as a man, and consequently we find several allusions to Him in his various poems. In "Prometheus Unbound", for instance where the Furies torment the Titan with the baseness and ingratitude of the humanity for whom he is suffering, he is particularly struck with the "woeful sight" of "a youth With patient looks nailed to a crucifix" and later he (Prometheus) cries

"Remit the anguish of that lighted stare;
Close those wan lips; let that thornwounded brow
Stream not with blood, it mingles with thy tears!
Fix, fix those tortured orbs in peace and death,
So thy sick throes shake not that crucifix,
So those pale fingers play not with thy gore."[36]

[35]Editor's note: Shelley (1914), p. 264.
[36]Shelley (1914), p. 218.

Shelley's deep reverence and admiration {73} for Christ and His teachings finds particularly strong expression in a chorus in his beautifullyrical drama "Hellas":

"Worlds on worlds are rolling ever
From creation to decay,
Like the bubbles on a river sparkling, bursting, borne away.
But they are still immortal
Who, through birth's orient portal
And deaths dark chasm hurrying to and fro,
Clothe their unceasing flight
In the brief dust and light
Gathered around their chariots as they go;
New shapes they still may weave,
New gods, new laws receive,
Bright or dim are they as the robes they last
On Death's bare ribs had cast.

"A power from the unknown God,
A promethean conqueror came; {74}
Like a triumphal path he trod
The thorns of death and shame.
A mortal shape to him
Was like the vapour dim
Which the orient planet animates with light;
Hell, Sin and Slavery came,
Like blood-hounds mild and tame,
Nor prey'd until their lord had taken flight.
The moon of Mahomet
Arose, and it shall set:
While blazon'd as on Heaven's immortal noon
The cross leads generations on."

Swift as the radiant shapes of sleep
From one whose dreams are paradise,
Fly when the fond wretch wakes to weep,
And day peers forth with her blank eyes!
So fleet, so faint, so fair,
The powers of earth and air {75}
Fled from the folding star of Bethlehem:
Apollo, Pan and Love,
And even Olympian Jove
Grew weak, for killing Truth had glared on them.
Our hills, and seas, and streams,
Dispeopled of their dreams,
Their waters turn'd to blood, their dew to tears,
Wail'd for the golden years."[37]

Even here, however, his reception of Christianity is not entirely favourable, for in the last stanza, while acknowledging that Christ taught deeper truths that what had gone before, he shows a lingering affection for the simpler deities of the past. Yet it would not be just to put too much emphasis on such a poem as the above, since it is putting into the mouth of a {76} Greek Chorus, who, to a large extend, are made to express rather their own ideas than Shelley's. Yet the Chorus may be taken as a fairly accurate expression of Shelley's own views at the time, for in the Notes to "Hellas" he says, "The Grecian gods seem indeed to have been personally more innocent, although it cannot be said, that as far as temperance and charity are concerned, they gave so edifying an example as their successor. The sublime human character of Jesus Christ was deformed by an imputed identification with a power, who tempted, betrayed, and punished the innocent beings who were called into existence by his sole will, and for the period of a thousand years, the spirit of this most wise, just and benevolent of men was {77} profligate

[37] Editors' note: Shelley (1914), p. 452-453.

with myriads of hecatombs of those who approached the nearest to his innocence and wisdom, sacrificed under every aggravation of charity and variety of torture."[38]

Shelley's own persecution by the orthodox long led him to regard Jesus as a well-meaning enthusiast who brought more trouble into the world than he took out of it; however, as has already been said, when he visited Italy and saw all its artistic beauties he lost much of his old animosity towards historical developments of Christianity. His ideas of what the original untrammelled teachings of Christ really were, were set out in his rather fragmentary "Essay on Christianity". After a short introduction, this {78} Essay opens with a discussion of the idea of God, and of the meaning Jesus Christ intended when he used the term. With regard to this latter Shelley says, "We can distinctly trace in the tissue of his (Christs) doctrines the persuasion that God is some universal being, differing from man and the mind of man. According to Jesus Christ, God is neither the Jupiter, who sends rain upon the earth, nor the Venus, through whom all living things are produced, nor the Vulcan who presides over the terrestrial element of fire; nor the Vesta, that preserves the light which is enshrined in the sun and the stars. He is neither the Proteus nor the Pan of the material world. But the word {79} God according to the acceptation of Jesus Christ, unites all the attributes which these denominations contain, and is the interpoint and overruling spirit of all the energy and wisdom included within the circle of existing things. It is important to observe that the author of the Christian system had a conception widely differing from the vulgar relative to the ruling Powers of the universe. He everywhere represents this Power as something mysteriously and illimitably pervading the frame of things. Nor do his doctrines practically assume any proposition which they theoretically deny. They do not represent God as a limitless and impenetrable mystery, affirming, at the same time, his existence as a being subject to {80}

[38] Editors' note: Shelley (1914), p. 475.

passions and capable — "[39] and here we have one of the sudden breaks which are the chief literary faults of Shelley's essays. However, he resumes the same subject later on, where he says, "God is represented by Jesus Christ as the power from which, and through which, the strains of all that that is excellent and delightful flow; the Power which models, as they pass, all the elements of this mixed universe to the purest and most perfect shape which it belongs to their nature to assume. Jesus Christ attributes to this power the faculty of Will. How far such a doctrine, in its ordinary sense, may be philosophically true or how far Jesus Christ intentionally availed himself of a metaphor easily understood, is foreign to the subject {81} to consider. This much is certain, that Jesus Christ represents God as the fountain of all goodness, the eternal enemy of pain and evil, the uniform and unchanging motive of the salutary operations of the material world. The suppositions that this cause is excited to action by some principle analogous to the human will, adds weight to the persuasions that it is foreign to its beneficent virtue to inflect the slightest pain." Shelley cannot conceive of Jesus Christ preaching any doctrine of eternal damnation, and thinks that such a teaching is an interpolation of his followers. For, he says, "Jesus Christ would hardly have cited, as an example of all that is gentle and beneficent and {82} compassionate, a Being who shall deliberately scheme to inflict on a large portion of the human race tortures indescribably intense and indefinitely prolonged: who shall inflict them, moreover, without any true mistake as to the nature of pain — without any view to future good — merely because it is 'just'."[40]

Shelley's allegorical interpretation of Christ's teachings is well illustrated by his treatment of the first of the famous Beatitudes. "'Blessed are the pure in heart, for they shall see God.' Blessed are those who have preserved internal sanctity of soul: who are conscious of no se-

[39]Editors' note: Shelley, P.B., (1915) *Selected prose works of Shelley*, London: Watts, pp. 145-146.

[40]Editors' note: Shelley (1905), p. 150.

cret deceit; who are the same in act as they are in desire; who conceal no thought, no {83} tenderness of thought, from their own conscience; who are faithful & sincere witnesses, before the tribunal of their own judgements, of all that they possess within their mind. Such as these shall see God. What! after death, shall their awakened eyes behold the King of Heaven? Shall they stand in awe before the golden throne on which He sits, and gage upon the venerable countenance of the paternal Monarch? Is this the reward of the virtuous and the pure? These are the idle dreams of the visionary, or the pernicious representations of imposters, who have fabricated from the very materials of wisdom a cloak for their own dwarfish or imbecile conceptions."[41]

> "Jesus Christ said no more than the most excellent philosophers {84} have felt and expressed - that virtue is its own reward. It is true that such an expression as he has used was prompted by the energy of genius and was the overflowing enthusiasm of a poet; but it is not the less literally true because clearly repugnant to the mistaken conceptions of the multitude. God, it has been asserted, was contemplated by Jesus Christ as every philosopher must have contemplated that mysterious principle. He considered that venerable word to express the overruling Spirit of the collective energy of the moral and material world. He affirms, therefore, no more than that a simple, sincere mind is the indispensable requisite of true science and true happiness. He affirms {85} that a being of pure and gentle habits will not fail, in every thought, in every object of every thought to be aware of benignant visiting's from the invisible energies by which he is surrounded."[42]

> "Whosoever is free from the contamination of luxury and licence; may go forth to the fields of the woods, inhaling a joyous renovation from the breath of spring, or catching from the odours and sounds of autumn some diviner mood of sweetest sadness, which improves

[41] Editors' note: Shelley (1905), p. 146.

the softened heart. Whosoever is no deceiver or destroyer of his fellowmen — no liar, no flatterer, no murderer - may walk among his species, deriving, from the communion with all they contain of beautiful or of majestic, some {86} intercourse with the Universal God. Whosoever has maintained with his own heart the strictest correspondence of confidence, who dares to examine and to estimate every imagination which suggests itself to his mind — whosoever is that which he desires, to become, and only aspires to that which the divinity of his own nature shall consider and approve — he has already seen God."[43]

Still dealing with the blessings of the pure in heart, Shelley here goes on to expound a theory which perhaps echoes his old Determinism and may well be termed a kind of glorified Predestination. Interpreting Christ, he says,

"We live and move and think; but we are not the arbiters of every motion of our own complicated nature; we {87} are not the masters of our own imagination and moods of mental being. There is a Power by which we are surrounded, like the atmosphere in which some motionless lyre is suspended, which visits with its breath our silent chords at will.

Our most imperial and stupendous qualities — those on which the majesty and the power of humanity is erected — are, relatively to the inferior portion of its mechanism, active and imperial; but they are the passive slaves of some higher and more omnipotent Power. This Power is God; and those who have seen God have, in the period of their purer and more perfect nature, been harmonized by their own will to so exquisite {a} consentaneity of power as to give forth divinest melody, when the breath of {88} universal being sweeps over their frame. That those who are pure in heart shall see God, and that virtue is its own reward, may be considered as equivalent assertions. The former of these propositions is a metaphorical repetition of the latter."

"The advocates of literal interpretation," he continues, "have been the most efficacious enemies of those doctrines whose nature they profess to venerate." Yet for all his insistence on an allegorical or figurative interpretation of Christ's teachings, it must not be imagined that Shelley merely seized upon a few of these teachings and then twisted even them to suit his own purposes. On the contrary, though he indeed tried to put Christ-{89}-ianity in what he considered to be its most beautiful possible form, he did not alter Christ's basic teachings even when he doubted this soundness. No Christian, for instance, could cavil at Shelley's exposition of the doctrine of immortality. Having elaborated the perfect goodness and kindness of God, he goes on to say "according to Jesus Christ and according to the indisputable facts in the case, some evil spirit has dominion in this imperfect world. But there will come a time when the human mind shall be visited exclusively by the influences of the Benignant Power. Men shall die, and their bodies shall rot under the ground; all the organs through which their knowledge and their feel-{90}-ings have flowed, or in which they have originated, shall assume other forms, and become ministrant to purposes the most foreign from their former tendencies. There is a time when we shall neither be heard or be seen by the multitude of beings like ourselves by whom we have been so long surrounded. They shall go to the graves; where then?"[44]

"It appears that we moulder and turn to a heap of senseless dust; to a few worms, that arise and perish, like ourselves. Jesus Christ asserts that these appearances are fallacious and that a gloomy and cold imagination alone suggests that thought can cease to be. Another and a more extensive state of being, rather than the complete extinctions of being, must follow from that mysterious change {91} which we call death. There shall be no misery, no pain, no fear. The

empire of evil spirits extends not beyond the boundaries of the grave. The unobscured irradiation from the fountain-fire of all goodness shall reveal all that is mysterious and unintelligible, until the mutual communications of knowledge and of happiness throughout all thinking natures constitute a harmony that ever varies and never ends.[”]

”This is Heaven, when pain and evil cease, and when the Benignant Principle, untrammelled and uncontrolled, visits in the fullness of its powers the universal frame of things. Human life, with all its unreal ills and transitory hopes, is as a dream which departs before the dawn, leav-{92}-ing no trace of its evanescent hues. All that it contains of pure and[45] of divine visits the passive mind in some serenest mood. Most holy are the feelings through which our fellow beings are rendered dear and venerable to the heart. The remembrance of their sweetness, and the completions of the hopes which they excite, constitute, when we awakens from the sleep of life, the fulfilment of the prophecies of its most majestic and beautiful visions.[”]

”We die, says Jesus Christ; and when we awaken from the languor of disease, the glories and the happiness of Paradise are around us. All evil and pain have ceased for ever. Our happiness also corresponds with, and is adapted to, the nature of what is most excellent in our being. We see God, and we see that he is good. How delightful a pic-{93}-ture, even if it be not true! How magnificent is the conception which this bold theory suggests to the contemplation, even if it be no more than the imagination of some sublimest and most holy poet!”[46]

From the above conclusion we may deduce that Shelley was at the time rather doubtful of personal immortality. He never reached any certain conclusions on this subject and his ”Essay on a Future state” is disappointingly agnostical in its outlook, but the development of his speculative thought on the subject death and immortality is well worthy of our special consideration. {94}

V. "ADONAIS", etc. —

Except perhaps in his wilder youth, Shelley never explicitly denied the belief in a future life, rightly realising that nobody alive really knows what follows death. However his attitude to the subject was at first a frank scepticism. He regarded the universe as consisting of matter animated by a vague abstraction which he called the Spirit of Nature of Life; various portions of this matter, when formed in a particular way, where more noticeably "animated" than others; where they lost their form and materially decayed, they ceased to be animated, and that, so far as he could see, was all there was to it. Of personal immortality or a {95} "future state" we leave no evidence whatsoever; and our belief in such was regarded by Shelley as nothing more than a selfish reluctance to face the fact of the cessation of our existence.

The conscious survival of our personality Shelley never admitted, but he soon developed the idea of immortality rather beautifully in different ways. He found much cause for comfort, for instance, in the fact that our lives always have some impress behind them — our human thoughts and actions produces chains of effects which go on through all eternity. We see this idea most beautifully expressed in his short love lyric,

"Music, when soft novices die,
Vibrates in the memory; {96}
Odours, when sweet violets sicken,
Linger in the sense they quicken;
Rose leaves, when the rose is dead,
Are heaped for the beloved's bed;
And so thy thoughts, when thou art gone,
Love itself shall slumber on."[47]

[47] Editors' note: Shelley (1914), p. 633.

Above all things, however, his doubt of personal immortality was compensated for by an acute realisation of the immortality of Nature and of beauty. In the concluding stanza of "the Cloud" for instance, he manifests great joy in the way that the cloud though seemingly dispersed always reappears as beautiful as before, and the Cloud, typifying Nature, testifies to all who see it,

"I change, but I cannot die."[48] {97}

The same idea is expressed in the Conclusion to "The Sensitive Plant", when he writes

"In this life
Of error, ignorance, and strife,
Where nothing is, but all things seem,
And we the shadows of the dream,["]

"It is a modest creed, and yet
Pleasant if one considers it,
To own that death itself must be,
Like all the rest, a mockery. ..."

"For love, and beauty, and delight,
There is no death nor change: their might.
"Exceeds our organs, which endure
No light, being themselves obscure."[49]

His hopes and fears with regard to {98} Death, however, find by for their most beautiful and most complete expression in his wonderful elegy on his fellow poet Keats "Adonais". The gist of his theory as expressed in his poems seem to be this: to the ordinary run of men, with

[48]Editors' note: Shelley (1914), p. 596.
[49]Editors' note: Shelley (1914), p. 590.

their low, earthly, selfish, personal interests, death — the cessation of individual existence — means nothing but utter destruction; but to men with such deep insight into the heart of things as Keats had, Death is a reunion with Nature, "the blending of the principle of thought with the universal spirit of beauty."

> "Dust to the dust", he cries, "but the pure spirit shall flow
> Back to the burning fountain where it came
> A portion of the Eternal." {99}

and later,

> "He is made one with nature: there is heard
> His voice in all her music, from the Moan
> Of thunders to the song of night's sweet bird;
> He is a presence to be felt and known
> In darkness and in light, from herb and stone,
> spreading itself where'er that Power may move
> Which has withdrawn his being from its own;
> Which wields the world with never-wearied love,
> Sustains it from beneath, and kindles it above."
>
> "He is a portion of the loveliness.
> Which once he made more lovely: he doth bear {100}
>
> His part, while the one Spirit's plastic stress
> Sweeps through the dull dense world compelling here
> All new successions to the forms they wear;
> Torturing the unwilling dross that checks its flight
> To its own likeness, as each mass may bear;
> And bursting in its beauty and its Might
> From trees and beasts and men into the Heaven's light."

Such a conception of immortality is; of course, impersonal — with death there is no more conscious, personal, individual existence, but only existence as an indistinguishable part of the Spirit of Loveliness which pervades the Uni-{101}-verse. In the three stanzas, following the above, however, Shelley attributes to Keats a kind of personal immortality, in so far as the memory and influence of the individual Keats will live for even in the minds of men. In one sense, the dead are all merged indistinguishably with nature, yet in this other sense they shine on like separate stars:

> "The splendours of the firmament of time
> May be eclipsed, but are extinguished not;
> Like stars to this appointed height they climb
> And death is a low mist which cannot blot
> The brightness it may veil. When lofty thought{102}
> Lifts a young heart above its mortal lair,
> And love and life contend in it, for what
> Shall be its earthly doom, the dead live there
> And more like winds of light on dark and stormy air."[50]

The next stanza, in which Keats is received into the company of the undying great, is erroneously thought by some critics to be a concession to the orthodox notion of conscious personal survival. Such an idea is wholly alive to Shelley's philosophy in its most perfect form and is quite inconsistent with ideas plainly expressed elsewhere in "Adonais". Some of the "undying great" are indeed mentioned by name and pictured as personally welcoming {103} Keats into their midst, but it must be remembered that all through the opening of the poem Keats is mourned by beings who are obviously but "personified abstractions" — Mother Earth, Echoes, Splendours, Desires, Sorrow, Pleasure, the Seasons, besides the more substantial spirits of Byron, Moore and Shelley

[50]Editors' note: Shelley (1914), p. 436.

himself. The stanza in question runs thus:-

"The inheritors of unfulfill'd renown
Rose from their thrones, built beyond mortal thought,
Far in the Unapparent. Chatterton
Rose pale, his solemn agony had not
Yet faded from him; Sidney, as he fought
And as he fell and as he liv'd and lov'd
Sublimely mild, a Spirit without spot, {104}
Arose; and Lucan, by his death approved:
Oblivion as they rose shrank like a thing reproved."[51]

In the next stanza these spirits welcome him by speech, but the fact they are represented as "living" only through their influence is clearly part of the stanza:

"And many more, whose names on Earth are dark,
But whose transmitted effluence cannot die
So long as fire outlives the parent spark,
Rose, robed in dazzling immortality.
"Thou art become as one of us," they cry,
"It was for thee yon kingless sphere has long
Swung blind in unascended majesty,
Silent alone amid a Heaven of Song. {105}
Assume thy winged throne, thou Vesper of our throng!"[52]

Again it should not be necessary to point out that Shelley did not literally hold the primitive belief that the souls of the dead each inhabited a particular star.

Shelley's noblest ideas in immortality are expressed near the end, and there he is explicit enough. All the disjunct and diverse individuals

[51] Editors' note: Shelley (1914), p. 436.
[52] Editors' note: Shelley (1914), p. 436.

in this world must eventually lose their form and disappear, but the one great Spirit of Beauty and Love that enfolds them all is eternal and unchangeable: at death we finally and completely lose our individual selves to gain a greater {106} and freer existence through perfect union with his primeval Beauty — that was Shelley's fundamental teaching about death, and he expressed it in these wonderful words:

> "The One remains, the many change and pass;
> Heaven's light forever shines, Earth's shadows fly;
> Life, like a dome of many-coloured glass,
> Stains the white radiance of Eternity,
> Until Death tramples it to fragments."[53]

{107}

ON THE BOOK OF JOB

(the noblest work in the literature of the world).

A type of meditation that always attracts me is the thought of superlatives — the thought of the greatest men in the world, the greatest books in the world, the greatest achievements in history, the greatest wonders of nature, and the like. Who, for instance, are the greatest thinkers the world has known? I have no hesitation in placing JESUS OF NAZARETH at the top of this list, but who else would come in the first half-dozen or so? PLATO is another certainty — his {108} glorious idealism is beyond a doubt the next thing in the thought of the world to Christianity. Then there is ALBERT EINSTEIN, whom even Bernard Shaw, given as he is to praising himself, acknowledged is the greatest thinker alive, and one of the "eight makers of the universe"[54]. Einstein is the latest and greatest of a line of thinkers who include Copernicus,

[53]Editors' note: Shelley (1914), p. 438.

[54]Editors' note: George Bernard Shaw made this widely reported comment on October 28 1930 in a speech at a dinner in London to honour Albert Einstein.

Galileo, Kepler and Newton. But Einstein himself bows in reverence before that "God intoxicated"[55] little Dutch Jew, BARUCH DE SPINOZA, and that most Christlike of Christians, ST. FRANCIS OF ASSISI. Only one more is needed to make up our half-dozen and him I find in that purest and most profound thinker of the East, GAUTAMA SIDDÂRTHA BUDDHA.

Another interesting subject to {109} ponder upon is the world's greatest literary masterpieces. Of all of these with which I am acquainted I can find none more inspiring than Shelley's "Adonais" and "Prometheus Unbound", Shakespeare's "Tempest", Goethe's "Faust", Plato's "Symposium", and above all the rest, the Biblical Book of Job. The bald story of Job is familiar enough to most of us — how Job, for all his righteousness, was visited with terrible sufferings, which were lifted when he unquestioningly acknowledged God's sovereignty — but the story is the least part of the book.

Writing of Goethe's "Faust", George Henry Lewes has said "Students earnestly wrestling with doubt, striving to solve the solemn riddles of {110} life, feel these pulses strangely agitated by this poem. In 'Faust' we see as in a mirror the eternal problem of our intellectual existence"[56]. That is perfectly true of "Faust", but it is a thousand times more true of "Job". "Faust" takes us in mighty strides through all the aspects of our social life — we see "Faust" as lover, statesman, schemer, scientist — and "Job" but shows us the bitter sorrows of a lonely old man; but there is no doubt which is the former poem, or which expresses the deeper thought. There is something unutterably majestic, primeval, about the Book of Job, and in it we feel the very beat of the Heart of Being.

John Milton once wrote a poem entitled "Paradise Lost", in which

[55]Editors' note: The poet Novalis describes Spinoza as " ... a God-intoxicated man" in *Fragmente und Studien* 1799/1800.

[56]Editors' note: George H, L.,(2010) *Life and works of Goethe: Sketches of his age and contemporaries*, Cambridge University Press, New York, p. 244..

{111} he endeavoured to "justify the ways of God to man." Great though his poem turned out to be, it failed in its primary object, and all the reader can glean about from "Paradise Lost" is that He is an unsufferable tyrant. The Book of Job was written with much the same object, and where Milton failed, the author of "Job" succeeded. While Milton's poem hardly shows God in a favourable light, "Job" leaves with us an ineradicable conviction of the great order of purpose that is behind all of God's creation.

The Prologue in Heaven. —

One of the most striking passages in the opening of "Job" runs thus:— "There was a day when the sons of God came to present themselves be-{112}-fore the Lord, and Satan came also among them.

> "And the Lord said unto Satan, Whence comest thou? then Satan answered the Lord, and said, From going to and fro in the earth, and from walking up and down in it.
>
> "And the Lord said unto Satan, Hast thou considered my servant Job, that there is none like him in the earth, a perfect and an upright man, one that feareth God and escheweth evil?
>
> "Then Satan answered the Lord, and said, Doth Job fear God for nought?
>
> "Hast not thou made an hedge about him, and about his house, and about all that he hath on every side? Thou hast blessed the work of his hands, and his substance is increased in the land:
>
> "But put forth thine hand now, and {113} touch all that he hath, and he will curse thee to thy face.
>
> "And the Lord said unto Satan, Behold, all that he hath is in thy power; only upon himself put not foth thine hand. So Satan went forth from the Lord."[57]

A little later there is a parallel passage in which Satan is permitted even to harm Job's person. These passages are ably imitated and elaborated in the "Prologue in Heaven" to Goethe's "Faust". Here, as in "Job", the angels are assembled in Heaven before the Lord, and make their various statements. The archangels Raphael, Gabriel and Michael all speak in praise of God's inanimate creation:-

Raphael "The sun makes music as of old
Amid the rival spheres of heaven,
On its predestined circle rolled
With thunder speed; the Angels even {114}
Draw strength from gaging on its glance.
Though none its meaning fathom away:
The world's unwithered countenance
Is bright as at creation day."
Gabriel— "And swift and swift, with rapid lightness,
The adorned Earth spins silently,
Alternating Elysian brightness
With deep and dreadful night: the sea
Foams in broad billows from the deep
Up to the rocks, and rocks and ocean,
Onward, with spheres which never sleep,
Are hurried in eternal motion.
Michael: "And tempests in contention roar
From land to sea, from sea to land;
And, raging, weave a chain of power,
Which girds the earth, as with a band
A flashing desolation there,
Flames before the thunder's way;
But thy servants, Lord, revere {115}
The gentle changes of the day."[58]

[58]Editors' note: Shelley (1914), p. 740.

Then in comes Mephistopheles, the counterpart of Satan, who refuses to be moved by all the wonders of nature, but directs the Lord's attention to the utter stupidity of man:

"Nothing know I to say of worlds and suns;
I observe only how men plague themselves; -
The little God o' world keeps the same stamp,
As wonderful as on creations' day...
He's like one of those long-legged grasshoppers,
Who flits and jumps about, and sings for ever
The same old song; the grass there let him lie
Burying his nose in every heap of dung"[59]

Then Mephistopheles is sent to tempt Faust to the best of his abilities, just as Satan was sent to try Job.

In both "Job" and "Faust" the Tempter is depicted as a being who tries to turn man's attention from higher to lower things — in "Faust" by means of worldly pleasures, and in "Job" by means of worldly pains. The most important thing we learn, however, from the Prologues of "Job" and of "Faust" is that the Tempter is counted among the "sons of God" and this work is divinely authorised.

Here then, right at the start, the author of "Job" faces matters fairly and boldly. For centuries we have been arguing over God's responsibility for misery and evil, and trying to reconcile the two conflicting notions that, on the one hand, God is the absolute sovereign of the Universe and nothing can happen against His will, and on the other, that misery and {118} evil and sin are opposed to God's will. Milton tried to show God as sovereign and Satan as a rebel, but the author of Job knew better, and made Satan, the personified Principle of Evil, a useful servant of God. Some people today, such as Bishop Barnes[60], rather

[59] Editors' note: Shelley (1914), p. 742.

[60] Editors' note: Ernest William Barnes, (1874-1953), Bishop of Birmingham 1924-1953; Modernist Anglican theologian, scientist and mathematician.

than attribute Evil to God, would have us believe that "God's control is imperfect". But that I refuse to believe; I like to think, with the author of "Job", that God has the whole universe under his control, and even the things that we call misery and evil play their part in the working-out of His eternal purposes.

The Argument.

In the early Hebrew days it was believed that all a man's sufferings were in punishment for his past {119} sins. When a man suffers, according to this theory, he is but reaping what he has sown. So when Job's elderly friends Eliphaz, Bildad and Zophar found him in such deep suffering (all his worldly possessions, including his family, had been taken from him, and he was himself attacked by a loathsome disease), they naturally thought that he had committed some terrible sacred sin. These pious old men came along to give Job some friendly advice on the matter, and when they heard Job cursing the day that he was born they were quite shocked, and mildly reproached him, though they did not at first tell him directly what they thought had brought on his sufferings.

{120} Job, however, easily saw the hint that lay behind their insistence that God is perfectly just, and never does anything without good reason; and he burst out into wild indignation at the idea that he had ever been so wicked as to deserve all these calamities. Thereupon the arguments on both sides became more and more heated, and Job was told, without further beating about the bush, that he must have done something to merit his sufferings. Anyway, said one of them, in good old Calvinistic style, mankind is rotten to the core, so why shouldn't God torment anyone he wants to? Job continues to protest his innocence, and in places comes perilously near to denying the righteousness of God's actions. {121}

The three old men find that they have run out of arguments, and cannot answer Job satisfactorily, so a younger member of the party, Elihu,

chimes in, and says they ought to be ashamed of themselves — such wise old men as they are supposed to be — for not answering Job's wild statements, and, apologising, for his own youth, he attempts to give his explanation like the other three, he insists on God's justice and righteousness, but he has a broader idea of justice and of the purpose of punishment. Job's sufferings, he points out, may not be of a retributory kind, but may simply be sent as a new experience to enrich Job's life. He cannot, however, fully grasp or express the whole truth, {122} and finally God himself answers Job's complaints "out of the whirlwind", to Job's own satisfaction. God, too, insists that Job should not question His justice or righteousness; but does not force this upon Job as a mere article of faith without reason. He makes the whole army of nature's phenomena march before Job's eyes, and Job, at length perceiving the wonderful order and purpose working behind them all, is satisfied.

The great lesson that Job learnt, and that we should learn, from God's final speech is that true happiness can only come to us if we shift our viewpoint from the personal to the cosmic. Job and his friends had got hold of an altogether wrong idea of the universe, because they thought that God made Man's personal inter-{123}-ests His first care in governing it. He doesn't. The universe is governed in perfect order and harmony but if the order of Nature conflicts with our idea of happiness, that is our lookout. We cannot help meeting with suffering if we simply consider events as causing us personal pain or pleasure, but we will escape suffering if we can forget our own personal ills in the realisation that all events contribute to the perfect order of the universe and to the working-out of God's purposes.

When Job had learnt this, God saw fit to give him back his material prosperity. This does not seem to be a necessary ending, since Job professed himself satisfied with God's answer from the whirlwind; but it {124} certainly helps to bring this point of the story home. Job, before his trouble, had been a morally upright man, but he had been missing the best in life just because of his wealth. His material happiness had

blinded him to the greater happiness that comes from seeing and feeling the beauty and harmony of all God's universe. When his material happiness had been removed his eyes were gradually opened to this, and only after he had learnt to prize this greater happiness was it safe or right for his material prosperity to be restored.

"Job" as a Literary Work

But a mere paraphrase or précis such as the above cannot do justice to a work like the Book of Job. Its value lies not only in the depth {125} of its thought, but also in the beauty and majesty of its language. The darker aspect of existence, given in Job's most bitter speeches, is extremely well expressed; and also what Calvin called the "immeasurable awfulness of God". This latter is told in words of unparallelled majesty and impressiveness in Chapter 26:

> "Hell *is* naked before him, and destruction hath no covering.
> "He stretcheth out the north over the empty place, *and* hangeth the earth upon nothing.
> "He bindeth up the waters in his thick clouds; and the cloud is not rent under them.
> "He holdeth back the face of his throne, and spreadeth his cloud upon it.
> "He hath compassed the waters with bounds, until the day and night come to {126} an end.
> "The pillars of heaven tremble and are astonished at his reproof.
> "He divideth the sea with his power, and by his understanding he smiteth through the proud.
> "By his spirit he hath garnished the heavens; his hand hath formed the crooked serpent.
> "Lo, these *are* parts of his ways: but how little a portion is heard of him? but the thunder of his power who can understand?"

And in chapter 9 also, Job speaks of God,

"Which removeth the mountains, and they know not: which overturneth them in his anger.
"Which shaketh the earth out of her place, and the pillars thereof tremble.
"Which commandeth the sun, and it {127} riseth not; and sealeth up the stars.
"Which alone spreadeth out the heavens, and treadeth upon the waves of the sea.
"Which maketh Arcturus, Orion, and Pleiades, and the chambers of the south.
"Which doeth great things past finding out; "

In all the Book of Job, however, I like best Chapter 39-41, where God takes Job's attention from his own ills to the wonders of creation. In Ch. 38 inanimate nature is described, in 39, all familiar animals, their habits being described with great accuracy, and in 40 and 41 are given garbled accounts of the hippopotamus and the crocodile. It is nearly all put into form of pointed rhetorical questions:-

"Where wast thou when I laid the {128} foundations of the earth? declare, if thou hast understanding.
"Who hath laid the measures thereof, if thou knowest? or who hath stretched the line upon it?
"Whereupon are the foundations thereof fastened? or who laid the corner stone thereof;
"When the morning stars sang together, and all the sons of God shouted for joy?
"Or *who* shut up the sea with doors, when it brake forth, *as if* it had issued out of the womb?
"When I made the cloud the garment thereof, and thick darkness a swaddlingband for it, "And brake up for it my decreed *place*, and set bars and doors,

"And said, Hitherto shalt thou come, but no further: and here shall {129} thy proud waves be stayed?

"Hast thou commanded the morning since thy days; *and* caused the dayspring to know his place;

"That it might take hold of the ends of the earth, that the wicked might be shaken out of it?

"It is turned as clay *to* the seal; and they stand as a garment.

"And from the wicked their light is withholden, and the high arm shall be broken.

"Hast thou entered into the springs of the sea? or hast thou walked in the search of the depth?

"Have the gates of death been opened unto thee? or hast thou seen the doors of the shadow of death?"

and so on. It is often claimed that the discoveries of science detract from the majesty of God; but I do not see how that can be. When the earth was conceived as sort of enlarged penny, and the sky as a kind of enlarged eggshell popped over it, it was surely {130} not so great or so wonderful of God to "spread the heavens" or to "form the crooked serpent" as it is now, when the skies are regarded as extending for countless billions of miles and even that small part of the heavens that Job called the "crooked serpent" and we call the "Milky Way" is seen to consist of millions of stars, all of them billions of miles apart! And surely it does not "detract from the majesty of God" to know that He is far above all the caprices that we are wont to ascribe to "persons" that the scientists can formulate exact laws of his workings in Nature!

Yet in at least one respect the ancients had reason to hold God {131}in perhaps greater awe than we do; for their very lack of knowledge about natural phenomena made them full of fear. Thus, if the modern scientist could show the heavens to be far more wonderful than Job conceived them to be he would not describe the hippopotamus or the crocodile in such impressive terms as Job does in chapters 40 and 41, saying of the hippopotamus,

"Behold now behemoth, which I made with thee; he eateth grass as an ox.
"Lo now, his strength *is* in his loins, and his force *is* in the navel of his belly.
"He moveth his tail like a cedar: the sinews of his stones are wrapped together. {131}
"His bones *are as* strong pieces of brass; his bones *are* like bars of iron.
"He *is* the chief of the ways of God: he that made him can make his sword to approach *unto him*.
"Surely the mountains bring him forth food, where all the beasts of the field play.
"He lieth under the shady trees, in the covert of the reed, and fens.
"The shady trees cover him *with* their shadow; the willows of the brook compass him about.
"Behold, he drinketh up a river, *and* hasteth not: he trusteth that he can draw up Jordan into his mouth.
"He taketh it with his eyes: *his* nose pierceth through snares."
and of the crocodile, {132}
"Canst thou draw out leviathan with an hook? or his tongue with a cord *which* thou lettest down?
"Canst thou put an hook into his nose? or bore his jaw through with a thorn?
"Will he make many supplications unto thee? will he speak soft *words* unto thee?
"Will he make a covenant with thee? wilt thou take him for a servant for ever?
"Wilt thou play with him as *with* a bird? or wilt thou bind him for thy maidens?
"Shall the companions make a banquet of him? shall they part him among the merchants?
"Canst thou fill his skin with barbed irons? or his head with fish spears?

"Lay thine hand upon him, remember the battle, do no more.
"Behold, the hope of him is in vain: shall not *one* be cast down even at the sight of him?
"None *is so* fierce that dare stir him up: who then is able to stand before me?
"Who hath prevented me, that I should repay *him? whatsoever is* under the whole heaven is mine.
"I will not conceal his parts, nor his power, nor his comely proportion.
"Who can discover the face of his garment? *or* who can come *to him* with his double bridle?
"Who can open the doors of his face? his teeth *are* terrible round about.
"*His* scales *are his* pride, shut up together *as with* a close seal.
"One is so near to another, that no air can come between them.
"They are joined one to another, they stick together, that they cannot be sundered.
"By his neesings a light doth shine, {133} and his eyes *are* like the eyelids of the morning.
"Out of his mouth go burning lamps, *and* sparks of fire leap out.
"Out of his nostrils goeth smoke, as *out* of a seething pot or caldron.
"His breath kindleth coals, and a flame goeth out of his mouth.
"In his neck remaineth strength, and sorrow is turned into joy before him.
"The flakes of his flesh are joined together: they are firm in themselves; they cannot be moved.
"His heart is as firm as a stone; yea, as hard as a piece of the nether *millstone*.
"When he raiseth up himself, the mighty are afraid: by reason of breakings they purify themselves.
"The sword of him that layeth at him cannot hold: the spear, the dart, nor the habergeon.
"He esteemeth iron as straw, *and* brass as rotten wood.

"The arrow cannot make him flee: slingstones are turned with him into stubble.

"Darts are counted as stubble: he laugheth at the shaking of a spear.

"Sharp stones *are* under him: he spreadeth sharp pointed things upon the mire.

"He maketh the deep to boil like a pot: he maketh the sea like a pot of ointment.

"He maketh a path to shine after him; *one* would think the deep *to be* hoary.

"Upon earth there is not his like, who is made without fear.

"He beholdeth all high *things*: he *is* a king over all the children of pride." {134}

Comparisons with other Scriptures. —

I regard "Job" as undoubtedly the greatest book in the Bible, and the only books which are worthy to be compared with it are those which are placed near by it — Psalms, Proverbs and Isaiah. Although there are few passages in the Bible which I do not read with enjoyment, my taste for scripture is perhaps limited in so far as I read with avidity only such passages as express the majesty and glory of God and the beauty and wonder of His creation. For this reason, if I look upon "Job" as the finest "dramatic poem" in the Bible, the finest "Ode", as it may be called, seems to me to be the Psalm 104. This Psalm is a masterpiece of composition and arrangement of subject, {135} and in the short space of about forty verses takes me through the whole wide realm of Nature, even including the daily life of man. The opening verses are particularly impressive:

"Bless the LORD, O my soul. O LORD my God, thou art very great; thou art clothed with honour and majesty.

"Who coverest thyself with light as with a garment: who stretchest out the heavens like a curtain:

"Who layeth the beams of his chambers in the waters: who maketh the clouds his chariot: who walketh upon the wings of the wind:
"Who maketh his angels spirits; his ministers a flaming fire:
"Who laid the foundations of the earth, that it should not be removed for ever. {136}
"Thou coveredst it with the deep as *with* a garment: the waters stood above the mountains.
"At thy rebuke they fled; at the voice of thy thunder they hasted away.
"They go up by the mountains; they go down by the valleys unto the place which thou hast founded for them."

If the Book of Job may be compared to Shelley's "Prometheus Unbound", Psalm 104 may perhaps be compared to Shelley's "The Cloud" — though in both cases the Biblical work are, of course, much greater than the productions of the modern lyrist. In fact, it is perhaps inappropriate to make any comparison between Shelley and the writers of the Old Testament; for though their outlook was by no means opposed, their diction and treatment of their subject {137} were totally different. A more apt comparison might be made between the Old Testament, especially such poetic portions as the Book of Job, and the religious writings of an even more recent thinker than Shelley — Albert Einstein. I may say here that from its appearance Einstein's "Cosmic Religion"[61] appealed to me strangely, and I rather wished that it had found expression in some literary work to stand beside "Prometheus Unbound" (the expression of Shelley's Platonism) and "Faust" (the expression of Goethe's Humanism). I forgot for the moment that, however he might have renounced the verbal forms, which meant so much to his forefather, Einstein still had the soul of a Jew, and I did not realise that "Cosmic {138} Religion" was but the expression of the highest and noblest aspect of Judaism — his so-called "atheism", for instance, his insistence on the abolition of "functional ideas of God", was nothing more than

[61] Editors' note: See p. 148

a consistent application of the traditional Jewish abhorrence of "graven images." When this dawned upon me, I found the very "literary work" I desired when I turned over the pages of the Book of Job. Four chapters of this wonderful drama consist of God's way of impressing on Job the same fact that Einstein has rather cryptically pointed out to us by saying "If we regard Nature as a poem, we are like little children who discover the rhyme but not the prosody of the rhythm" — even behind the apparent discords of our life Nature is instinct with order and harmony. And {139} the essential message of the Book of Job — that Man should change his viewpoint from the personal to the cosmic — is the same as that expressed by Einstein when he says that the individual should learn to feel "the vanity of human desires and aims, and the nobility and marvellous order which are revealed in Nature of the world of thought."[62]

The New Testament is generally regarded as containing a newer and greater "dispensation" than the old, but, although it indeed takes away the narrow nationalistic spirit of some of the earlier Jews, it does not in my opinion contain such noble literature as the poetical books of the Old. It does not, moreover, seem to me to lay enough stress on the cosmic idea of God, though here I must acknowledge that if it does not do {140} full justice to God's power (except in certain of the writings of St. Paul), the New Testament gives us an altogether new and beautiful conception of His love.

In the New Testament we find propounded a new idea of the motive Powers of the Universe — an idea which has not even yet taken firm root in the minds of men, for people are still arguing as to what it is that maintains Nature as a living reality. Materialists, with their eternal hankering after words that have no meaning, tell us that it is Force. Bergson, with his typical hard, prosaic common sense, tells us that it is

[62]Editor's note: Einstein, A., (2013). *Einstein on Politics: His Private Thoughts and Public Stands on Nationalism, Zionism, War, Peace, and the Bomb,* Princeton University Press, p.232.

Life that keeps the universe in existence. Bernard Shaw, with his typical love of compromise, {141} prefers to call it "Life - Force". In the New Testament we are plainly told that these are but minor things, and the Primal Power that gives meaning and actuality to the universe is Love. "God is Love" says St. John, "and he that dwelleth in love dwelleth in God and God in him."[63]

It would, however, be a grave mistake to suppose that the New Testament conception of God as Love is in any way contradictory to the Old Testament idea of his power and majesty, and the fact that I am a Christian rather than a Jew does not give me any cause to hesitate in saying that the Old Testament Book of Job is by far the noblest achievement in all the literature of the world.
{142}

ADDENDA —

Favorite Extracts from other Writers —

— The Unknown God —

Far up the dim twilight fluttered
Moth-wings of vapour and flame:
The lights danced over the mountains,
Star after star they came.

The lights grew thicker unheeded,
For silent and still were we;
Our hearts were drunk with a beauty
Our eyes could never see. (Geo. W. Russell)

It was beginning morning: night, throeing with dissolution, spread out, like old misers on lamp-lit death-{143}-beds of velvet, a gluttony of

[63] Editors' note: 1. John 4:16.

bulging jewels; a languid, lowlooming moon wrapped in elfin satins the crimson of pomegranate, and the grey-green of the tower, and the sardius of asphodel-berries, and the purple of myrtle-fruit. Here in galaxies fireflies poise uncertain, sun-birds and droning coccinellæ dart. Turtles and nightingales hang their harps upon its willows. Inconsequent hints of zephyrs, hoth with the fragrance of clove and jasmine, came with healing in their wings to my parched lips and forehead. I sent up from the lyre a lullaby, tuned to the splash of a fountain which gushed from a basin of cipolin—a cold white spirit in the midst of the garden; muttering; wreathing with aureoles of the lunar rainbow her far-{144}-tossed hair of dew. (M.P. Shiel)[64]

— Music —

If music be the food of love, play on;
Give me excess of it, that, surfeiting,
The appetite may sicken, and so die.
That strain again! it had a dying fall:
O, it came o'er my ear like the sweet sound,
That breathes upon a bank of violets,
Stealing and giving odour! (William Shakespeare)

— Quatrains from the "Rubáiyát" —

{XVIII}

I sometimes think that never blows so red The Rose as where some buried Cæsar bled; {145}
That every Hyacinth the Garden wears Dropt in its Lap from some once lovely Head.

[64]Editor's note: From "Phorfor" by M.P. Shiel.

{XIX}

And this delightful Herb whose tender Green Fledges the River's Lip on which we lean—
Ah! lean upon it lightly! for who knows From what once lovely Lip it springs unseen!

{XXI}

Lo! some we loved, the loveliest and the best That Time and Fate of all their Vintage prest,
Have drunk their Cup a Round or two before,
And one by one crept silently to Rest.

{LXXII}

Alas, that Spring should vanish with the Rose!
That Youth's sweet-scented Manuscript should close!
The Nightingale that in the Branches sang,—
Ah, whence, and whither flown again, who knows! (Omar Khayyám)

{146}

---ooo---

Our revels now are ended. These our actors,
As I foretold you, were all spirits, and
Are melted into air, into thin air:
And like the baseless fabric of this vision,
The cloud-capp'd tow'rs, the gorgeous palaces,
The solemn temples, the great globe itself,
Yea, all which it inherit, shall dissolve,
And, like this insubstantial pageant faded,
Leave not a rack behind. We are such stuff

As dreams are made on; and our little life
Is rounded with a sleep. (Wm. Shakespeare)

---ooo---

— The Lake Isle of Innisfree —

I will arise and go now, and go to Innisfree,
And a small cabin build there, of clay and wattles made: {147}
Nine bean-rows will I have there, a hive for the honey-bee;
And live alone in the bee-loud glade.

And I shall have some peace there, for peace comes dropping slow,
Dropping from the veils of the morning to where the cricket sings;
There midnight's all a glimmer, and noon a purple glow,
And evening full of the linnet's wings.

I will arise and go now, for always night and day
I hear lake water lapping with low sounds by the shore;
While I stand on the roadway, or on the pavements grey,
I hear it in the deep heart's core. (W.B. Yeats)

---ooo---

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— Cosmic Religion —

"Cosmic religious sense" is hard to make clear to those who do not experience it, since it does not involve an anthropomorphic idea of God; the individual feels the vanity of human desires and aims and the nobility and marvellous order which are revealed in the world of thought. He feels the individual destiny as an imprisonment, and seeks to experience the totality of existence as a unity full of significance....

In its farthest reaches of communion with the vast harmony of the illimitable universe, Religion will dispense with pictorial ideas of God, with doctrines of personal salvation, with creeds and churches and sites of worship. Science can believe as little in a (personal) Christian Providence as in a Roman Jupiter {149} or an Egyptian Ra. But cosmic religion rises far above these levels of imaginative superstition, and its appreciation of a universe that moves in beauteous order through a time and space that are single essence of reality, becomes the strongest and noblest living force behind scientific research. (Albert Einstein).

---ooo---

— Lorenzo to Jessica —

How sweet the moonlight sleeps upon this bank!
Here will we sit and let the sounds of music
Creep in our ears: soft stillness and the night
Become the touches of sweet harmony.
Sit, Jessica. Look how the floor of heaven
Is thick inlaid with patines of bright gold:

{150}

There's not the smallest orb which thou behold'st
But in his motion like an angel sings,
Still quiring to the young-eyed cherubins;
Such harmony is in immortal souls;
But whilst this muddy vesture of decay
Doth grossly close it in, we cannot hear it. (Wm. Shakespeare)

---ooo---

I stand amid the roar
Of a surf-tormented shore,
And I hold within my hand
Grains of the golden sand —
How few! yet how they creep
Through my fingers to the deep,
While I weep — while I weep!
O God! Can I not grasp
Them with a tighter clasp?
O God! can I not save
One from the pitiless wave?
Is all that we see or seem
But a dream within a dream? (Edgar Allan Poe).

Essays Religious*

(Sept --- Oct 1931)

A N Prior

Dedicated to my Father and other Arminians who will not agree with it.

1 Author's Preface

Those readers who have previously known me only as a bit of a sceptic, frequently lapsing into atheism, will be rather surprised to find me here a bigoted champion of strict orthodoxy. Yet if they consider the section on the nature of God in the essay on "Predestination", they will find that my basic views have not radically changed since[1] the time when I propounded "mystical atheism", but have merely been put in a new setting. What has dawned upon me in the last few months is not so

*Editors' note: This text has been edited by David Jakobsen and Peter Øhrstrøm based on A.N. Prior's booklet kept at Bodleian library, Oxford, Ann Prior's Collection, box 13. In the transcribed text, page numbers are placed where the text on that page starts, put in curly brackets: {xxx}.

[1]Editors' note: The following text has been cut out here, but reproduced in the margin at the top of page iii: 'that my basic views have not radically changed since.'

much that I have myself been in the wrong, as that orthodox Christians have been, like myself, in the right – in {iii} other words, that orthodox Christianity is a much more reasonable religion than I had previously supposed it to be.

I have always been a Determinist of one sort of another — free will has always seemed to me logically inconceivable — and during an argument in a Bible Class with an ardent Libertarian, I was told upon good authority that my views were more orthodox than those of my opponent. I was rather surprised, & after looking up the Biblical passages in which free-will was condemned, I decided that orthodox Predestination was quite as good as my unorthodox Determinism – a conviction which has grown stronger with the passage of time. I believe {iv} that there is nothing we can cavil at in the orthodox Christian doctrine but a certain repulsive baldness in its expression. Shelley's "Essay on Christianity" and Calvin's "Institutes of the Christian Religion" are generally regarded as radically opposed in thought & teaching; but I rather think that their basic thought is identical, & the only difference between them is that while Calvin austerely declares that "We were elected from eternity, before the foundation of the world, from no merit of our own, but according to the purpose of the divine pleasure,"[2] Shelley prefers to say the same thing in these words: "We live & move & think; but we are not the creators of {v} our own origin & existence. We are not the arbiters of every motion of our own complicated nature, we are not the masters our own imagination & moods of mental being. There is a Power by which we are surrounded, like the atmosphere in which some motionless lyre is suspended, which visits with its breath our silent chords at will."[3]

I have long been a follower of Shelley; & in this book I make no recantation, but whereas I was once a Shelleyan anti-Christian, I am now

[2]Editors' note: Prior does not provide a reference for this quotation, but a reference could be John Calvin's *Institutes of the Christian Religion* where Calvin comments on Ephesians 1:4-5.

[3]Editors' note: Prior does not provide a reference for this quotation which is from Shelley's Essay on Christianity.

a Shelley pro-Christian. Formerly I have been all too eager to appreciate the destructive aspect of the teaching of men like Shelley & Einstein; but now I use the ideas I have derived from them as an instrument, not for the destruction of orthodox tenets, {vi} but the establishment of orthodox tenets upon a firmer logical basis.

The subject of Predestination, which forms the principal topic of this booklet, is naturally a rather deep one, & in many places I may not have expounded it with sufficient lucidity; but though I may seem incoherent in places, I do not think I can be anywhere accused of inconsistency, except in the treatment of my opponents, & here the reader may find me extremely capricious. An attitude which at one moment I condemn as unpardonable and infamous blasphemy, you will find me at another moment tolerating as an excellent aid to the popular imagination. Probably this is because I am by nature open-{vii}-minded and tolerant, but I feel that a certain uncompromising dogmatizing gives a great additional forcefulness & conviction to one's arguments. In practical life I am all for tolerance, but it is out of place in debate or in argumentative writing, so that when you find me tolerant in these essays you may regard it as a "lapse".

Another probable source of confusion to the unwary reader is my constant change of idiom — at one moment I use the jargon of the very orthodox preacher, at another that of the Cause & Effect philosopher, & sometimes I even break into broad colloquialisms which some might even term slang. However, I must ask the reader to excuse the slang; & as to the other, I {viii} can only say that this continual jumping from the blunt assertions of orthodox leaders to the plausible ratiocinations of the philosophers should prove good mental exercise for him!

I am glad to receive all criticism but one criticism which has often been made of the views expressed in this booklet seems to me wholly unjustifiable, & it is this: Various deep-thinking and broad-minded people who have all along regarded Calvinism as narrow-minded and untenable, have agreed with me in views similar to those expressed herein,

and have even agreed that they throw new light on the questions at issue, but they maintain that I have failed to justify Calvinism because the said views {ix} are quite unorthodox. They do not think my views are "dark" enough to be termed Calvinistic. I hope any future reader of this book will be intelligent enough to realize how baseless is such a criticism. For in Calvinism of the sternest type there is nothing "darker" than the emphasis of the immeasurable awfulness of God, His eternity, His absolute sovereignty and the immutability of His decrees – and all these things I agree should be emphasized. With regard to the "immeasurable awfulness" of God, for instance, I am even more consistent than most strict Calvinists; for while they "measure" God by describing Him as a kind of person, my sense of His "immeasurable awfulness" is so acute that I not only deny His {x} personality but I even go so far as to say that it would be irreverent to call Him a "being" (p. 34). And as for God's absolute sovereignty, is not the very keynote of my essay on Predestination the same as that of the (Calvinistic) Westminster Confession — "The Decree of God are His eternal Purpose according to the Counsel of His will, whereby for His Own glory He hath foreordained whatsoever cometh to pass."[4]

Another so-called "dark" feature of Calvinism is its emphasis on the fact that the greater part of Humanity are "lost"; I think I have agreed with this explicitly enough in my essay, but just in case I have not, let me say here that not only the "benighted heathen", but also the vast majority of Christian's today, are {xi} spiritually dead, and cannot be said to be in any way "saved". In fact, I would go almost as far as John Glas, who was described by William Godwin as a celebrated north-country apostle who, after Calvin had damned ninety-nine in a hundred of mankind, has contrived a scheme for damning ninety-nine in a hundred of the followers of Calvin." Well, God be with you reader!

A.N. Prior

[4]Editors' note: Prior does provide a reference, but it is likely to answer 7 of Westminster Shorter Catechism to the question: What are the decrees of God?

{1}

2 Contents

(Index on p. 134).

3 On Predestination

(being a defence of Calvinism on the grounds of reason).

"The kings of the earth stood up, and the rulers were gathered up together against the Lord and against his Christ. "For of a truth against thy holy child Jesus, whom thou hast anointed, both Herod, and Pontius Pilate, with the gentiles, and the people of Israel, were gathered together,
"For to do whatsoever thy hand and thy counsel determined before to be done"

(Acts 4:26-28)

"And we know that all things work together for good to them that love {2} God, to them who are called according to his purpose.
"For whom he did foreknow, he also did predestinate to be conformed to the image of his Son, that he might be the firstborn among many brothers.
"Moreover whom he did predestinate, them he also called and whom he called, them he also justified, and whom he justified, them he also glorified."

(Romans 8:28-30)

"Blessed be the God and Father of our Lord Jesus Christ, who hath blessed us with all spiritual blessings in heavenly places in Christ:
"According as he hath chosen us in him before the foundation of the world, that we should be holy and without blame before him in love.
"Having predestinated us into the adoption of children by Jesus Christ to {3} himself, according to the good pleasure of his will,
"To the praise of the glory of his grace, wherein he hath made us accepted in the beloved.
"In whom we have redemption through his blood, the forgiveness of sins, according to the riches of his grace;

"Wherein he hath abounded toward us in all wisdom and prudence;
Having made known unto us the mystery of his will, according to his good pleasure which he hath purposed in himself:
"That in the dispensation of the fullness of times he might gather together in one all things in Christ, both which are in heaven, and which are on earth even in him:
"In whom we have obtained an inheritance, being predestinated according to the riches of his grace;
Wherein he hath abounded toward us in all wisdom and prudence;
"Having made known unto us the mystery of his will, according to his good pleasure which he hath purposed in himself:
"That in the dispensation of the fullness of times he might gather together in one all things in Christ, both which are in heaven, and which are on earth, even in him:
"In whom we have obtained an inheritance, being predestinated according {4} to the purpose of him who worketh all things after the counsel of his own will.

(Ephesians 1:3-11)

When Rebecca had conceived by one, even by our father Isaac; "(For the children being not yet born, neither having done any good or evil, that the purpose of God according to election might stand, not of works, but of him that calleth;)
"It was said unto her, the elder shall serve the younger.
"As it is written, Jacob have I loved, but Esau have I hated.
"What shall we say then? Is there unrighteousness with God? God forbid.
"For he saith to Moses, I will have mercy on whom I will have mercy, and I will have {5} compassion on whom I will have compassion.
"So then it is not of him that willeth, nor of him that runneth, but of God that showeth mercy.

"For the scripture saith unto Pharaoh, Even for this same purpose have I raised thee up, that I might show my power in thee, and that my name might be declared throughout all the earth.
"Therefore hath he mercy on whom he will have mercy, and on whom he will he hardeneth.
"Thou will say then unto me, Why doth he yet find fault? For who hath resisted his will?
"Nay but, O man, who art thou that repliest against God? Shall the thing formed say to him that formed it, Why hast thou made me thus?
{6} "Hath not the potter power over the clay, of the same lump to make one vessel unto honour, and another unto dishonor?
"What if God, willing to show his wrath and to make his power known, endused with much long-suffering the vessels of wrath fitted to destruction:
"And that he might make known the riches of his glory on the vessels of mercy, which he had afore prepared unto glory?

(Romans 9:10-23)

I. MOSTLY HISTORICAL

St. Augustin's Teachings — The above passages constitute the principal scriptural sources of the doctrine of Predestination, which has proved a bone of contention among the {7} various sections of Christianity for many centuries – and not unworthily, for to my mind a consideration of this doctrine must bring out all the essential facts and ideas upon which the Christian religion is based. After St. Paul (who, as is evidenced by the above passages from his letters, had fairly definite opinions on the matter) the first great Christian leader to bring the doctrine of Predestination into prominence was the early Father Aurelius Augustin, generally known as St. Augustine (354-430), in his celebrated controversy with the Celtic monk Pelagius.

St. Augustine was a man who had led an extremely wild youth, and his conversion to Christianity and the subsequent reformation of his {8} character was little short of a miracle. In the light of this fact, it is not surprising that all his writings were coloured with a very deep – perhaps too deep – sense of the sinfulness of man and the unspeakable goodness and power of God; and this is nowhere better seen than in his writings on Predestination. He could not see the slightest possibility of good in human nature apart from the intervention of God's grace – man, according to Augustine, is hopelessly depraved and sinful, and worthy of nothing less than eternal damnation. The majority of mankind will be treated accordingly, but God in his infinite mercy has seen fit to bestow salvation upon a chosen few, and these he leads or "calls" to their {9} happy ending, the divine grace working in them to make them lead worthy or faithful lives. Salvation is thus a free gift from God, and we ourselves play no effective part in it; for we are unable to will anything but evil, having inherited this propensity for sin from the first great sinner Adam.

Augustine's opponent Pelagius, on the other hand, maintained that Adam's sin affected no one but himself; and that we have all the capacity for good as well as for evil, and a free will whereby we ourselves play an effective part in our salvation or damnation. At the time, Pelagius was most deservedly sat on, but the idea he promulgated kept cropping up one way and another, and in time {10} the Church moved right away from Augustine's own standpoint and its attitude to the question of Predestination became looser and looser until today the Roman Catholic verdict on it is that it is a question of speculative philosophy rather than one of faith.

The Calvinists and Arminians — The great Reformers of the 16th century, however, Martin Luther (1483-1546), Ulrich Zwingly (1484-1531), and Jean Calvin (1509-1564) — revered the Augustinian doctrine

in all its strictness, and it is with the name of Calvin that Predestination has come to be particularly associated today.

Calvin taught, as Augustin did, that Man is of himself hopelessly corrupt and sinful, and can be saved, not by his own will or {11} action, but solely by the grace or favour of God. He particularly insisted that, firstly, man is powerless to resist this divine grace; secondly, that God bestows his grace solely upon certain ones that he has chosen from eternity (the elect); and thirdly, that once a man has been "saved", the divine grace can never leave him. These three essential qualities of the divine grace – its irresistibility, its selectness and its permanence – were one and all directly contradicted by the Dutch reformer Jacobus Arminius (1560-1609) and his followers the Arminians or Remonstrants, who maintained that, firstly, man has a free will to accept or resist God's grace; secondly, that God's grace is offered {12} to all, and those who refuse it do so entirely of their own accord; and thirdly, that even after a man has received God's grace he may lose it if he doesn't hang on to it. The Synod of Dort, called to deal with these Remonstrants, rightly decided in favour of the Calvinists, but the Arminians were by no means suppressed.

In the century following these disputes Calvinism, reaching its sternest and strictest development in Puritanism, came to be widely regarded as a harsh and uninviting creed, while Arminianism degenerated into a "stiff and frozen Deism" in which God was represented as a being who created the world and man, and then retired into the background and left man to work out his {13} own salvation. The Church was rescued from this state by that great Englishman John Wesley (1703-1791), who brought to it a new living and attractive creed in the form of Methodism . Wesley himself conceived of this as a kind of vitalised Arminianism; but not all Methodists (thank Heaven!) were Arminians, and a Calvinistic branch was founded and led by George Whitefield

(1714-1770)[5], of whom I am, in my small way, a follower.

The Fall of Man.

"O Lord, who bearest rule, thou spakest at the beginning, when thou didst plant the earth, and that thyself alone, and commandest the people,
"And gavest a body unto Adam without soul, which was the workmanship of thine hands, and didst {14} breath into him the breath of life, and he was made living before thee. "And thou leddest him into paradise, which thy right hand had planted, before ever the earth came forward.
"And unto him thou gavest commandment to love thy way: which he transgressed, and immediately thou appointedst death in him and in his generations, of whom came nations, tribes, people, and kindreds, out of number. (II Esdras 3:4-7)

"I answered then and said, This is my first and last saying, that it had been better not to have given the earth unto Adam: or else, when it was given him, to have restrained him from sinning.
"For what profit is it for men now in this present time to live in heaviness, and after death to look for punishment?
"O thou Adam, what hast thou done? for though it was thou that sinned, thou art not fallen alone, but we all that come of thee.
"For what profit is it unto us, if there be promised us an immortal time, whereas we have done the works that bring death?
"And that there is promised us an everlasting hope, whereas ourselves being most wicked are made vain?
"And that there are laid up for us dwellings of health and safety, whereas we have lived wickedly?

[5]Editors' note: George Whitefield was, together with John Wesley, one of the founders of Methodism. Unlike Wesley, he accepted the doctrine of predestination.

"And that the glory of the most High is kept to defend them which have led a wary life, whereas we have walked in the most wicked ways of all?
"And that there should be shewed a paradise, whose fruit endureth for ever, wherein is security and medicine, since we shall not enter into it?
"(For we have walked in unpleasant places.)
"And that the faces of them which have used abstinence shall shine above the stars, whereas our faces shall be blacker than darkness?
"For while we lived and committed iniquity, we considered not that we should begin to suffer for it after death." (II Esdras 7: 46-56)

The orthodox doctrine of Predestination is intimately bound up with the doctrine of the Fall of Adam (of which Esdras complains so bitterly in the above passages from the Apocrypha), Augustine and Calvin alike teaching that Adam before his fall was created godlike not only in his sinless purity and {17} sanctity, but even in the freedom and independence of his will, and that in his Fall he lost both his godly purity and his freedom, and all his descendants share his helpless depravity. Owing to the intimate connection of the two doctrines, the attitude of various Predestinarians to the Fall is taken as a measure of the extent to which they go in acknowledging the absolute sovereignty of God, the term "lapsarian" from Latin "lapsus" = a fall) being used with various prefixes to indicate the degrees to which they go.

The "Infra-lapsarians", for instance, hold that God merely foresaw and permitted the Fall of Adam – surely an astonishing indifference on His part! Augustine and Calvin, who are termed "sub -{18}- lapsarians", admit that God must have decreed the fall, but insist that for all that Adam had a free will before it occurred, and the damnation of the bulk of the human race is therefore a fair punishment of a free act on Adam's part. This strikes me as being not so much a softening of Calvin's breast as of his head, and his immediate followers were somewhat more consistent. Calvin's great French lieutenant Theodore Beza

(1519-1605) and his English follower William Perkins and others kindred spirits, pushing the doctrine of Predestination to its logical extreme in "supra-lapsarianism", taught that not only was the Fall decreed, but it was decreed {19} as a means to carrying out a previous decree to save some and leave others to perish, and that our first parents had no liberty from the beginning.

I am a professed supra-lapsarian myself, but I wish it to be made perfectly clear what I mean when I say this. Though I believe that there is more in the Adam and Eve story than meets the eye, a straight-out, crude literal interpretation of it seems to me untenable, in the light of modern knowledge; but the fall of Adam very well symbolizes the entry of Sin upon the stage of our human activities, and is a convenient criterion of the extent to which one is prepared to go in connecting God with this origin of Sin. That is to say, just supposing that {20} such an event as the fall did occur, I believe that it must have been decreed and ordained by God like all other events; and moreover, if it entailed the corruption of the human race and the subsequent damnation of the majority of mankind, then the corruption of the human race must have been God's express plan and purpose, and the fall his means to carrying out that purpose.

It may well be complained that the doctrine of Predestination, especially in the extreme form which I have chosen to adopt, is a hard and merciless sort of creed. My answer to such criticism is that the opposed idea of free will, if fully and fairly analysed (as {21} Jonathan Edwards analysed it, and as I propose to analyse it myself later on in this paper) turns out to be not only illogical but meaningless. After all, it must be remembered that from the human point of view life is not exactly a bed of roses, and the doctrine of Predestination is really the most reasonable way – if not the only reasonable way – of accounting for the hard facts that continually face us. The basis of all religious faith is that God's absolute sovereignty on the one hand, and the perfect righteousness of his every action on the other, are completely beyond question; and while

it is absolutely impossible to say that sin and misery entered the world in spite of God without {22} denying His absolute sovereignty, it is a comparative easy matter to show that it does not detract from His perfect righteousness to acknowledge that He permitted or even caused the entry of Sin. Before I show this, however, I should like to mention one other thinker who has played a part of paramount importance in the historical development of the doctrine of Predestination.

The System of Jonathan Edwards.

At the time when George Whitefield was occupying himself with Calvinistic Methodism, a New England preacher, JONATHAN EDWARDS (1703-1758), had set himself to establish the strictest and most merciless Calvinistic orthodoxy on a perfectly sound, logical and reasonable {23} basis. He did this by giving it a broad philosophical foundation – a thing he was competent to do above all men, for Edwards is regarded as the greatest speculative philosopher America has yet produced. This high reputation rests principally upon his famous treatise on "The Freedom of the Will", which is recognized as America's foremost contribution to philosophy. When I come to criticize the freedom of the will in detail in this paper, I shall to a large extent be merely restating the arguments of Edwards; I acknowledge this freely here, lest anyone should accuse me of plagiary.

A fundamental principle {24} in the Edwardean philosophy was the identity of God with "being". God may be defined as an "eternal and infinite Being", or, more correctly, as "the eternal and infinite Being", since there can only be one such. Now such a definition would seem to have two meanings, according as we treat the word "Being" as a pure noun or as a noun with an active verbal sense – a gerund. The word "being" does not simply mean a particular existing individual; as a gerund of the verb "to be", in an active sense – like "eating", "swimming", etc. – it may mean the very process of existence. Edwards maintained that the

two meanings thus implied in his definition of God were fundamentally identical, and the {25} "eternal and infinite Being" called God is that identified with the eternal and infinite process of existence going on throughout the universe. In the word of Edwards himself, "The eternal and infinite Being is in effect being in general and comprehends universal existence."[6] Being or entity was for Edwards the greatest and only good, and God as infinite entity, where the agreement of being with being is absolute, was the supreme excellency, the supreme good.

These ideas were brought out particularly in his Dissertations "On the True Nature of Christian Virtue", and "On the Final End for which God Created the World." Virtue, according to Edwards, consists primarily in disinterested love {26} of all being, and consequently of God; and the "final end for which God created the world" is, as Scripture tells us, the "glory of God" – not, as the Arminians would have us believe, the happiness of his creatures. Edwards taught that in all things God, the "being of being", must come first; and his conviction of the absolute sovereignty of God was so strong that it amounted to "mysticism".

It is rather surprising to find that this philosopher and mystic should have been turned out of his church, not because his views were in any way heterodox, but because they were too narrowly orthodox! And indeed he did contrive wonderfully well to correlate his broad philosophy {27} with the narrowest Calvinistic theology, and to some his chief claim to fame is not his treatise on the freedom of the will so much as a certain sermon in which he gave a most moving and graphical description of the torments of hell-fire! In "Original sin" he gives his views on the doctrine of the fall, and, like myself, he took the supralapsarian attitude that Adam had no more freedom than we have, but a special gift of grace was bestowed upon him and withdrawn upon his fall, and from his descendants, who have one and all identified themselves with him in his

[6]Editors' note: Prior does not provide a reference for this quote which is from Jonathan Edward's answer to objection 4 of his assertion that God is the end of all his actions, in "A Dissertation Concerning The End For Which God Created The World."

Transgression. In an "Essay on the Trinity" also he deduce[s] very orthodox notions of God, without actually contradicting {28} the above mentioned idea of God as in some sense comprising all being.

In his attempt to place strict Calvinistic orthodoxy on a logically consistent footing, Edwards, so far as the light of his day could show, met with full success. But we have moved a long way from the intellectual standpoint of the eighteenth century, and have learnt since then a number of things which make many of his ingenious explanations hardly acceptable today. Yet I believe most strongly that there may still be found a firm logical and reasonable basis for the most rigid orthodoxy; and I have presumed to take upon my shoulders the mantle of JONATHAN EDWARDS {29} in an attempt to find and to show that basis.

II. THE NATURE OF GOD.

God is not a person. In thus undertaking to justify strict orthodoxy, I find, however, that I must make one little reservation, namely, that I may be freely permitted to substitute for the term "person" the term "spirit", and for the term "personal" the term "spiritual" where it seems to me fit and advisable to do so. I make no secret of the reason for this postulate: I ask it simply because the English word "person" seems to me to have a smack of the concrete, the worldly, the finite, which is distasteful to me; {30} and only where concreteness, worldliness and finitude are obviously implied do I think the term "person" and appropriate word to use.

I do not like to speak, for instance, of "personal immortality", I see nothing inspiring or elevating in the belief that this selfish and argumentative little bundle of follies that is called Arthur Prior shall continue to pester the universe for an eternity. The belief is anyhow a selfish one, and as it is the essential function of religion to draw us out of ourselves and away from ourselves, I cannot imagine any religion worthy of the

name holding up such an utterly selfish and individualistic ideal. But that is not by {31} any means to say that I am a materialist or a sceptic, or "lacking in Christian hope." Far from it. I believe in immortality as much as anyone, but I do not like to narrow down such a grand conception to the oppressively limited sphere of the personal self. I do not think there is a single one of us entitled to make a definite, substantial assertion about what happens after physical death; but this much I feel, and cannot help believing with all my heart: that nothing, in our own lives or elsewhere, that is truly lovely – that is truly a part of the unspeakable Beauty that lies at the heart of all being – can ever {32} pass away. The little things, the mean things, with which our lives are overcrowded, these must go; but Beauty and Love, wherever it is found – within us or without us – is essentially undying.

"The One remains; the many change and pass;
Heaven's light for ever shines; earth's shadow fly;
Life, like a dome of many – coloured glass,
Stains the white radiance of eternity,
Until death tramples it to Fragments."

(Shelley "Adonais")

If the idea of merely personal immortality is too gross to appeal to me, even more so is the idea of a merely personal {33} God. I believe with all my heart the Teaching of the Catechism that "God is a spirit, infinite, eternal and unchangeable" [7]; but to say that God is a kind of person because a person is a kind of spirit, is considerably more ridiculous than saying that man is a kind of insect because insects eat cabbage-leaves. If we were to take the liberty of changing the splendid catechism definition to "God is a person, infinite, eternal and unchangeable", it would seem to me to be a contradiction in terms; for a person, in the only sense

[7] Editor's note: Prior is here quoting from the answer to the second question "What is God?" of the Short Catechism of the Westminster Confession.

in which I can understand the word, is an isolated, finite, individual being; possibly "eternal", but I would like to think not; and ever changing and adapting himself {34} to his altering surroundings.

God is not a being. I cannot, then, imagine God to be a literally personal being, because to take such a description literally would be to put unjustifiable limitations on God's nature; and for the same reason, I am rather inclined to think that God is not a "being" at all. If my first assertion savours of Nestorianism, my second doubtless savours of Atheism; but let us consider the matter for a moment more deeply. We are all, I think, too apt to look at God in a "shallow" way instead of a "deep" way – to search for God in immediate Causes instead {35} of in ultimate Causes.

This tendency is a relic, natural enough, of times when immediate Causes were unknown, and God was supposed to be directly responsible for natural phenomena. It was wondered, for instance, how the stars were kept in place; and the only answer that could be given was, "God keeps them there". Modern science has taught us that they are kept there, not by God, but by the Law of Gravitation. This should not lessen our reverence for God, but should rather increase it; for in the light of this new knowledge we see that God is not a mere immediate Cause like us, but is to [be] found somewhere beyond immediate Causes. The laws of {36} Nature hold the stars in place, but how do the laws of Nature always remain true? What preserves the harmony of Nature, and prevents the universe from becoming a lawless Chaos? Like Causes, we are told, invariably, produce like Effects, but how is this so? How do events follow one another in any case? How does time pass? Why doesn't it stop? How do things exist, and continue to exist? How do we be?

That, to my mind, is where God comes in. Generally speaking, God is not a Cause producing an Effect, but without God Causes would not be effective – things just wouldn't happen. Not only that; but without

God, things just wouldn't be. Thus God is not so much a Being {37} himself, as the Source and Fount from which all Being ceaselessly flows. God is not a being because He is right above and behind and beyond all being and all understanding. We would cease to exist without God, and we would cease to understand anything without God, but God Himself we cannot understand. It is easy to say what God is not; but nobody can say what God exactly is. These crude "pictorial descriptions of God", as Einstein calls them, must be dropped; they are an anachronism a relic of the most primitive idolatry, and a standing insult to the Divinity. As Shelley says "The deep truth is imageless" .[8] Yet, though any definite description or qualification of God would limit Him unjusti-{38}-fiably, there are certain vague and highly suggestive terms such as "spirit", "beauty", "love", which can be without irreverence applied to God, and by juggling around a little with these words we can find out a surprising amount about the Divine nature.

God is a Spirit

"God is a Spirit and they that worship him must worship him in spirit and in truth." (John 4:24)

When I was a boy at Sunday school, another boy, on being told that God is a spirit, said "Huh! Something like alcohol, I suppose?" I know he only meant to be funny, and will probably be damned for it, but here is something we can learn from his words for all that. For there must be some reason why St. John described God in the same term in which we {39} describe the most accursed of all drugs; and the reason, I think, is this Alcohol is called the spirit of wine because it is the essential principle without which all the sugar, water, fruit, etc. would be valueless. In like manner, the spirit or soul of man is that part of him without which all his limbs, body, muscles, etc. would be a mere useless mass of flesh.

[8] Editors' note: From Shelley's Prometheus Unbound (2.4.115).

And, to carry the analogy further, God, the Cosmic Spirit, is that deep essential something which alone gives Nature meaning, purpose, reality, beauty and life. And to say that this Spirit is simply an enlarged model of the spirit or soul of man is almost as childish and as blasphemous as to say that God is a concentrated form of the spirit of wine. {40}

God is Love.

St. John came nearer the mark than any other man has done when he wrote that "God is Love". For Love, in the noblest and truest sense of the word, is no more passion that sets a human heart or two being quicker, but is a mighty power which not only moves all Being but draws and binds all Being together, and makes of Nature one stupendous and united whole. Love imperfect moves to unity; Love perfect is unity itself. The world about us is full of diversity and even discord, but I feel – nay, I know, and I know that this is true even if all else is delusion – that behind and beyond it all, down at the heart of all Being, there lies a perfect Unity, a perfect Harmony, and infinite Beauty and an infinite Love, that is God.

{41} Here I may say that God may be very aptly compared to a personal spirit because the Unity of God amid the diversity of His world is effected in the conscious unity of our own personality amid all the diversity of our bodily functions. What complicated creatures we are, to be sure! – and yet we are each conscious of being but One personality. And in like manner is God One amid all the diversity of His world. After all, mere negatives and abstract terms leave the average man quite cold; he needs some idea of God that he can more easily grasp, and in the comparison of God with a Person he seems to find just what he requires.

{42} We must not, however, forget that it is only a comparison, and while realizing its aptitude we must also remember that it is by no means without faults. For instance, Personality implies, among other

things, distinctions and differences between separate finite individuals, while God is the infinite Love and which is beyond all distinctions and differences and makes all Nature One.

"Beloved, let us love one another for love is of God and everyone that loveth is born of God, and knoweth God.
"He that loveth not knoweth not God; for God is love.
"In this was manifested the love of God toward us, because that God sent his only begotten son into the world, that we might live through him.
{43} "Herein is love, not that we loved god, but that he loved us, and sent his Son to be propitiation for our sins.
"Beloved, if God so loved us, we ought also to love one another.
"No man hath seen God at any time. If we love one another, God dwelleth in us, and his love is perfected in us.
"Hereby know we that we dwell in him, and he in us, because he hath given us of his spirit.
"And we have seen and do testify that the father sent the Son to be the Saviour of the world.
"Whosoever shall confess that Jesus is the Son of God, God dwelleth in him, and he in God.
"And we have known and do testify the love that God hath to us. God is Love and he that dwelleth in love dwelleth in God and God in him." {44} (I John 4:7-16)

God is Trinity.

As Father, Son and indwelling Holy Spirit are all three mentioned in the foregoing passage, it would be as well to say a few words here on the subject of the Holy Trinity. Apart altogether from the way in which I have shown what many may call the cloven hoof in my treatment of the personality of God, those whom I profess to support to wit, the most

strictly orthodox Christians – may well complain that my ideas on the Absolute Unity of God seem to conflict with the orthodox doctrine of the Holy Trinity. It must be remembered, however, that the Christian Trinity is also a Unity – God is not merely Three, but He is Three in One. The very {45} essence of the Christian Trinity is that its three members are not separate beings, but are One God. In fact, the Nicene Creed, upon which the orthodox doctrine of the Trinity is founded was expressly formulated to combat the heresy of one Arius, who denied the unity of God by maintaining that at one time only the Father existed, and at some definite moment in the past He created the Son out of Nothingness — a preposterous assertion indeed! The Nicene Creed runs thus!

> "We believe in one God, the Father Almighty, maker of all things, both visible and invisible; and in one Lord, Jesus Christ, the Son of God, begotten of the Father, only begotten, that is to say, of the substance of the Father, God of God and Light of Light, very God of very God, begotten, not made, being of one {46} substance with the Father, by whom all things are made, both things in Heaven and things on earth; who for us men and for our salvation, came down and was made flesh, suffered and rose again on the third day, went up into the heavens and is to come again to judge the quick and the dead, and in the Holy Ghost, the Lord and giver of life, who proceeded from the Father and the Son, who with the Father and Son is worshipped and glorified, who spake by the prophets."[9]

The three members of the orthodox Christian Trinity are one substance, co-existent and co-eternal, and no good Christian Trinitarian can deny the basic unity of God. Yet all this, I know, only shows that the orthodox Trinity conforms to my postulate of the Unity of God; and if I am to maintain my claims as a champion of strict orthodoxy, I {47} must show also that my own ideas are definitely Trinitarian.

Well, it seems to me obvious that the idea of Trinity is a very fundamental one in Nature – all things that are really worth our consideration

are trinities of some sort. And the natural form of nearly all these fundamental Trinities is that each consists of two extremes and that which unites them. We see this, for example, in the great natural Trinity of Time, in which the Past, and the Future are connected by the Present; and in the great ethical Trinity of Good, Bad and Indifferent. We see it, to in the Hindu Divine Trinity or Trimurti in which the one Supreme God Ishvara has three aspects — the Creator (Brahma), the Destroyer (Shiva), and, working in betweenthese two extremes, the {48} Preserver (Vishnu). And I believe that the Christian Trinity is also of this nature, consisting as it does of the God without us (the father), the God within us (the Holy Spirit[10]), and the God who perpetually unites and reconciles the two (the Son or Word).

So far I have dealt principally with the aspect of God we call the Father – the perpetual source of all being and all understanding though Himself above and beyond all being and all understanding. Later on in this paper I will have occasion to consider the working of God's grace in the hearts of His creatures – the spark of divinity which He permits to shine in some men – an aspect of God that we call the Holy Spirit. And, finally, there {49} is the Son, who brings the created world into perpetual contact with its Creator, and through whom a fortunate few are actually brought into mystical union with God.

We are all too prone to think of the Son solely as he was in the flesh incarnate in Jesus Christ – we are all to prone to forget that the human being called Jesus Christ, wonderful as He was, was but a temporary embodiment of the Son, and that the Son was in existence long before Jesus Christ the Man was ever born – in fact, long before the world was first created, unless (and this, I may say, is a high probability) the world has existed from eternity. As the term "Son" has come to mean to so many merely the "incar-{50}-nate Son", it might be better to call this aspect of God, as St. John did, the Word (Logos). There has been a

[10]Editors' note: Prior has crossed out 'the Son' and instead written only the Spirit.

great deal of argument among theologians as to what St. John meant when he wrote,

> "In the beginning was the Word, and the Word was with God, and the Word was God.
> "The same was in the beginning with God.
> "All things were made by him; and without him was not anything made that was made.
> "In him was life; and the life was the light of men.
> "And the light shineth in darkness, and the darkness overpowered it not." (John 1:1-5)

but it seems to me plain enough, firstly, that St. John was referring to the {51} influence through which God maintains the world's existence and through which the imperfect, finite, material world is kept in perpetual contact with its infinite, perfect and purely spiritual father and Creator; and secondly that, since St. John employs the term "Word", this influence can be nothing more nor less than the expression of God — as one commentator has it, "the eternal Interpreter of the Nature of God." God not only transcends the world, but He is immanent in it, and inseparable from it — as Schleiermacher puts it, God without His world would be a "phantasm", and the world without God a "chaos"; and the aspect of God which is not so much "above and behind and beyond all being" as in and through all being — God {52} perpetually expressing and revealing Himself in and through His Creation – is what we call the Son or Word, or sometimes the Divine Reason, the Divine thought or the Divine Wisdom – all figurative terms, of course, and apt ones, but none, I think as apt as the simple one "Word", if we take it to mean "expression".

Before leaving this aspect of our subject, I wish to level a shot at the late Dr. Robert Bridges, who attempted to "improve" the Bible by rendering the above-quoted splendid opening of St. John as, "In the begin-

ning was Mind, and the Mind was with God, and the Mind was God." This sort of thing — this presumptuous and idolatrous degradation of the divine nature by identifying God with the principle of human {53} intelligence — plainly gets my goat. It appears that Voltaire's equal remark about man "creating God in his own image" holds true even in this enlightened age; for not only do we find plays being written in all earnestness in which God is represented as a "kindly old negro who smokes 10-cent cigars", but we find the mathematical physicist Jeans informing that God is a "Great Mathematician"[11], and we are symbols in his equations, and such crude parodies on the Bible as the one quoted above from Dr. Bridges highly praised by no less renowned a scientist than Sir J. Arthur Thomson. For my part, I would have it plainly understood from the start that my reverence for God is too great for me to tolerate such {54} travesties of truth as these men shamelessly propound.

III. DIVINE PROVIDENCE

"Behold the LORD, O my soul. O LORD my God, thou art very great; Thou art clothed with honour and majesty.
"Who coverest thyself with light as with a garment: who stretchest out the heavens like a curtain:
"Who layeth the beams of his chambers in the waters: who maketh the clouds his chariot: who walketh upon the wings of the wind:
"Who maketh his angels spirits; his ministers a flaming fire:
"Who laid the foundations of the earth, that it should not be removed {55} for ever.

[11] Editors' note: This is quite likely a reference to the English physicist, astronomer and mathematician Sir James Hopwood Jeans OM FRS (1877-1946). Several of Jeans books are part of Prior's Ideal Library.

"Thou coveredst it with the deep as with a garment: The waters stood above the mountains.
"At thy rebuke they fled; At the voice of thy thunder they hasted away.
"They go up by the mountains; they go down by the valleys Unto the place which thou hast founded for them.
"Thou hast set a bound that they may not pass over; That they turn not again to cover the earth.
"He sendeth the springs into the valleys, Which run among the hills.
"They give drink to every beast of the field: The wild asses quench their thirst. {56}
"By them shall the fowls of the heaven have their habitation, Which sing among the branches.
"He watereth the hills from his chambers: The earth is satisfied with the fruit of thy works.
"He causeth the grass to grow for the cattle, And herb for the service of man: That he may bring forth food out of the earth;
"And wine that maketh glad the heart of man, And oil to make his face to shine, And bread which strengtheneth man's heart.
"The trees of the LORD are full of sap; The cedars of Lebanon, which he hath planted;
"Where the birds make their nests: As for the stork, the fir trees are her house.
"The high hills are a refuge for the wild goats; And the rocks for the conies.
"He appointed the moon for seasons: {57}
The sun knoweth his going down.
"Thou makest darkness, and it is night:
Wherein all the beasts of the forest do creep forth.
"The young lions roar after their prey, And seek their meat from God.

"The sun ariseth, they gather themselves together, And lay them down in their dens.
"Man goeth forth unto his work And to his labour until the evening.
"O LORD, how manifold are thy works! In wisdom hast thou made them all: The earth is full of thy riches.
"So is this great and wide sea, Wherein are things creeping innumerable, Both small and great beasts.
"There go the ships: There is that leviathan, whom thou hast made to play therein. {58}
"These wait all upon thee; That thou mayest give them their meat in due season.
"That thou givest them they gather: Thou openest thine hand, they are filled with good.
"Thou hidest thy face, they are troubled: Thou takest away their breath, they die, And return to their dust.
"Thou sendest forth thy spirit, they are created: And thou renewest the face of the earth.
"The glory of the LORD shall endure for ever: The LORD shall rejoice in his works.
"He looketh on the earth, and it trembleth: He toucheth the hills, and they smoke.
"I will sing unto the LORD as long as I live: I will sing praise to my {59} God while I have my being.
"My meditation of him shall be sweet: I will be glad in the LORD.
"Let the sinners be consumed out of the earth, And let the wicked be no more. Bless thou the LORD, O my soul. Praise ye the LORD. (Psalm 104)

The Universal Providence of God — In the foregoing psalm — one of the noblest poems in the literature of the world, and perhaps the most wonderful passage in the Bible — God is hailed by the Psalmist as being

figuratively or literally, the direct and immediate Cause of all the phenomena of Nature. Modern science leads us to think that God plays a deeper part in the workings of Nature, for it teaches us that all natural phe- {60} nomena are the logical and necessary effect of natural Causes – all the events that occur in Nature are linked up by science into one vast and ordered chain of Causes and Effects following one another with perfect mathematical precision according to unchanging natural laws. But it is a grave mistake to think (as some do) that such a picture as this leaves no room for God in the Scheme of Things, or reduces Him to a mere blind mechanism. For perfect consistency is surely the first thing we should expect of the very Spirit of Perfection; and what's more, we could hardly expect it of anything else. Therefore I say that the great Order and Necessity and Law by which the Universe is governed, so far from eliminating God from {61} the Scheme of Things, is perhaps our surest indication of God's universal power and Providence. Without the underlying Unity that is God, Nature would be turned from a Cosmos to a Chaos, for unless the harmony of things is perpetually maintained by God, there is nothing to prevent the universe from going along just anyhow — in fact, unless is behind it all the time, there is nothing to prevent it stopping altogether. To my mind, then, what the scientists call the Uniformity of Nature – the great law by which like Causes must universally produce like Effects – is identical with what the preachers call Divine Providence.

God the Source of Good and Evil alike — A noteworthy feature of the Psalm I have quoted is the way in which the Psalm-{62}-ist takes the good with the bad and thanks God for both. There are not many of us who are prepared to do that! Like children who think their parents are constrained to obey the same little rules as they impose upon them, we are most of us all too apt to vainly fancy that God must obey the same moral laws as we must – even when it is perfectly obvious that He is not so tied down, and that the great natural laws of God's workings

often completely disregard all human moral principles. There are indeed some forces and powers in the Cosmos which are definitely sympathetic with our human ideals and aims – it would be a hard world indeed if there were not; but it is childishly vain and presumptuous to suppose (as the Arminians do) that {63} all things happen for the sole benefit of happiness of the human race. Indeed, the Holy Scriptures themselves (or incidentally all Nature as well) tell us that the final end and good for which the Universe exists is not the happiness of God's creatures but the glory of God. The stars move in their courses, the seasons pass in endless cycles, clouds and storms sweep over the face of the earth, living creatures are born only to "die and return to their dust", life marches on from one level to another, all according to natural laws which for the most part are only remotely connect[ed] with human ideals and moral principles, but the very fact that things happen, and exist, is an unceasing testimony to the power and glory of God.

In view of the recent earth-{64}-quake at Hawkes' Bay, New Zealand, certain Christian thinkers have tried to explain these catastrophes by attributing them to "blind mechanical forces", and only acknowledge God's sovereignty in the realm of the human soul. They take as their authority such a passage as the following —

> "And, behold, the LORD passed by, and a great and strong wind rent the mountains, and brake in pieces the rocks before the LORD; but the LORD was not in the wind: and after the wind an earthquake; but the LORD was not in the earthquake: "And after the earthquake a fire; but the LORD was not in the fire: and after the fire a still small voice. .... Said, Why art thou here, Elijah? {65}

A convenient way, this, of avoiding certain rather distasteful conclusions: but I cannot believe it. No, there is no such thing as a "blind, mechanical force" in all Nature; and the same Divine Providence, the same Law and Order and Uniformity, that decrees that Spring shall ever follow Winter and day night, also decrees that earthquakes must always

follow certain underground volcanic disturbances. Even the disasters are a part of God's great plan. This view is confirmed by God Himself, who is supposed to have said to Isaiah,

> "I am the LORD, and there is none else, There is no God beside me: I girded thee, though thou hast not known me:
> "That they may know from the rising of the sun, and from the west, That {66} there is none beside me. I am the LORD, and there is none else.
> "I form the light, and create darkness: I make peace, and create evil: I the LORD do all these things. (Isaiah 45:5-7)

Predestination.

If the laws of Nature are unchangeable, then it naturally follows that the Destiny of the universe is fixed from eternity — a conclusion which many people dislike as savouring of "fatalism". Some object, "But surely God has the power to break His own laws if He so chooses?" In the first place, I do not think He ever would choose to do so; as I have said, perfect consistency is the first thing we should expect of the very Spirit of Perfection; and in any case the Scriptures assure us that God {67} is not only infinite and eternal, but *unchangeable*.

> "Every good gift and every perfect gift is from above, and cometh down from the Father of lights, with whom there is no variableness, neither shadow of turning." (James 1:17)

But even supposing that God did choose to break His own laws by some sort of miraculous intervention would that take away the "fatalism"? Not a bit of it. For from the Absolute nothing of past, present or future – is hidden – in the sight of God events are set in time as surely as material objects are located in space – and God must have foreknown

and predetermined the miraculous intervention from eternity, and the destiny of the Universe is as fixed and certain as ever. {68} Well might Shelley cry

> "Necessity! Thou mother of the world!"[12]

IV. NECESSITY IN MAN

> Throughout these infinite orbs of mingling light,
> Of which yon earth is one, is wide diffused
> A spirit of activity and life,
> That knows no terra, cessation, or decay;
> That fades not when the lamp of earthly life,
> Extinguished in the dampness of the grave,
> Awhile there slumbers, more than when the babe
> In the dim newness of its being feels
> The impulses of sublunary things,
> And all is wonder to unpractised sense:
> But, active, stedfast, and eternal, still
> Guides the fierce whirlwind, in the tempest {69} roars,
> Cheers in the day, breathes in the balmy groves,
> Strengthens in health, and poisons in disease;
> And in the storm of change, that ceaselessly
> Rolls round the eternal universe, and shakes
> Its undecaying battlement, presides,
> Apportioning with irresistible law
> The place each spring of its machine shall fill;
> So that when waves on waves tumultuous heap
> Confusion to the clouds, and fiercely driven
> Heaven's lightnings scorch the uprooted ocean-fords,

[12] Editors' note: Prior does not provide a reference for this quote which is from Shelley's *Queen Mab 12* (VI) 198.

Whilst, to the eye of shipwrecked mariner,
Lone sitting on the bare and shuddering rock,
All seems unlinked contingency and chance:
No atom of this turbulence fulfils
A vague and unnecessitated task, {70}
Or acts but as it must and ought to act.
Even the minutest molecule of light,
That in an April sun-beam's fleeting glow
Fulfills its destined, though invisible work.
The universal Spirit guides; nor less,
When merciless ambition, or mad zeal,
Has led two hosts of dupes to battle-field,
That, blind, they there may dig each other's graves,
And call the sad work—glory, does it rule
All passions: not a thought, a will, an act,
No working of the tyrant's moody mind,
Nor one misgiving of the slaves who boast
Their servitude, to hide the shame they feel,
Nor the events enchaining every will,
That from the depths of unrecorded time {71}
Have drawn all-influencing virtue, pass
Unrecognized, or unforeseen by thee,
Soul of the Universe! eternal spring
Of life and death, of happiness and woe.
Of all that chequers the phantasmal scene
That floats before our eyes in wavering light,
Which gleams but on the darkness of our prison,
Whose chains and massy walls
We feel, but cannot see. (Shelley, "Queen Mab"[13]).

[13]Editors' note: From Part VI of Queen Mab.

Necessity in the Human Mind. — It is my firm and unshakeable belief that this Order, this Necessity, this Providence which governs all of outer Nature, prevails equably in the realm of human mind. We are indeed perfectly "free" to choose our course of action on any particular occasion, but there is invariably {72} a Reason why we choose as we do, and in no other way – our choice (and consequently our action) is always the logical and necessary result of some Cause. The way in which we choose to act is determined by the prevailing motive in our mind at the time, and what that strongest motive is, depends upon what our experience has taught us, upon our inherited nature, and upon circumstances in general. As Einstein says, 'Everything is determined, the beginning as well as the end, by forces over which we have no control. It is determined for the insect as well as the star. Human beings, vegetables and cosmic dust, we all dance to a mysterious tune intoned in the distance by an Invisible Piper."[14]

There is only one way of getting out of this, and that is by saying that our will, {73} our choice, is not determined by a motive or reason. This may not seem such a horrible conclusion at first sight, but let us look into it further and see what it implies. It implies that in the realm of the human mind Causes do not produce logical and inevitable Effects — that there is a certain amount of chance or caprice about the way events follow one another in the human mind. It implies that though there may be motives, the active part of the human mind is indifferent to them — it can override the strongest motive. And it implies that the Will determines its own course for no reason at all— that the will is not a faculty by which we make logical choices according to our lights {74}, but is a blind, irrational and unnatural impulse. This belief, incidentally was actually held by the pessimist Arthur Schopenhauer, and has been revived in recent years by Henri Louis Bergson, who applies the enticing term creative to actions performed independent of any guiding motive

[14]Editor's note: Clark, R.W., Einstein: The Life and Times, Avon, 2001, p. 422.

or reason. What a lot of irresponsible maniacs we must be, to be sure, if these people are right!

But I, for one, do not believe they are. I believe that there is a Reason for all our choices and actions — that all our actions are the logical and necessary outcome of Causes; and further — a thing we should be careful never to forget – are themselves Causes which produce their logical and necessary effects on our lives and on the lives of others. And the very fact that {75} Causes and Effects are seen to follow one another in the realm of human mind with the same perfect mathematical precision as in the realm of outer Nature, is but a further testimony of the Universal power and Providence of God. Not only the sequence of the seasons, the occurrence of earthquakes and other vast natural phenomena; not only the motion of every atom and speck of dust, but every human thought and action, "good" or "bad", is predetermined by God and must play a necessary part in the working out of His unfathomable Plan and Purpose.

The Selfishness of Man. Whatever our actions are, they are part of God's great Scheme of Things, and some use, some good, must come of them; that, however, reflect no credit on us, but {76} solely on God. So far from earning credit by our "works", it may well be said that eternal perdition is our just lot. As St. Paul says,

> There is no righteous, no, not one.
> There is none that understandeth, there is none that seeketh after God.
> They are all gone out of the way, they are together become unprofitable, there is none that doth good, no, not one.
> Their throat is an open sepulcher: with their tongues they have used deceit the poison of asps is under their lips.

Whose mouth is full of cursing and bitterness:
Their feet are swift to shed blood:
Destruction and mercy are in their ways,
And the way of peace have they not known.
{77} "There is no feat of God before their eyes. (Romans 3:10-18)

This sort of round denunciation of the whole human race I used once to think quite unfair, but I am now able to see that there is a great deal in it. For man, whether or not he can be fairly described as inherently corrupted and depraved, is certainly completely devoid of merit, for everything he does is done in his own interests – his every action is performed with his own ultimate satisfaction and advantage consciously or unconsciously in view.

Of course, people have different ideas of what is going to be to their own advantage — and consequently act differently. Each one of us has his own Sense of Values, determined by {78} his part experience, his inherited capacity or incapacity to learn by that experience, and circumstances in general. Some people, for instance, know no higher satisfaction than that derived from material gain or sensual pleasure, and the search for these constitutes the prevailing motive in their lives. Others, again, place Fame or Praise or Popularity above all other pleasures, and devote their lives to the pursuit of these things. Others, again, look upon all earthly things as naught and live in the hope of winning a "Crown" or a "Mansion" in a substantial heaven after death. And this last motive is no less selfish than the others. There are people, indeed, who do good "for its own sake"; but that is only another way of saying that these {79} people find the greatest satisfaction in the sheer joy of doing good.

Sometimes this endless search for satisfaction takes a negative form — the prevailing motive in some people's lives is not so much the desire for physical pleasure as the fear of physical pain; not so much the desire for material gain as the fear of material loss; not so much the desire for Fame or Praise as the fear of disgrace; not so much the hope of a man-

sion in Heaven as the fear of the fires and dungeons of Hell; or not so much the love of good "for its own sake" as the hatred of evil "for its own same" — but in all cases it comes to the same thing; everyone is really seeking his own ultimate satisfaction, and all our motives are selfish at heart. {80} Even if someone were to come to me and say, "Well, just to show you that I have a free will and can act against my own interest, I shall now proceed to do something I intensely dislike doing, and, moreover, something which cannot possibly bring me a 'celestial mansion' or other compensation — it is obvious that such a person, though he may not realise it, is expecting other compensation, in the form of the satisfaction he hopes to derive from demonstrating his supposed free will, which at the moment outweighs his distaste for what he proposes to do. No, true disinterestedness is a thing of which man is by his very nature incapable; and the very fact that man expects pleasure — that the hope {81} of pleasure is the basic motive for all his actions, good and bad – excludes him from deserving it.

SALVATION AND PERDITION

Owing to the basic selfishness of all man's motives and ideals, to the vast majority of mankind Death, the cessation of substantial personal existence, means utter destruction and the loss or perdition (Lat. "perdere" – to lose) of all that seems to them worth having. In a fortunate few, however, the interplay of Causes which constitutes God's Grace and Providence may conspire to produce the Effect we call Salvation, in which they lose themselves in such close {82} conscious union with God that God's life becomes identified with their life ("the shed blood of Christ flows in their veins," as it is picturesquely put by some) and partaking as they do of His eternity, the cessation of their individual existence becomes a matter of no moment to them. That, at least, is my idea of Salvation, and I think it is based on good scriptural authority. That the essence of Salvation is the loss off the "death", as it is often put — of the

individual Self, with all its petty personal conceits and fears and desires and aims, in the mystic union with the Deity, is insisted upon both by Christ, who said that "He who would find his life must lose it,"[15] and by St. Paul, who tought {83} that our old Self must be "crucified" with Christ "before we can partake of Christ's immortality:

> "Know ye not, that so many of us as were baptized into Jesus Christ were baptized into his death?
> Therefore we are buried with him by baptism into death: that like as Christ was raised up from the dead by the glory of the Father, even so we also should walk in newness of life.
> For if we have been planted together in the likeness of his death, we shall be also in the likeness of his resurrection:
> Knowing this, that our old man is crucified with him, that the body of sin might be destroyed, that henceforth we should not serve sin.
> For he that is dead is freed from sin.
> Now if we be dead with Christ, we {84} believe that we shall also live with him:
> Knowing that Christ being raised from the dead dieth no more; death hath no more dominion over him.
> For in that he died, he died unto sin once: but in that he liveth, he liveth unto God.
> Likewise reckon ye also yourselves to be dead indeed unto sin, but alive unto God through Jesus Christ our Lord. (Romans 7:3-11 (sic)[16])

"Election"— Salvation, like everything else, is the logical and necessary result of some Cause — in fact, of a chain of Causes going back through an Eternity of time. As Calvin says, "We were elected from eternity,

[15] Editor's note: See Matt 10:39

before the foundation of the world."[17] The imme-{85}- diate Cause of Salvation may be one of a number of things – it may be, for instance, the eloquence of a Salvation Army lassie; or the impressive atmosphere of holiness which pervades certain religious services; or simply a quiet study of the Bible or of God's other great Book, Nature — but whatever the Cause may be, Salvation can only come as the logical and necessary result of some Cause; and the way in which it follows logically and necessarily from that Cause is a manifestation of the Universal Providence and Grace of God. We are "saved by grace" just as everything else in our lives happens by grace. Salvation my seem to come from a "free act" on our part; but if we look deeper we will see {86} that that act was determined by a motive: what our guiding motives are is not in our hands, but rests entirely with God.

> For by grace are ye saved through faith: and that not of yourselves: it is the gift of God
> Not of works, lest any man should boast.
> For we are his workmanship, created in Christ Jesus unto good works, which God hath before ordained that we should walk in them." (Ephesians 2:8-10)

In the above passage as elsewhere, St. Paul minimizes the part played in Salvation by our own works, for after all even our best actions are performed with some selfish end in view, and in any case are really performed by God working through us. {87} On the other hand, he strongly emphasizes the value of faith, because belief in God and in Christ is the first step towards that mystic union with them which constitutes life's greatest crown. Yet we should not regard even faith as a means whereby we bring about our own salvation, for faith is a gift from God, the result of His Holy Spirit working His will in us.

[17] Editors' note: Ephesians 1:4.

The Effects of Salvation— It must not be imagined from the above, however, that St. Paul said anything against good works – his famous "Ode to Charity" (ending "And now remain faith, hope and charity, these three: and the greatest of these is charity") would go far to dispel this illusion; but he taught that belief and then {88} Salvation should be our first cares and good works would then follow naturally – in fact, they would be a test of the depth of our faith. For Salvation is not only the logical Effect of a Cause, but is itself a Cause producing profound Effects. God's grace does not depart at the moment of our salvation, but continues to work in us, transforming, ennobling and glorifying our whole lives. The chain of Causes and Effects which constitutes God's universe is unending, and when it has led up to a person's "salvation" it does not stop there, but goes on; the whole course of his life is altered, and, if his spiritual experience has been deep enough and true enough, he learns to forget Self in service for others; he may {89} even be led to bring others to Salvation and so the Causes and Effects unfold themselves unceasingly.

Yet, though Salvation transforms a man's life, it must not be expected that it immediately makes him perfect. It makes a radical alteration in his Sense of Values, and provides him with a higher motive, leading him to realize that happiness is measured not by what we take out of life but by what we put into it; yet the old motives, the old inclinations, the old impulses, still remain strong, and may often get the better of him, for all his new aspirations. St. Paul himself confessed that he could not always live up to his high ideals, and often found the impulses of his "flesh" too strong for the aspirations of {90} his spirit. But, while acknowledging these frequent shortcomings, I believe and maintain that the influence of true Salvation upon a man's life is too profound for him ever to fall completely from his "state of grace", as the Arminians say he may.

The Part Played by Christ. — The immediate Cause of Salvation may, as I have said, be one of a number of things, but if we go beyond the

immediate Cause and trace further back along the chain of Causation, we will almost invariably be led to the life, teachings and death of Jesus Christ. Christ is, as it were a great central Cause from which Effects radiate in all directions leading to the salvation of countless millions of men. There {91} is a great deal of argument among theologians about the details of Christ's birth – the Cause of which Christ's life was an Effect – but there can be no doubt that Christ's life was itself a Cause which has produced amazing Effects, and shed an ever-spreading light where darkness was before. The beauty of all Christ's life, and perhaps more than anything else, the lonely heroism of His death on the cross, has had the effect of awakening the slumbering religious instincts of multitudes of men, and has more than compensated for the spiritual blindness of thousands.

There has been much discussion among Christian thinkers as to the exact part played by Christ's death in God's {92} great plan to save some of humanity from the spiritual deadness into which mankind has fallen. The early church fathers elaborated a very quaint story about Christ being offered by God to Satan as a sort of ransom for his people, and Satan then being cheated out of both by a piece of rather feeble underhand trickery. Somewhat loftier notions of the Atonement were developed by Anselm and others. The idea of the Reformers – Luther, Calvin etc. were expressed rather crudely, but I think it is in them that we find the truth of the matter enshrined.

Christ's sacrifice was regarded by the Reformers as lifting a curse from humanity — the {93} curse of Sin that was lain upon them when Adam fell. Among Protestants there have been many disputes as to whether Christ died to raise the curse from all humanity, or whether He died only for the "elect". It seems to me obvious that, as a human being, with intensely human sympathies, Christ hoped that His death would be the means of Salvation of all mankind; but that this was not to be – for it is obvious that even after Christ's sacrifice millions have been left to "perish". I am inclined to agree with such very strict Calvin-

ist's as Jonathan Edwards and the Puritan divine John Owen, who hold that Christ was sacrificed to pay the just price of the sins of those whom God had chosen to save; only I pre-{94}-fere to put it this way: The sacrifice of One who so expressed divinity in every act and feature as to be in very truth the incarnate Word of God, was the only Cause which could produce as its just and logical Effect the salvation of even a few of humanity.

Lost Souls.— "A few of humanity" — that is all, so far, that Christ's sacrifice has availed to "save" from spiritual stagnation (though of course the number is increasing all the time). And the rest, the "lost", those who are "left to perish" (which is all that any of us really deserve) – what of them? There are literally millions of them about still, people who are missing the very best that life has to offer. Yet even their condition is the logical and necessary result of some {95} Cause – if we search long enough and hard enough, we cannot fail to find some Reason why they are what they are, and still walk in darkness. It may be that they have not met our eloquent Salvation Army lassie; indeed, they may be natives of a country where God is a name unknown. Or again, it may be that they have been brought up in unfavourably surroundings, or that circumstances of heredity and environment have hardened their very nature against God; but always there is some Reason why they are inevitably what they are. And whatever the Cause of their condition may be, the very fact that that Cause produced its logical Effect is an unfailing testimony to the {96} Order and Harmony of Nature and the Universal Power and Providence of God.

Further, the very fact that some men are saved and others left to perish shows that the salvation and rejection of men alike must play their part in an ordered and harmonious Scheme of Things, the ultimate purpose of which is unfathomable. Some would like to think that those who have "missed the bus" will somehow gain Salvation later on; but this strikes me as an exceedingly unprofitable speculation. For, after all,

it is not for us to make suggestions as to how God should carry out His eternal purposes. Rather let us conclude with St. Paul {97}

> "O the depth of the riches both of the wisdom and knowledge of God! how unsearchable are his judgments, and his ways past finding out!
> For who hath known the mind of the Lord? or who hath been his counsellor?
> Or who hath first given to him, and it shall be recompensed unto him again?
> For of him, and through him, and to him, are all things: to whom be glory for ever. Amen." (Romans 11:33-36) {98}

Alternatives (being an attack on Arminianism on the grounds of reverence)

It is a gratifying feature of the more recent developments of the freewill controversy that supporters of both sides are fearlessly pushing their views to their logical conclusions. William Godwin, Jonathan Edwards, and even the earlier Supralapsarians (Beza, Perkins, etc) developed Calvinism to what they conceived to be its logical extreme, and in the foregoing essay I have attempted to do the same. Calvin taught the "incommensurable awfulness of God", {99} and I have elaborated this feature to such a degree as to say that not only to call God a person, but even to Him a being, is unpardonably irreverent. Calvin taught that man lost his freedom of will after the Fall, and I go as far as to say that human free will is logically meaningless, before the Fall or after. Calvin taught that the Fall itself was decreed, and the corruption of man was its inevitable consequence, I would even say that the corruption of man was itself decreed, and the Fall – if it occurred was decreed as a means to procuring it.

And not only the Calvinists, but even the Arminians, have shown willingness to accept the most extreme {100} conclusions to which their position leads them, and as I have put my own Calvinistic views in the most favourable form I can, it would be only fair for me to say what little there is to be said for my more logically consistent opponents – so far as logical consistency can be found among people who deny the Principle of Causality. The conclusions to which the Arminian position inevitably leads are these:

1) Either God's sovereignty or His foreknowledge is not absolute, or He is not unchangeable.
2) Either there is a certain amount of Chance in the workings of the universe and of the human mind, or the Will is frankly confessed to be an irrational impulse. {101}

The modern Arminians may be divided into two schools.

1) Those who hold that God's control of the Universe is imperfect, and that Change plays a considerable part in Nature's workings. These include H.G. Wells, William James, James Martineau, W. Heisenberg and his school (Sir Arthur Eddington, A.H. Compton and others), and Bishop Barnes.
2) Those who hold either that God does not exist or He is perpetually changing, or even that He is Himself Perpetual Change, and believe in what they call "creative freedom". These include Arthur Schopenhauer, George Bernhard Shaw and Henri Louis Bergson. On the whole these are less orthodox and also less logical than the first school, though their beliefs are often cast in an {102} attractive form.

I do not think any of these Libertarians can claim to strict orthodoxy – even Bishop Barnes. At least two of the ones I have mentioned (James and Martineau) were Unitarians though it must be owned that both of these defend what they consider orthodox beliefs, James even more than Martineau. When I class H.G. Wells among them I am considering his beliefs at the time he wrote "God the Invisible Kind"; since then he has adopted a Rationalistic determinism, which seems to me a more sound position than his first. Bergson is not exactly a Unitarian, but he was born a Jew, and Judaism is but a step removed from Unitarianism. {103}

William James and Chance

The late Professor William James, in his essay on "The Dilemma of Determinism," frankly acknowledges that to believe in Free-will is tantamount to asserting that the universe is largely guided by Chance. He then goes on in an attempt to show how satisfying such a position is. What is behind us, he says, is certain, but in front of us lies a realm of vast possibilities. The determinist holds that all of these possibilities but one are excluded from the beginning of time, but according to James none are excluded until one excludes the other by becoming actual. To put his position in another way, James believes that like Causes do {104} not invariably produce like Effects, but a particular Cause, in a particular set of conditions, may produce a variety of Effects; and indeed events may happen (especially in the realm of the human mind) without any previous Cause at all. For instance, the strongest motive may cause the will to act in a particular way, or it may not; and the will may even act with no motive or reason at all.

The great chasm of this Scheme of Things, according to Professor James, lies simply in this: According to the Determinists, the things that are happening now, and {105} the things that are going to happen in the future, are produced by a chain of causes going right back to the beginning of eternity, and unless the universe had been different right

at the beginning, things could not happen differently from how they do happen — the course of events has been fixed from eternity, and cannot be other than it is; But according to his (James's) scheme, when any great disaster occurs we can take legitimate comfort in saying, "It might have happened otherwise"; and when we commit any particularly foolish act, we can legitimately enjoy the satisfaction of saying, "We might have done otherwise." I cannot help remarking that it seems to me a melancholy sort of consolation. {106}

> "For of all sad words of tongue or pen the saddest are these: "It might have been!" (Whittier "Maud Muller")

James also points out that it adds to our sense of moral responsibility if we know that there was nothing to prevent us from acting in a better way than we did (considering the case of the "particularly foolish action" above-mentioned). He does not, however, point out (as he should) that on his scheme we are given no motive or reason for acting in a better way – if we do act in a better way, we do so blindly.

James only gave this "Chance" of reacting in various ways to the mental and moral {107} part of our nature; he acknowledged that, so far as our studies could show, there was a logical and determined sequence of cause and effect in purely physical occurrences. In 1927, however, an attempt was made by Professor W. Heisenberg of Leipzig, one of the world's foremost atomic physicists, to abolish Causality even in the physical world. Professor Heisenberg has taken upon himself the highly praiseworthy task of dispelling delusions, especially the delusions many people (including some of his fellow-scientists) hold about the Atoms of which all of us are made. He showed in 1925 that many of the difficulties which beset atomic physics at that time could be cleared up by abolishing the then complicated picture of the atom, and {108} describing it instead in terms of the mathematical properties of very simple and fundamental things like "energy" and "change". The idea that the atom was a kind of miniature solar system was shown by Heisenberg

to be pure imagination. And in 1927 he attempted to show that the idea that like Causes invariably produce like Effects is also pure imagination, and has no warrant in physical fact – a conclusion which physicists and also enquiring laymen, have found harder to swallow.

Nevertheless Heisenberg's "Principle of Uncertainty"[18]has met with the acceptance of many prominent physicists, including Niels Bohr, G.P Thomson, A.H. Compton and Sir Arthur Stanley Eddington, of the University of Cambridge, In "The {109} Nature of the Physical World" Eddington asserts that, in the age-long controversy between Free-will and Predestination, Science has turned from the side of Predestination. The natural Laws of science are no longer regarded as rigid and definite, but they can only state probabilities or chances. It is, of course, obvious – and indeed acknowledge – that the Free-will implied in Heisenberg's Principle of Uncertainty is identical with Chance. It may be remarked that Einstein and Dirac and other scientists of high repute deny that experimental results justify the momentous change in our ideas of nature that Heisenberg and his followers suggest. Nevertheless I {110} have mentioned Heisenberg's Principle in order to be as fair as I can to the Arminians, and bring up all the support they can legitimately claim.

Is God Finite.

Such ideas of the universe as those above propounded inevitably lead to a denial of the absolute sovereignty, omnipotence and omniscience of God – and this, be it said to their credit, is no more clearly pointed out than by the Arminians themselves. Even such a pillar of orthodoxy as Dr. Barnes, the Anglican Bishop of Birmingham, frankly says, "We must acknowledge that, in some way, God's control is imperfect. Man, for instance, has a measure of free-will, and among lower forms of life

[18]Strictly speaking, the abolition of Causality is not expressed in the Principle of Uncertainty, but it is an idea deduced from the Principle by the above named scientists. The Principle itself is discussed in "Essays Scientific" pp. 113-9. (Editors' comment: Prior's "Essays Scientific" is also included in this volume.).

what we must regard as imper-{111}- fection, physical or moral, is evident." It is rather remarkable that the same divine who reproached his Primate for not adhering strictly to the thirty-nine Articles[19] with regard to Transubstantiation, should himself directly repudiate in such unmistakeable words the teachings of those same Articles on Predestination. Incidentally, the attitude of the Church of England to this question has always been rather uncertain. The Thirty-nine Articles – the recognized creed of the said Church — seem to insist on the Calvinistic doctrine of Predestination, and on "the impotency of man's will to effect salvation." However, at the Synod of Dort, where Arminianism was adjudged a heresy, Laud and others of the {112} clergymen there representing the Church of England, "bade John Calvin goodnight," and since then there have been many controversies as to whether the Church of England is really Arminian or Calvinistic. Augustus Montague Toplady (1740-1778), the author of the hymn "Rock of Ages," is particularly noteworthy in this matter, having defended the Calvinism of the Church of England against John Wesley.

William James also acknowledges that, if the Libertarian attitude be adopted, God's power and knowledge cannot be as absolute as we had thought, and in "Varieties of Religious Experience" (1909) he wrote, "The line of least resistance .... is to accept the notion .... that there is a {113} God, but that he is finite .... These, I need hardly tell you, are the terms in which common men have usually carried on their active commerce with God; and the Monistic perfections that make the notion of him so paradoxical practically and morally are the colder addition of remote professional minds operating in distance upon conceptual substitutions for him alone." For William James and his followers, the "spirit infinite, eternal and unchangeable" is a mere figment of the "remote, professorial mind", and the true, the living, God is an admittedly finite

[19]Editors' note: The Thirty-nine Articles of Religion, also known as the Thirty-nine Articles, are the doctrines of the Church of England with regard to the controversies of the English Reformation.

being like ourselves – immeasurably more powerful and good than ourselves, it is true, yet a being not literally all powerful and all-knowing, and a being of whom we are quite independent. {114} James's conception of God is, however, immeasurably loftier than certain more recent notions which I shall deal with in a moment. God, according to James, is like a chess player, and the universe is at once his "game" and his "opponent." We creatures have free wills which we can exercise for or against him, and he cannot foresee what is coming next; but when it does come, he is wise enough to meet it with such moves as will bring the universe towards a safe conclusion in spite of it, knowing that "no matter how much it might "zig-zag", he could surely bring it safely home at last."

In times of great disaster this {115} notion of a finite God often has a run of popularity among Christian thinkers. I have mentioned the case of the New Zealand minister (the Rev. E.O. Blamires)[20] who exempted God from all responsibility of the Hawkes Bay earthquake by divorcing Him from the realm of inanimate Nature and limiting His proper sphere to the mind and heart of man. During and after the Great War Christian thoughts ran on much the same lines, and in "God the Invisible King" Herbert George Wells gave a most fantastic picture of the deity as a great "Captain of Mankind", putting up a gallant struggle against the blind and unsympathetic forces of {116} Nature hemming us in all around.

Creative Evolution

It will be refreshing to turn from the above gloomy picture to the ideas of Bergson, but before doing so we must consider the dark pessimism of Arthur Schopenhauer, who thought that the Will is not only independent, but is the very source and cause of all existence – and consequently of all misery. According to the cheerful philosophy of Schopenhauer, the whole world is a snare and delusion, brought into being, and kept in existence, solely by Will. Neither reason, cause nor motive can control

[20] Editors' note: Ernest Oswald Blamires (1881-1963) was a New Zealand clergyman.

this thing Will, which over-{117}-rides them all. This sort of "freedom", of course, cannot be attached to moral responsibility, nor does Schopenhauer say that it can – the Will which he believes governs the universe is conceived as a blind and irrational but irresistible impulse.

There are few today who would follow Schopenhauer in his pessimism, yet the ideas underlying his metaphysics are the basis of the great modern philosophy of "Creative Evolution", elaborated by Henri Louis Bergson and by George Bernard Shaw. G.K. Chesterton has persistently described Shaw as a "Puritan" – a description that is inappropriate in at least one way. For while the real "Puritans" were the most rigid of Calvin-{118}-ists, Bernard Shaw is an advocate of Free-will. Yet he does not accuse Calvinism of being "unreasonable", indeed, he actually takes a pride in the fact that his own view is unreasonable – for real life, he says, is essentially opposed to reason. That is just what Schopenhauer said, only while Schopenhauer concluded "so much the worse for Life", Shaw concludes, "So much the worse for Reason." Shaw and Bergson both defend Free-will by treating reason as a faculty essentially imperfect.

Reason teaches us that, though changes occur, they occur according to principles which do not change – that for all the ever-changing appearances {119} there must be some basis that is permanent. But Bergson maintains that nothing is permanent, and indeed that Change is one name for the fundamental Reality. Another name for this Reality is Duration, or Time; but by this Bergson does not mean "Time" in the ordinary sense. "Time" for Bergson is not just a sort of imaginary background against which events take place, but is rather, as H. Wildon Carr puts it, "an unceasing becoming, which preserves the past and creates the future."[21]

The great fact about this Reality is that it is Creative — it is not constrained to follow any pre-established harmony or order, but creates

[21] Editors' note: Carr, W.H., Henry Bergson: The Philosophy of Change, 1911, p. 15.

new and ever-changing modes of action as it goes on. Another {120} great fact about it, through which this creative power is alone conceivable, is its continuity. The faculty of Reason is necessarily analytical, and that, according to Bergson, is why it leads us astray. Reason breaks up the course of time into a series of successive "states", each of which follows logically and inevitably from the one preceding it – a succession of Causes and their necessary Effects. From this point of view, Bergson acknowledges that we must regard the universe as unalterably determined; but what, he asks, if Time is so essentially continuous that it cannot be legitimately broken up into antecedents and consequents, Causes and Effects? Then, he says, Creative {121} Freedom and Creative Evolution is possible – the universe moves onwards and upwards and ever changes as it moves, regardless of rigid laws.

And what is true of the Universe as a whole is true of every one of its parts. If we analyse our mental being into a succession of states, each of which follows logically from the preceding one, determinism is inevitable; but if our thought and action cannot legitimately by so analysed, then "creative freedom" may be possible. Yet Bergson himself admits that this means nothing more than the power to do the unpredictable – the power to add to the course of events something that was not contained in it before. It is ad-{122}-mitted not a rational freedom – it does not mean the power to perform reasoned acts without reason, for such a power is a plain contradiction in terms – but merely means that in all things there is an impulse, the élan vital, or Life-Force as Bernard Shaw calls it, which leads to actions essentially new and unpredictable. That is what "freedom" means to Bergson; and as such you may take or leave it – although, reader, I would strongly advise you to leave it.

Arminianism is essentially irreverent

I have pointed out the more obvious disadvantage of the above system while outlining them; now to deal with them more fully, one by one.

{123}

William James had a persuasive habit of appealing to our sense of moral fitness – to what we would "like to think" is the true explanation of the facts we have to face. He himself did not like to think, that all the disasters and moral failures in the world were bound to happen from eternity, and preferred to attribute them to the uncertain vagaries of Chance. Meeting him on his own ground, I too appeal to our sense of moral fitness; and it does not seem to me a fit or pleasant thing to believe that God has ever, in the smallest degree, abandoned the Universe to blind Chance; I like to think rather that even the disasters and moral failures are fulfilling some {124} inscrutable purpose in an ordered and harmonious Scheme of things.

I appeal, too, to our natural sense of reverence for the divine, which is violated by all these Arminian ideas. Perhaps I am cursed with a "remote, professorial mind", but to me God as a "Spirit infinite, eternal, and unchangeable" is a mental and spiritual necessity. A God who is not in all things Supreme, whose sovereignty and foreknowledge is not absolute, does not seem to me worthy of worship, and to say that the true God is not all-powerful and all-knowing seems to me, to say the least of it, highly irreligious. A small boy might well be reproved for making such a statement as "God's control is imperfect", but when it comes from the pen of a Bishop of the Church of {125} England, it makes me wonder what is happening to the Christian religion.

Yet such an assertion inevitably follows from the belief in man's independence in will or in deed, and Bishop Barnes at least deserves the praise for carrying his belief to its logical conclusion. If man is really an independent being, God's absolute sovereignty must be denied. And if, as James, Heisenberg and others assert, the course of events is essentially uncertain and largely haphazard God's "timelessness" – that is his perfect knowledge of past, present and future as if they were all present – must be denied. And if Bergson and his followers are right in saying that {126} the fundamental Reality is Change, the unchangeableness of

God is also challenged.

To this some may well ask, "Well why should not God change if he wants to? Let me refer you, good friend, to Charles Haddon Spurgeon's sermon on "The Immutability of God." As Spurgeon points out, "If God is a perfect being, he cannot change. Do you not see this? Suppose I am perfect today, if it were possible for me to Change, should I be perfect tomorrow after the alteration? If I changed, I must either change from a good state to a better – and then if I could get better, I could not be perfect now – and or else from a better state to a worse – and if I were worse, I could not be perfect then If I am perfect, {127} I cannot alter without being imperfect. If I am perfect today, I must keep the same tomorrow if I am to be perfect then. So if God is perfect, he must be the same, for change would imply imperfection now, or imperfection then" — and God's perfection is surely the mainstay of our faith.

Let me repeat here the argument I have already advanced against the idea that God may really change in my essay on "Predestination". If God ever appears to depart from a set order of things, He, being all-knowing, must have foreseen his departure, and therefore His purpose has remained unaltered. In fact, the "timelessness" of God inevitably involves His "change-{128}-lessness". There is no getting away from it – Free Will in any shape or form, be it the Bergsonian variety or the "orthodox" Arminian, inevitably leads to the grossest irreverence. Even the Mohammedan with his Kismet, the Brahinan and the Buddhist with their Karma, do fuller justice to the greatness and glory of God than does the average Arminian Christian.

My Own Creed

Calvinism, as opposed to Arminianism, seems to me the only form of Christianity which can satisfy our truest and deepest religious feeling – to wit, our sense of complete dependence on God for everything in our lives – nay, for existence itself. For this reason I am willing to subscribe

{129} to all the written doctrines of Calvinism, except in so far as they err on the side of moderation; but for the sake of those who are repelled by the crudeness of expression of many of these written creeds, I have endeavored to put my own beliefs in more acceptable language, in the following Confession of Faith. I believe that

> God is a Spirit, infinite, eternal and unchangeable, above and behind and beyond all being and all understanding; yet in Whom, and through Whom and from Whom all being and all understanding ceaselessly flows.
> From the Divine, that is, from the Absolute, point of view, change, and the passage of time itself, are illusions, and events are set in time {130} as fixedly and as surely as material objects are located in space. From the Divine or Absolute point of view there is no distinction between Past, Present and Future.
> This perfect certainty applies as much to events in the realm of human mind as to events in the realm of outer nature. Our every thought and action was certain, necessary and inevitable from the beginning.
> Sin and selfishness are inherent qualities of all men, and this leads the vast majority of them to a state of mind in which the loss of the individual self can mean nothing but utter destruction and perdition.
> Yet a rare and fortunate few have (mainly through the labours of one Jesus of Nazareth) learnt to find happiness by losing their individual {131} selves in close and conscious union with God, so that the cessation of their individual existence is of no moment to them, since they partake of His eternity."

— this is a mystical idea which I have found hard to put into words, but the "rare and fortunate few" will know what I am talking about. But to continue.

"This experience, called Salvation, come to people through no merit of their own – for none of us have any merit of our own – but is simply one of the events that is fixed and certain from the beginning.
"And lastly, since this entire Scheme of Things, with its fixed and certain events, salvation and destruction and all – since it all eternally proceeds from God, {132} it is an unceasing display of the greatness and glory of God, and the glory of God is in fact the very end and purpose for which its existence is maintained."

And finally, just in case anyone should still accuse me of heterodoxy, I shall repent of the above creed, translating its clause by clause into the older terminology. I believe, in other words, that

God is a Spirit infinite, eternal and unchangeable immeasurably and unalterably awful, and is the maker and sustainer of all things.
From eternity He hath ordained and decreed all things that come to pass according to the unalterably purpose and counsel of His will.
Even all the works of Man hath {133} he decreed and ordained from eternity.
Man himself is become corrupt, depraved and sinful, and worthy of nothing but utter destruction and death.
Yet God in His infinite mercy hath elected and called a remnant to salvation, that they may have eternal life in Him through Jesus Christ.
Nor is it of their own will or through their own works that these are saved, but solely through the bountiful grace and providence of God,
Who hath foreordained this and all things unto His eternal glory.
Amen"

Not a bad little effect, eh what?

Well, everything in this book I mean perfectly seriously – though I confess I have licked my lips with a grin in penning some passages.

A.N.P.

{136}[22]

4 Addenda

p. x – xi. I must confess to a great deal of sinful Pride about that fine blustering, bigoted Preface, but I must confess to one little weakness. I am indeed prepared to "damn" an even greater proportion of humanity than Calvin did – but only by first taking all the "sting" out of damnation, and making it a merely subjective affair. We all come to the same end the cessation of personal existence – but while to the "damned" that means utter destruction and loss, to the "saved" it means nothing worse than a "release", to the "damned" the cessation of existence is an unpleasant ending, but to the {137} "saved" such selfish cases are unknown. After all, no less a Puritan than Milton, and no less a Muhammedan than Omar Khayyam, have subscribed to the belief that the worst Hell is in the mind – that is, it is subjective.

p. 46. In connection with the Trinity, there is told in the Life of St. Francis of Assissi (whom Einstein, a "mystical atheist", regards as one the three purest, noblest and wisest of mankind) the story of the visionary trances of Friar John of Alvernia, "among the which times, he was one night so elevated and rapt in God that he beheld in Him, the Creator, all created things, both celestial and terrestrial, {138} and all their perfections and grades and separate orders. And then he clearly understood how everything represented its Creator, and how God is above, and within, and outside and beside all created things. Thereafter, he

[22] Editors' note: The pages 134 and 135 appear to have been torn out.

discerned one God in three Persons, and three Persons in one God, and infinite charity which caused the Son of God to become incarnate in obedience to the will of the Father. And, finally, he perceived, in that vision how that there was no way whereby the soul could go to God and have eternal life, save only through Christ the blessed, who is the Way, the Truth and the Life of the soul."

A rather beautiful and simple summary of the nature of the Christian doctrine of the Trinity. {139}

p. 98 and many others. It has been remarked that while condemning the idea of a personal God I myself use the personal pronoun when speaking of Him. This is in no way a "recantation" on my part, but is simply due to the imperfections of our language. We have no pronoun to express that which is more than personal, and so, rather than use a pronoun such as "It" which would imply that I regard God as something less than personal, I make use of the traditional pronoun "He".

p. 132 and round about there. In these pages I have given my own creed, first expressed in my own works and then in the diction of the orthodox. I maintain that it contains the es-{140}-sentials of the Calvinistic creed, and lest anyone should still have the temerity to doubt this, let me repeat the most prominent articles in that creed, as given in the "Westminster Confession of Faith":

"The Decrees of God are His eternal Purpose according to the Counsel of His will, whereby for His Own Glory He hath foreordained whatsoever comes to pass.

"By the decree of God, for the manifestation of His glory, some men and angels are predestined unto everlasting life, and others are foreordained unto everlasting death.

"These angels and men, thus predestinated and foreordained, are particularly and unchangeable designed, and their number is so certain and definite that it can neither be increased nor diminished." {141}

Once deny that God's sovereignty extends even to this – that the whole universe, the will of man included, is bound by God's laws as

in chains of iron – and the Scheme of Things would seem to me to be reduced to a Chaos, and God to a helpless puppet.

It might be of interest here to tabulate the various views held at different times by leaders of the Christian Church on the subject of predestination and election. First, we have St. Augustine (354-430 A.D.) who taught that

1) Adam was created in the image of God, perfect, sinless, free.
2) Upon his Fall his free will was taken from him, and he and all his descendants (who, since they were in a sense a {142} part of him, shared in his Transgression) became utterly corrupt, depraved, sinful, helpless, unable of themselves to will or to do any good thing.
3) But God in His infinite mercy has chosen a few out of this fallen humanity, whom He will let His grace so work as to effect their salvation.
4) The rest of mankind he will "pass over" and leave to perdition.

Opposed to Augustine was Pelagius, whose tenets were that

1) Men are born in the same state in which Adam was created. Adam's sin affected himself only, and his guilt is not imputed to his descendants.
2) Human nature is not depraved, nor is sin hereditary. Man has the power not only to sin, but to perceive, and to will, {143} and to do that which is good.
3) Therefore man is capable of procuring his own salvation by a proper use of his unborn power.

The semi-Pelagians attempted to reach a mean between the doctrines of Pelagius and Augustine. They held that Man by a free act takes his

first step towards salvation, but all further progress is due to the grace of God. The discussions of the subject in the Middle Ages were largely philosophical, and need not here concern us. The theological discussion was revived by the Reformers. Martin Luther (1483-1546) was a strict Augustinian, but his follower Philip Melanchthon (1487-1560) held somewhat milder views. He taught that salvation could only come by the grace of God–God alone supplied {144} the "means of salvation", but Man, by a purposed act of his own, had to avail himself of those means. This is at present the orthodox doctrine of the Lutheran Church. Much stricter views were held by Jean Calvin (1509-1564), who taught that Man's salvation can only be effected by the grace of God, and that this grace is

1) Irresistible – Man is powerless to resist the workings of God's grace.
2) Selective – God's grace falls only upon a certain chosen few – chosen from no merits of their own (for all men are utterly corrupt and only worthy of damnation) but chosen simply according to God's good pleasure.
3) Permanent. Once a man is saved he is saved, and God's grace never turns back. If a man seems to have "fallen {145} from grace", it is because he never had God's grace in the first place.

With regard to the cause of man's present depravity, the Fall of Adam, Calvinists are of distinct views. There are

1) Infralapsarians, who hold that the Fall was foreseen and permitted by God, but not divinely decreed.
2) Sublapsarians, who admit that the Fall was decreed by God, but still maintain that Adam was created with a free will, and that the present state of man is the punishment of a free act on Adam's part.

3) Supralapsarians, who hold that the Fall was decreed, and decreed for the very purpose of bringing man to his present state; and Adam had no free will from his creation. Ulrich Zwingli (1484-1531) held this view, {146} but he did not regard the consequence of the Fall as so very terrible, and thought that pious pagans would be saved as well as Christians.

The first noteworthy opponent of Calvinism was Jacobus Arminius (1560-1609), who taught that

1) God has elected or rejected men from the beginning of time, but this predestination is not absolute, i.e. solely dependent on God's good pleasure, but is conditioned by his foreknowledge of our conduct.

2) Man's actions are thus foreknown but not decreed by God. They are "decreed" by ourselves — we are free agents who accept or reject the grace God offers.

3) God's grace is offered to all, and we are all at liberty to receive it how we will — it is neither irresistible nor se-{147}-lective, Later Arminians went further, and maintained that its effects were not necessarily permanent.

In fact, as time went on Arminians went to extremes of which Arminius himself would have been appalled. They taught that God created the world and man and then retired into the background, leaving man to save himself from perdition as best he could. This doctrine was repudiated by the distinguished Arminian John Wesley (1703-1791) who taught that Man works out his own salvation, with the assistance of God's grace. At about the same time an extreme form of Calvinism was propounded by Jonathan Edwards (1703-1758) who taught that

1) The idea of free-will is logically {148} meaningless. The inevitable sequence of Cause and Effect is at work in the mind of man as surely as in the physical universe.

2) Free-will is just as meaningless for Adam as for us. Adam was created sinless, but not free, and after his fall he and his descendants lost his original saintliness, but freedom of will he never had to lose.

3) The sequence of cause and effect is inevitable and necessary even in the thoughts and deeds of God Himself.

Here, I may say, I break from Edwards; for to my way of thinking, God is the source of all existence, and the source of all the order of existence – the logical sequence of Cause and Effect is something that proceeds from God, not something to which God Himself is subject. ... Ave Atque Vale!

Essay Scientific*

(Sept. - Oct. 1931)

by

Arthur N. Prior

Dedicated to Uncle Dick[1]

And other "enquiring laymen"

Who will not understand it

{ii}

*Editors' note: This text has been edited by Julie Lundbak Kofod, Jørgen Albretsen, and Peter Øhrstrøm. In the transcribed text, page numbers are placed where the text on that page starts, put in curly brackets: {xxx}.

[1]Editors' note: Uncle Dick is Richard Cronhelm, a carpenter of Irish background, married to Arthur's aunt Constance (née Prior). The word "enquiring" suggests that his uncle displayed a friendly interest.

Author's Preface

The only part of science which this booklet touches is the higher Physics — modern Field Physics and Atomic Physics. Field Physics is its principle subject, with particular reference to the theories of Albert Einstein. Out of 141[2] pages (not including the biographical appendix) 9 are on Einstein's theories of space and time. I strongly doubt whether those 9 notebook pages will suffice to make clear to an ordinary layman the essential points of theories which have taken the world's best scientists years to elaborate. My father[3] has pointed that one needs to study a subject fairly fully to get a reasonable grasp of it, and a "condensed" treatment of any subject is usually {iii} difficult to follow. However, I have done as well as I can.

The Theory of Relativity is essentially a mathematical one, but I have left mathematics out of my essays so far as is possible. With the algebra involved in Einstein's theories I am only vaguely familiar myself, but I find the geometry fairly simple; so the mathematics that enters into these essays is largely geometry. Einstein claims that the theories are purely physical and mathematical, and not philosophical, but most philosophers do not agree with him. The ideas expressed in the following essays are little more "philosophical" than those propounded by Einstein, so I shall leave the reader to judge for himself whether or no[t] Einstein's claim is {iv} justified. Personally, I think his views on the fixity of events (an extreme form of determinism) though having a firm basis in physics and mathematics, are highly philosophical; also the views of the relativists on the ultimate nature and destiny of the Universe.

In writing the Essays, I made them as up-to-date as I could at the time, but I have found it necessary to make an important Addendum, one of

[2]Editors' note: The total number of pages in the notebook is 154. Prior also wrote "My Ideal Library" (12 pages) which is dated earlier than the present text i.e. 1.8.31.

[3]Editors' note: Norman Henry Prior, had a medical background.

Einstein's theories appearing after the Essays had been written. This Addendum should be read after the Relativity essay.
For the idea of my essay on "Sweet Nothings" I am indebted to an article by Dr. P.R. Hayl on "The Perspective of Modern Physics", though my arrangement and treatment of the[4] subject differs much from his.

A.N. Prior

[4]Editors' note: something has been crossed out here.

Contents

{1}

On Relativity

Science today has moved a long way from the dogmatic materialism of last century; and in fact the "orthodox philosophy", as it were, of present-day physical science is rather a highly abstract idealism. So far from reducing all things to Matter or Force, modern science seems to teach us that Matter and Force have no objective existence. This radical change in the scientist's point of view was wrought principally by Albert Einstein; but his work was to a {2} large extent foreshadowed by that of the great Austrian philosopher and physicist, Ernst Mach[5] (1838-1916).'

Mach, a follower in many respects of Germany's great idealist philosopher Immanuel Kant (1724-1804), drew attention to the fact that the things with which the scientists of his day concerned themselves were by no means such certain and substantial realities as they were popularly supposed to be. After all, he pointed out, we have no direct knowledge of the real, objective world around and about us — all our "knowledge" is a knowledge only of subjective sense — impressions, of what we have seen, heard, felt, smelt, etc., and the amount of {3} certain knowledge that the senses can bring us is after all very little.

The world that a dog "knows", for instance, is very different from the world that a man "knows" — it is a world with a lot less to be seen and a lot more to be smelt, and there are plenty of other differences, too. And both the dog's world and the man's world are but "worlds of appearances", built up of mere sense-impressions and for all we know quite different from the real, objective, outer world. We are completely shut off from reality by what might be compared to a "dome of many-colored glass"; how much light the glass lets through, and how much it keeps back, and how much delusion it adds {4} by reason of its own nature, its "colour", we can never find out — or not in this life, anyway.

Yet science has found a way to get a fairly definite indication of what is real and what is illusory, and it is based on this fact: Upon things which depend solely on the nature of the senses — on the colour, as it were, of the dome of glass that imprisons us — different observers

[5]Editors' note: For further reading consult https://plato.stanford.edu/entries/ernst-mach/

will disagree; but where we find universal agreement among different observers, we may take it that we are touching basic fact. Those things which depend upon the observer and his point of view are termed relative, and those which are independent of the observer and his point of view are termed absolute. Briefly, what Einstein has done in his Theory of Relativity is to {5} show us that the things we deal with in daily life and in many of the sciences — things like Motion, Force, Matter — are merely relative things, and our idea of them varies with our point of view; while absolute reality is quite different from the world of our senses — which, after all is only to be expected. If we just remember this, that the world we are accustomed to is after all but a world of sense-impressions, and that the deeper reality that Einstein is seeking is probably quite a different sort of thing, I think we shall find his more startling conclusions easier to accept.

I. THE SPECIAL THEORY

Absolute Motion — The little trouble {6} between Brother Einstein and Father Time that we call the Theory of Relativity, was all started by that arch-mischiefmaker Absolute Motion. The earth, you see, is moving round the sun at 19 miles per second; the sun with all its planets is approaching a certain distant constellation at 12 miles per second (or else the constellation is approaching us at 12 miles a second — it all depends how you look at it); further, we have evidence that the entire stellar system or galaxy is rotating, and is moving rapidly away from other stellar systems (unless, of course, they are moving rapidly away from us). Amid all this chaos of movement, it may well be asked what is our real motion, our Absolute Motion, our motion through empty space? Is {7} there any way of determining such Absolute Motion?

If the air is calm, the strength of the apparent "wind" that we feel when we move through it gives a measure of our speed; might there not be something in outer space akin to our atmosphere, whereby we might measure our, absolute speed? During the last two centuries or so there grew in the minds of scientists the belief that space beyond our terrestrial atmosphere and in between atoms of matter, was not empty, but was filled with a substantial plenum ("filling") or medium, somehow akin to matter and called the ether. Professor James Clerk Maxwell[6]

[6]Editors' note: Prior writes "Clerk-Maxwell".

gave us a highly satisfactory mathematical description of the ether last century, {8} in which he accounted for light and other radiations as electromagnetic undulations or waves in this ether or field. Maxwell's description of the ether was purely mathematical, and it probably would have been much better if it had been left at that; but, following the custom of his day, Lord Kelvin tried to supplement it with a mechanical picture of the ether, endowing it with a most amazing structure of whirling vortex rings. Professor Osborne Reynolds elaborated an alternative "picture" of the ether as consisting of countless closely-packed corpuscles, like a mass of grains of sand; and other theories were elaborated by scientists of less repute.

The important fact to realise, {9} however, is that upon this hypothesis of a substantial "filling", if the earth is moving through the ether at a particular speed, the speed of light (i.e. of waves in the ether) propagated from the earth will appear greater or less than normal, according to the direction of the earth's motion through the ether; and the apparent difference in the speed of light when propagated from the earth in various directions would be a measure of the earth's absolute velocity. As soon as our methods of measurement were sufficiently accurate, attempts were made to determine the earth's absolute motion by making use of the above facts. The name of Professor Albert Abraham Michelson (1852-1931) of Chicago is {10} particularly noteworthy in connection with the elaboration of extremely accurate methods for determining the velocity of light propagated in various directions; and in the historic Michelson-Morley experiment, the apparatus used was so accurate that an absolute velocity of 1 km. per second could be readily detected.

The surprising result of this experiment was to show that the speed of light was absolutely the same, whatever was the direction in which it was propagated, and the earlier "absolute velocity" was consequently nil. The supposition that the ether was "carried round" by earth in its motion was definitely excluded by the experiments of Sir Oliver Joseph Lodge, which showed that the ether, if it existed, was in a state of {11} absolute rest, being in no way disturbed by the matter moving through it; so the only conclusion that could be drawn from the Michelson Morley experiment was that the ancients must have been right after all, when they told us that the earth was fixed in the centre of the universe and all the heavens revolved around it. However, Professor Hendrik Antoon Lorentz in Holland, and, independently, Fitzgerald in England, showed

that Michelson's results could be satisfactorily explained by supposing that passage through the ether caused a very slight contraction in all matter, so that the slight variation in the length of Michelson's measuring instruments just compensated for the slight variation in the velocity {12} of light, so that there appeared to be no variation at all. Lord Raleigh showed that if such a contraction occurred it could be measured by electrical methods, and the "absolute velocity" then found. He and others attempted to determine the earth's "absolute velocity" by working on these lines; but again a null result was obtained.

The simple solution of the very difficult problems arising from these results came in 1905 at the hands of Albert Einstein, then an obscure inspector of patents at Berne, Switzerland, 26 years of age. In this he formulated his famous Principle of Relativity, which states that the idea of "Absolute Motion", i.e. motion of material bodies relative to (empty) {13} space, is intrinsically meaningless, the motion of material objects can only be measured relative to other material objects. That is, if I'm walking along the corridor of a train, it may be quite correct to say that I am moving at 4 miles an hour relative to the floor of the train, or 34 miles an hour relative to the surface of the earth; but it is just nonsense to say I am moving with any speed relative to empty space. Stated like this, the Principle seems to be but a natural expression of observed facts; but it becomes a little more startling if we state it another way: Einstein's Principle, by taking away space as the absolute standard to which all motion can be ultimately referred, makes motion merely one of those rela-{14}-tive, illusory things that depend for their existence on the observer's point of view, and when we come to consider real things, absolute things, it makes no difference whether we regard any given material object as being in a state of rest or in a state of motion. This is the general Principle which naturally follows from the results of the Michelson-Morley experiment; for a few years, however, Einstein restricted his work to a consideration of the identity of a state of rest with a state of uniform motion in a straight line.

The Special Theory of Relativity — The concept of motion is the connecting link between Space and Time; and any juggling with the idea of motion is then bound to affect our ideas of the relationship between Space and {15} Time. The precise way in which this relationship was affected by the Principle of Relativity was worked out in the 3 years

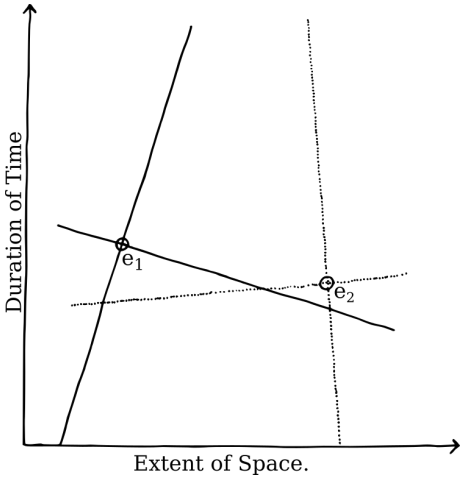
following 1905, in conjunction with Einstein, by Professor Hermann Minkowski (1864-1909) of the University of Göttingen, one of the most brilliant mathematicians that Poland has produced. Briefly, the theory they worked out was to this effect: Any body in space is, by the principle of Relativity, entitled to call itself at rest, i.e. moving through time only, and to say that all other bodies are in motion relative to it. But another body in motion relative to the first, is also entitled to say that it is at rest, and the first body is in motion, i.e. moving through space as well as time. Thus what is pure time to one body is a mixture of space and time to another, so {16} space and time are themselves but relative conceptions, and varying aspects of some deeper reality, called Space-Time, in which they are indistinguishably united.

A very useful way of depicting the course of events in space and time is to make use of a graph, in which one co-ordinate, say the vertical represents duration of Time, and the other, extend of Space. Of course this only gives a limited representation of Space, for real Space would require three co-ordinates, corresponding to the three spatial dimensions length, breadth and height. However, we must let that pass. On such a graph as this, the motion of bodies moving through time (as all bodies do) will be represented by approximately {17} vertical lines; these were termed by Minkowski the world lines of the bodies in question. If a body is at rest, its world line will naturally be absolutely vertical; but if it is moving through space as well as time, its world line will be inclined from the vertical at an angle depending on its "absolute velocity" in space.

But here lies the rub — for Einstein insisted that the idea of "absolute velocity" is devoid of real meaning. Any body in the whole wide world may be taken as being at rest, and all other bodies as moving relative to it. That is to say, on our graph, we may take any world-line at all as being "vertical" and adjust all other accordingly. Our idea of what is "vertical", i.e. {18} of the way in which Time is flowing, depends entirely upon what particular object we take as our "reference-body". We can tilt a box over so that what was once its height is now partly its width; and in like manner we can tilt our graph over so that what was once purely temporal durations is now partly spatial. The difference between time and space becomes no more absolute than that between right and left — we only have to "turn round", as it were, and the whole nature of the relationship between time and space is altered.

This confusion might best be illustrated by an example. Let us consider the case of two stars, A and B, moving towards one another with uniform velocity in a straight line. On the graphical scheme above indicated, their world-lines will be represented by {19} two straight lines inclined to one another at an angle depending on their relative motion. Let us consider events, E_1 and E_2 occurring on the stars A and B respectively. Now an observer at A, considering (as he is perfectly entitled to do) that his star A is at rest and its world-line vertical, will say that all events simultaneous with E_1 are represented on the straight line perpendicular to A's world-line at E_1. As is seen from the accompanying diagram, this straight line cuts the world-line of B at a point representing some time previous to the occurrence of E_2. An observer at A, in short, would say that the event E_1 happened before the event E_2.

But what would an observer at B have to say on the matter? Considering (as he too is perfectly entitled to do) that his star B is at rest, and its world-line {20}



perfectly vertical, he will say that all events simultaneous with E_2 lie on the line perpendicular to the world-line of B at E_2. As is seen in the diagram, this line cuts the world-line of A at a point representing some time previous to E_1. An observer at B, then, would say that E_2 happened before E_1. Yet we have just seen that an observer at A would say that E_1 happened before {21} E_2! And moreover, it would be quite possible to depict a third observer in between the two, to whom the events E_1 and E_2

would seem to be happening simultaneously. Which of the observers is right? According to Einstein, all must have equal claims, and the notion of distinction between Space and Time varies with the point of view. Because motion is merely relative, space and time themselves are merely relative — "mere shadows", as Minkowski says.

But Einstein and Minkowski were not content with reducing space and time to shadowy figments of an observer's brain — they were out to find something real and objective behind this world of illusory appearances, some-{22}-thing upon which all observers, whatever their state of motion, would universally agree. So long as we confine our attentions to uniform motion in a straight line, it may readily be seen that all observers will draw the same picture on a graph such as ours in which space and time are inseparably conjoined (although they may disagree as to which aspect of the picture should be called temporal and which spatial). In the words of Minkowski's memorable statement at Cologne in 1908, "Henceforth space and time in themselves sink to mere shadows, and only a kind of union of the two preserves an independent existence".

Space-Time, Events and Causality — Our little graph was a surface, a two dimensional continuum,[7] in which one dimension represented space and the other {23} time. But as pointed out at the start, real space has three dimensions; and consequently the background of reality, Space-Time, is not simply a surface, but a continuum of four dimensions — length, breadth, height and duration of time. If this union of time and space is to be complete, units of temporal duration and of spatial extend must be interchangeable and we should be able to say, for instance, how many "feet" these are in a "second". This has actually been worked out, but it involves mathematics of a highly abstract kind. One second of time, we are told, is equivalent to the length travelled by light in a second, multiplied by the square root of minus one. This last is not a numerical quantity, for no number will {24} give minus one when multiplied by itself — as every schoolboy knows, all perfect squares (of numbers) must be positive. $\sqrt{-1}$ is not even an irrational number, like $\sqrt{2}$ or $\sqrt{3}$, but it is what Sir William Rowan Hamilton termed a "right

[7] Editors' note: Prior has "continiuem" here.

versor".[8] However, there is no necessity for the laymen to go into details in this aspect of the subject, and we will pass on to another idea connected with Space-Time.

The fundamental occupants of Space were supposed to be material bodies; but these manifestly will not serve as fundamental occupants of Space-Time. We cannot conceive of the objective existence of a pure point (without any dimensions at all), or of a pure straight line (with neither width nor thickness) {25} or of a pure surface (without thickness); and in the light of Einstein's theory it is equally impossible to picture the existence of a "pure solid body", without duration added to its three other dimensions. A solid, to exist at all, must exist for some amount of time. The fundamental occupants of Space-Time must have temporal duration added to their three spatial dimensions; and their position in space-time must be fixed, not only by reference to the three spatial dimensions, but also by reference to the duration of time. They must not only be "some-where"; and the concept "material object" does not take this into account. You might say "Where is a banana?", but you could not say "When is a banana?" {26}

This requirement is fulfilled by the concept "event", for of an event you can say both "Where did it occur?" and "When did it occur?" Consequently events are the fundamental things in the world of Einstein and Minkowski. Events are to space-time what solid objects were to space. And just as, at any moment of time, all the material particles in space have a definite, fixed location, so do all events have a definite, fixed location in space-time. Of course, the location of material particles may change as space moves through time; but there is nothing through which space-time can "move", and events are fixed once and for all. As we have seen in connection with our two stars A and B, what is future for one observer is past for another {27} — events which one observer is laboriously and hazardously predicting, to another observer have already "happened".

I put the word "happened" in inverted commas because when we realise that events are simply "there" all the time, the idea of "happening" has no counterpart in absolute truth. "Events do not happen — we simply come across them", as Einstein himself puts it. And Eddington, "The past and future may be regarded as lying mapped out — as much

[8] Editors' note: See https://archive.org/stream/in.ernet.dli.2015.165707/2015.165707.A-Source-Book-In-Mathematics-Vol2_djvu.txt.

available to present exploration as the distant parts of space. Events do not happen; they are just there; and we come across them. 'The formality of taking place' is merely the indication that the observer has on his voyage of exploration passed into {28} the absolute future of the event in question; and it has no important significance." Eddington tries to avoid this conclusion, but such an idea of events leads inevitably to a doctrine of unalterable Necessity, such as Einstein has expressed in these famous words: "Everything is determined, the beginning as well as the end, by forces over which we have no control. It is determined," he adds, "for the insect as well as the star. Human beings, vegetables or cosmic dust, we all dance to a mysterious tune intoned in the distance by an invisible player."

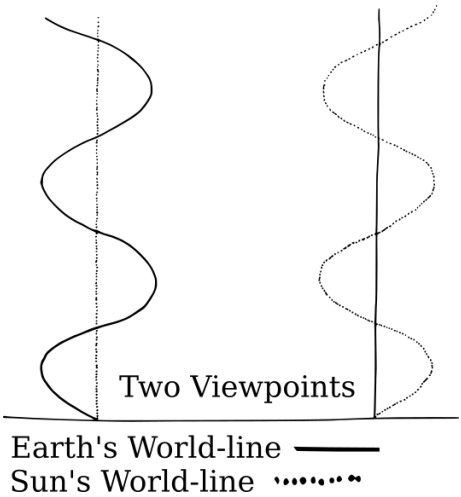
According to "extreme relativists", the "occurrence" of events is a purely subjective affair — simply an impression {29} made on the observer — and not a part of absolute reality; and the same applies to the passage of Time. From the Absolute point of view, Time is not something that passes or flows, but is merely an aspect of a fixed entity Space-Time. The idea of the passage of Time is just one of our many delusive sense-impressions (from the point of view of physics at least) and even the distinction between past and future is treated by Einstein as a mere "convention based on light-signals." A strange picture indeed, but we must not forget the distinction that exists between the impression we receive and the real things that make them — the distinction between Relative and Absolute. {30}

II. THE GRAVITATIONAL THEORY

The General Theory of Relativity — The earlier work of Einstein, undertaken in conjunction with Minkowski, is known as the Special Theory of Relativity, because he then confined his attention to one special type of motion, to wit, uniform motion in a straight line. Later, in his General Theory of Relativity, which was not completed until 1915, Einstein considered motion subject to curvature and acceleration (Acceleration, incidentally, is really included in the term curvature, because the world-lines of bodies whose motion is subject to acceleration will be curved in the direction of Time). In considering the Special Theory, we have seen that when two bodies are in steady motion {31} relative to one another, we find that observers on both bodies agree as to the picture of space-

time, though they may differ as to what aspect of the picture is temporal and what spatial. But what happens to the picture of Space-Time when we consider such an instance as the motion of the planets round the Sun?

In the time of the wise old ancient Greeks, astronomers made the earth this "reference-body", and depicted all the heavenly bodies, the sun included, as moving around it. If they had known anything about Minkowski and Einstein and Space-Time, they would have depicted the earth's world-line as a vertical straight line, and the sun's as a spiral twining around it. In these degenerate days, however, it has been found convenient to {32}



make the Sun our reference-body — to depict the sun's world-line as a vertical straight line, and the earth's as a spiral. Now can these two views, by any stretch of the imagination, be regarded as but different aspects of one and {33} the same picture? For what the ancient Greeks (true "earth-dwellers" as they were) called a straight line, we moderns, (behaving like observers on the sun) call a spiral, and vice versa. To an observer on the Sun, the terrestrial observer's idea, not only of Space, but of Space-Time, would seem a hopelessly bent and twisted travesty of his own.

But Einstein said No! and insisted that the network of world-lines which constitutes the universe must be the same to all observers. For this to be so, every world-line must be of the same nature — either all

world-lines must be "straight", or they must all be curved in the same way. Einstein postulated that they are all geodesics which is simply a broader term for "straight", and implies that every world-{34}-line is "the shortest distance between two points." But if the established geometry of Euclid's is sound, we only have to consider the earth's motion around the sun to see that the above statement is manifestly untrue. The earth's path is certainly not what Euclid would have called "the shortest distance between two points" — or if the earth's path is, then the sun's path cannot be.

Einstein soon perceived that the only way out of this dilemma was to deny that Space-Time is Euclidean, and to say that in the neighbourhood of the Sun the geometry of space is such that the shortest path the earth can take — "the shortest distance between two points", so far as the earth is concerned, — is {35} what we call its circular orbit. If we are going to regard all the world-lines as "straight", then their apparent twists and turns can only be accounted for by saying that there must be something extremely queer about the geometrical properties of some parts of Space-Time (and consequently of that aspect of Space-Time we call Space). Euclid's geometry does not allow for such peculiarities and variations and consequently Einstein abandoned Euclid's geometry in favour of a more general system devised last century by Georg Friedrich Bernhardt Riemann (1826-1866), of Göttingen.

Riemann's Geometry is an extension of the "Theory of Surfaces" and {36} propounded by Johann Karl Friedrich Gauss (1777-1855), also of the University of Göttingen; and the variations that Riemann worked on Euclid's Geometry are likened to the effects produced by Curvature on the properties of a surface. If we consider the surface of the earth, we know that, if it were flat, the "shortest distance between two points" on it would be a Euclidean straight line; but that, as it happens, the earth's surface is curved, and the "shortest distance between two points" on it is the minor arc of a "great circle" lying between the points. We may likewise suppose that Space-Time is curved through higher dimensions, and these "bumps" in higher dimensions prevent the earth from moving {37} in a straight line. We must not, however, take this compassion too literally, for if we wished to explain the earlier orbit in this way, we should have to suppose that space is curved in no less than six dimensions totally unknown to us. While the idea of curvature in higher dimensions is an excellent aid to the imagination, in practice it

is best to consider space-time as a continuum of four dimensions only, but with non-Euclidean properties, (which can be expressed by mathematical symbols without reference to curvature at all).

By this time the reader may have already realised that the geometrical modification of Space which occurs in the neighbourhood {38} of massive bodies is nothing more nor less than what has been called since the time of Isaac Newton the Force of Gravitation. What Newton ascribed to a mysterious force he called Gravitation, Einstein has now explained as a simple geometrical peculiarity of Space. When he came to formulate in detail the effect of this geometrical peculiarity upon massive bodies, he reached a law practically identical with Newton's Law, but differing appreciably from Newton's law in a few extreme cases. Where experiment has been possible in connection with these cases, Einstein's law has invariably been verified.

One such extreme case is the planet Mercury, the fastest-moving {39} body in the solar system. Its orbit has always been a thorn in the side of the older theory, because of a slight but totally unaccountable deviation from Newton's law. The motion of Mercury, however, conforms perfectly to Einstein's law. Another slight difference is in connection with the bending of light rays near massive bodies; this was studied at the solar eclipse of 1919, and Einstein's predictions were fully verified. From then onwards his theories have been regarded with respect, and have received wide acceptance.

A Finite yet Unbounded Universe — Einstein's General Theory of Relativity dealt only with local deviations from Euclidean geometry, produced by local massive bodies. In 1916 {40} he came to consider how this effect spreads from each body through the whole of space (though it is felt in diminishing degrees as it recedes from the body, for, as Newton demonstrated, gravitation is approximately inversely proportional to the square of its distance from its source); and how space is "gathered up", as it were, by all the gravitating masses of the universe acting together. This led him to abandon the classical idea of a "finite yet unbounded space, running into itself in all directions."

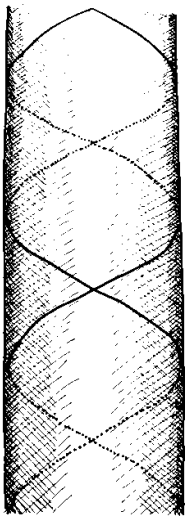
This sort of space is difficult for us to imagine, especially when we are accustomed to the geometry of Euclid. But we may get a fair conception of Einstein's "finite yet un-{41}-bounded universe by again imagining space-time to be curved in higher dimensions than those of which

we are sensible. We may compare the classical idea of an infinite space to an infinitely extending plane, and Einstein's space is produced by the curving round of this plane to form a spherical surface. Space is boundless in the same way as a ring of rope is "endless", and a spherical surface has no edge. We cannot bring against Einstein's space the argument "if space is finite, what is outside it is still space", because there is no boundary to space and therefore no "outside". If we go on and on indefinitely in a straight line in any direction, we will not come bump against a brick wall or anything like that to mark the {42} boundary of space; but if we go far enough we will find ourselves back at our starting-point, just as we may if we travel round the surface of a sphere.

Many years before Einstein's time a similar conception of space had been elaborated by Riemann, but whereas Riemann's "spherical" or "spheroidal" space was merely a mathematician's fancy, Einstein's idea of such a space was founded in physical facts. Einstein had reduced gravitation to a geometrical peculiarity of space in the neighbourhood of massive bodies; and the finitude of space was, as it were, one big geometrical peculiarity due to the totality of gravitating masses in the cosmos. The more matter, the more "curvature", and the smaller space becomes. Given the amount of {43} matter, the size of space is at once fixed, and consequently the mean density of matter in space. Again, given the mean density of matter in space, we can find the size of space and the amount of matter in it. This calculation was made in 1926 by Dr. Edwin Powell Hubble (b. 1889), of Mt. Wilson Observatory, who found from astronomical data that the mean density of cosmic matter is 1.5×10^{-31} gms. per c.c., from which he calculated that the radius of spheroidal space is 84000 million light-years, and the amount of matter in it, 10^{57} grams.

Before considering de Sitters rival universe, let us see what space-time becomes under Einstein's cosmology. Real space is a peculiar entity which "runs into itself in all directions; if we abstract one dimension, we can {44} mentally picture it as a spherical surface; abstract another dimension, and we are left with a "finite but endless line", that is a circle. As this moves in the direction representing time, it generates an infinitely long cylinder. It will be later found useful to consider the way in which light travels in this "cylindrical" space-time. Waves or ripples of light originate at some point in space and travel further and further outwards (in all directions) as time goes on. On a surface represent-

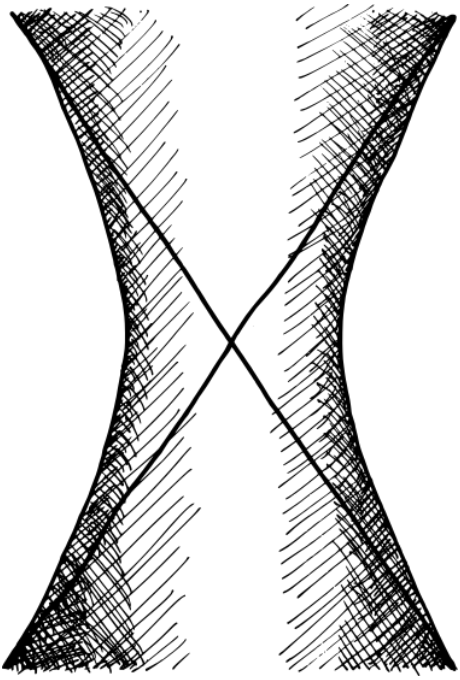
ing space-time this spreading of light-waves is represented by two {45} straight lines diverging from the point of origin. These are called the "light cone". It will be seen that on Einstein's cylinder these diverging lines meet again on the "other side".



Thus on Einstein's cosmology, not only space in the usual sense, but even the light cone (which represents the space we see) is finite, while time is infinite. This at once undermines the "fundamental corner-stone of relativity" — the absolute identity of space and time. According to Einstein, within the universe we can make an absolute distinction between space and time, but if we could get right outside space and time we would see that they were different, the one being finite, and the other infinite. As {46} Weyl puts it, Einstein's universe is not so much "4-dimensional" as "3+1-dimensional." From a formal theoretical point of view, this is a serious defect in Einstein's cosmology, and it is one of the defects which de Sitter tried to remedy.

De Sitter's Cosmology — In 1917 a Dutch astronomer, Professor Willem de Sitter of the University of Leyden, elaborated his alternative cosmology, which proved widely popular, but which Einstein, for very good reasons, never accepted, and which de Sitter himself later abandoned. In de Sitter's picture of All Things, not only space but time also is curved, though there is such a cunning blending of inward and outward curvature that rays of light in de Sitter's universe may travel on indefinitely

without ever re-{47}-turning to their starting-point. Some faint idea of this complicated scheme may be formed if we imagine Einstein's cylinder to be replaced by the surface known as a hyperboloid; though this pictorial representation rather obscures the fact that space and time are both alike and both



Hyperboloid

{48} infinite.

De Sitter's universe is not, however, infinite in the same way as the classical or Euclidean idea of the universe. On classical notions, the abstraction of two dimensions would reduce space to an indefinitely extending plane, not to a cylinder or hyperboloid. The effect of the dual curvature of space and time in de Sitter's scheme is peculiar. For one thing, on this cosmology, every observer should find the stream of time apparently faster in his own neighbourhood and getting slower and slower at greater distance, until at an infinite distance, "half-way round" de Sitter's hyperboloid, time would appear to be standing still. Of course, this effect is only relative, and at that distant "lotus-land",

{49} time is really passing just as swiftly as it is here, and indeed to an observer there it would be our time that would seem to stand still. Clocks (mechanical or natural) at a great distance from an observer would appear to him to run slow, and consequently bodies would appear to be moving faster than they really are.

This would tend to accentuate another peculiarity caused by de Sitter's supposed dual curvature of space and time — to wit, that distant bodies should actually recede from the observer and from one another at a rate increasing with the distance. Within relatively small areas (anything up to 10000 or so light years) de Sitter's universe is just like Einstein's, and bodies are drawn together by gravita-{50}-tion, but very large and distant masses, such as the spiral nebulae and our own galaxy, should recede from one another with relative velocities increasing with their distance. The astronomers of Mt. Wilson Observatory have actually found that such recession occurs, but not to the extent predicted on de Sitter's theory; and this observed effect has supported and verified a more recent cosmological theory which we shall discuss in due course.

De Sitter's cosmology had the advantage of preserving the complete union of space and time; and Einstein's had the disadvantage of leaving the receding velocities of the spiral nebulae unexplained; but de Sitter's universe was full of complications for which there was no apparent reason. Einstein's {51} cosmology was a logical deduction from his gravitational theory; de Sitter ingeniously ignored gravitating matter altogether. Einstein's scheme seemed to have the firmer basis in common facts; but he had so far considered only one order of facts — to wit, the gravitational properties of bodies. He had not yet come to consider the electromagnetic forces, and, since matter is essentially electromagnetic in nature, no theory of the universe based on the effects of matter could be final or complete until he did so.

III. THE ELECTROMAGNETIC THEORY

Newton said that all bodies in free space would move in Euclidean straight line, and ascribed any deviation from this course to mysterious entities he {52} called forces. Einstein said that all bodies take the shortest path they can, and if this path is not a Euclidean straight line it is because space is not Euclidean. So long as he confirmed this attention to motional effects previously ascribed to gravitation and the sim-

ple mechanical forces (e.g. centrifugal force, cohesion, surface tension etc.), Einstein found in Riemann's geometry just the variation in space's properties that he needed. But when he and others came to consider effects which had been ascribed to electromagnetic forces, they were not found so easy to explain away.

Affine Geometry — Even Riemann's geometry could not bring the electromagnetic phenomena into the relativist's mathematical scheme of things; so the only thing that could be done was {53} to invent an entirely new system of geometry. In 1918 such a system was elaborated by Professor Hermann Weyl of Zürich. There were various ways in which he might have tackled the problem; and as it happens, he chose the wrong one. Thereby hangs a tale, for his work led the world's foremost scientists astray for eight years, before his line of attack was given up.

Weyl concentrated on the effects of non-Euclidean geometry on lenghts, for convenience, the lengths of measuring-rods. On Riemann's scheme, the geometry of various parts of space varies (according to the amount of gravitating matter present in those parts) in such a way that the lengths of measuring rods may change in different regions. Thus, if we equalise {54} two rods at Paris, and take one to London, the one at London will now have a different length from that at Paris. However, according to Riemann, if we bring the other to London it will change its length correspondingly, so no one will detect the difference by comparing the rods; and further, if we bring either of them back from London to Paris it will regain its original length. According to Riemann's idea of the possible "curvature of space", the length of a measuring rod just depends on where it happens to be.

Weyl extended the meaning of the term "curvature" to geometrical influences that permanently effect the rod's length; in his scheme, lengths depend not only on where the measuring standard is, but also on where it has been. On his view, if {55} two measuring-rods (or, for that matter, abstract "lengths") were equalised at Paris, and taken separately to London, by different routes[9] and under different "physical" (i.e. geometrical) conditions, their lengths might not be the same at London. Such a geometry, which precluded the possibility of perfectly exact measurement, was called affine.

[9]Editors' note: Prior has "roots" here.

Weyl worked out equations dealing with the permanent changes of length produced by these hypothetical spatial properties, and found them identical with Clerk Maxwell's equations describing the electromagnetic field. As far as that went, his theory was successful, but it had very serious drawbacks. In the first place, "Weylian" space — the electromagnetic field — seemed to {56} be just a sort of "intrusion" in Einstein's geometrical field — the connection between Weyl's space and Einstein's was by no means complete. This in itself was highly dissatisfying, for the aim and object of Relativity physics is to present all the forces of nature as properties of one homogeneous continuum, not a disjointed combination of two.

In 1921 Professor (now Sir) Arthur Stanley Eddington (b. 1882) of the University of Cambridge, partly solved this difficulty by introducing an even further generalisation of Weyl's geometry, in which even lengths existing continuously at[10] the same place could not be legitimately compared. And in Eddington's scheme there was a basal unification of gravitational (Rie-{57}-mannian or symmetrical) quantities and electromagnetic ("Eddingtonian" or antisymmetrical) quantities, but unless we looked at the very heart of things we would find space separated into two types as definitely as on Weyl's system. In Eddington's own words, "Geometrico-mechanical and electromagnetic quantities are completely unified provided that we look at the basal structure; if we do not look so deep we find a bifurcation of the properties of the universe into symmetrical and antisymmetrical, and a corresponding distinction of space and entities in space"

Eddington's equations were also identical with Clerk-Maxwell's, and so far as that went both he and Weyl had succeeded in putting the electromagnetic field on a purely geometrical basis. But {58} when they came to apply their schemes to such electrical quantities as electrons and protons and light quanta or photons (not known or considered in Maxwell's day) they found that, though they could explain most of the known properties of these things, their explanations introduced numerous other effects which have never been[11] observed and which would take some explaining away. Einstein himself came to their aid in 1923 and 1925, and pushed the subject as far as was possible along the lines they were following; but he himself was highly dissatisfied with the re-

[10] Editors' note: Prior has "as" here.

[11] Editors' note: Prior has "be" here.

sults, and in 1926 washed his hands of the whole matter.

The Unitary Field Theory — Having wiped all previous efforts off the slate, Einstein made a fresh start, and {59} eventually arrived at a theory which was without the defects of those introduced by Weyl and Eddington. What had particularly dissatisfied him was the strong distinction made by Weyl, and to a lesser degree Eddington, between the electromagnetic and gravitational fields. Such a distinction is not in accordance with fact, for the facts seem to show that gravitation is but a "special case" of electromagnetic radiation. Cosmic rays, gamma-rays, X-rays, ultra-violet rays, light rays, radiant heat, wireless waves, and gravitation all travel with the same speed c (186000 miles per second in a vacuum); the only difference being that while these other types of radiation are emitted in finite pulses or waves, gravitation comes not continuously, as if its {60} wavelength were infinite.

Such a close connexion between the two forces justified Einstein in seeking a system of geometry to which both electromagnetic and gravitational fields conformed. This he found in 1929 in a peculiar kind of cross between Euclid's system and Riemann's. On Riemann's system, there could be no parallel straight lines — no straight lines which always kept the same distance apart. To return to the comparison of Riemann's geometry with the geometry of a spherical surface, we can draw lines on such a surface which keep the same distance apart, but such lines would not be "straight"; for "straight" lines on a spherical surface are "great circles", and any pair of great circles must meet some-{61}-where. If Riemann's geometry is completely true, "parallel straight lines" must be regarded as a figment of Euclid's imagination. On Einstein's new geometry of 1929, however, parallel straight lines are possible, but not parallelograms. If we tried to draw, with perfect accuracy, a quadrilateral with its opposite sides equal and parallel, the fourth corner would refuse to close up.

This system formed the basis of Einstein's new famous Unitary Field Theory of 1929-30, in which what we had previously described as electromagnetic forces, as well as gravitation and the similar mechanical forces, were all explained away as geometrical peculiarities of one type of Space-Time Continuum. But this was not all. Not only the various forces {62} which seemed divert the world-lines of material particles, but even the world-lines themselves, were reduced to mere "twists" in

empty Space-Time, and the material particles to mere "twists" in empty space. As Einstein said in a recent lecture, "Space is now the sole representation of reality; it has eaten up light and gravitation, electromagnetic fields, corpuscles and all their movements. Space, with its metric structure, is the primary reality, and matter in all its forms is derived from it. Space has even eaten up matter."

The Annihilation of Matter. — Matter is no longer regarded as indestructible — how could it be if it is only a form of empty space? — but this was suspected long before the appearance of Einstein's Unitary Field {63}Theory, and even before Einstein had formulated his Principle of Relativity. For in 1904 Professor (now Sir) James Hopwood Jeans (b. 1877), to explain certain astronomical facts, suggested that matter in the hot, dense central regions of stars was being constantly "annihilated" — vanishing away as radiant energy. For even by 1904 the electrical theory of the constitution of matter had seen the light of day, and it was known that matter is ultimately composed of minute charges of positive and negative electricity (protons and electrons). These were pictured as opposite "strains" in the ether, and what Jeans suggested was that, under extreme conditions, an electron and a proton might rush together, and "neutralise" one another's {64} existence, leaving but a splash in the ether which would spread out as a ripple of radiation.

With the advent of the Theory of Relativity, it was fully established that matter is simply a highly condensed form of energy, and is convertible into other forms, one gram of matter being equivalent to 900 million million ergs of energy. It was realised then that whenever matter emits or absorbs energy, it gains or loses a very minute portion of its mass. Thus, when enough heat-energy is put into water to turn it to steam, it gains in mass 5 parts in a million million. And when enough heat energy is taken out of water to turn it to ice, it loses in mass 3 parts in a million million. Most other substances incur even smaller changes in mass when {65} their physical state is changed — water is an exceptional substance, and is associated with relatively large quantities of energy.

More powerful than radiant heat is light, and when the emission or absorbtion[12] of light is concerned the loss or gain of mass is greater than with heat. Thus, when hydrogen or oxygen burn to form water, and give out light as well as heat, they lose in mass one part in 6000 million.

[12]Editors' note: Prior writes "absorbtion" here.

Most chemical reactions involve much smaller changes. More powerful than light are the ultra-violet rays, and the X-rays, and the gamma-rays given off in radioactivity. Radioactivity may involve a disappearance of matter amounting to as much as one part in ten thousand; though these changes usually take {66} thousands or even millions of years to accomplish.

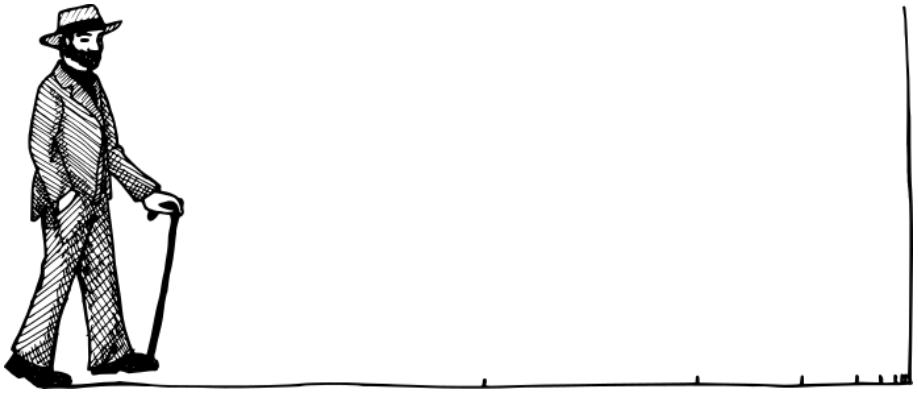
But this is not what Jeans meant by the "annihilation of matter". When ordinary heat and light, or X-rays and gamma-rays, are produced, individual electrons lose a tiny fraction of their mass, but it is not a case of entire electrons and protons coalescing and dissolving away. The radiant energy that would be produced by such a process as Jeans suggested, would be more than fifty times as powerful as the most penetrating gamma-rays known. Does such energy exist? Within the last decade, Professor Robert Andrews Millikan (b. 1868), of the University of California, has shown that it does. Somewhere in space these tremendously powerful rays — "cosmic rays", they are called — are being manu-{67}-factured, presumably by the "annihilation of matter" (though indeed there are other theories about their origin).

And what has all this to do with Relativity? As soon as Einstein had brought forward his Unitary Field Theory, some of the most brilliant scientists in the world saw that it has quite a lot to do with Relativity. In his Unitary Field Theory, Einstein brought electromagnetic phenomena into the relativist's mathematical scheme of things. What we have just been outlining is an important electromagnetic phenomenon — the transformation of gravitating matter into electromagnetic radiation. Since Einstein has shown electromagnetic energy to be merely a variation of space, it is thought that even energy ultimately disappears into mere "bigness of space".[13] In 1930, it was seen by the Abbé Lemaître, a Belgian mathematician, that if matter is going to disappear {68} like this, there is not going to be so much gravitation in the universe; and as matter dissolves away, the curvature of space must be lessened ("released", one might say), and space in consequence will expand. This fact formed the basis of Lemaître's cosmology, further elaborated by Eddington and Jeans in England and by Dr. Richard C. Tolman in America.

[13] Editors' note: This sentence has been added as a sort of a footnote.

Lemaître's Cosmology — On May the 9th, 1930, Sir Arthur Eddington read before the Royal Astronomical Society a paper, based on the calculations of the Belgian Abbé Lemaître showing mathematically that if the universe at any moment were finite (as Einstein first supposed), it would be unstable, and would inevitably expand or contract at an ever-increas-{69}-ing rate, concomitant with a conversion of matter into radiation, or vice versa. If the initial effect of the instability were a condensation of radiation into matter, the increase of gravitating matter would increase the curvature of space and decrease its size, until it would finally dwindle right away. However, all the evidence goes to show that in point of fact the matter in the universe is melting away as radiant energy, the gravitational curvature of space becoming consequently less, and the size of the universe consequently greater; until ultimately, when all the matter has disappeared, it will be an "infinite" universe like de Sitter's.

Before elaborating this picture, I must dispel a misunderstanding {70} that may arise from the use of the term "initial effect". It may be thought this means something that happened in the finite past; it might well be argued, in fact, that since the universe expands as we go forward into future time, it must contract as we go backward into past time, until at some time in the finite past it disappears altogether. Such a time would represent the Creation, before which there was no Universe. To see the fallacy in this, think of a man walking to a point eight feet away. His first stride takes him say four feet, and he still has four feet to go. His second pace, however,



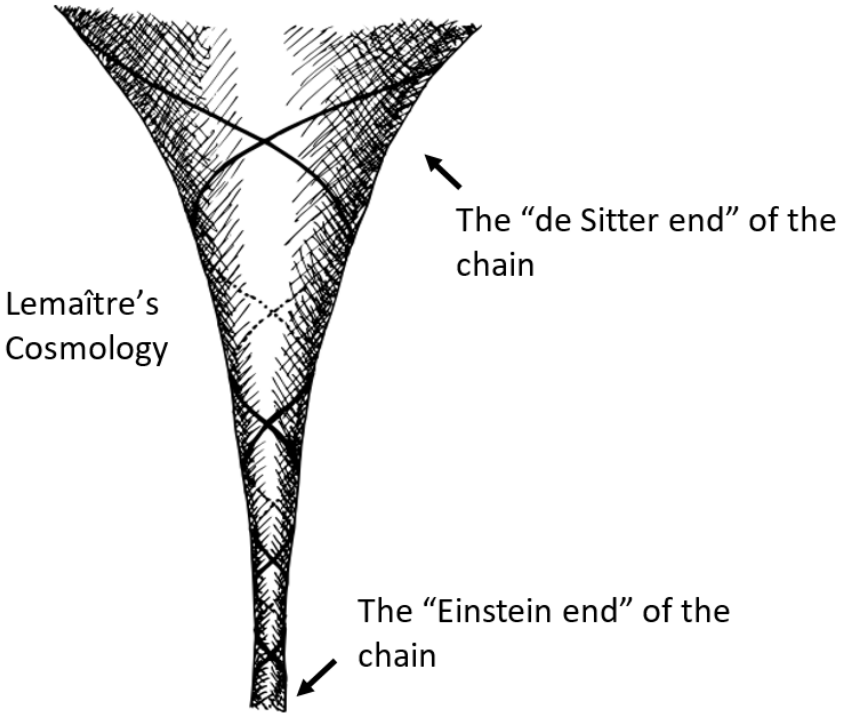
only takes him two feet, and he {71} still has two feet to go. His third

only takes him a foot, and there is still a foot more. His fourth mincing step takes him but six inches — still six inches left. He walks warily and cautiously now, for his fifth pace takes him but three inches, and the post is still three inches away. It will be readily perceived that if he continues to decrease his rate of approach he will never quite reach his post however many steps he takes, though he will always be getting nearer. Now remember that, as we go into the future, the rate of which the universe expands continually increases, and consequently, as we go into the past, the rate at which it contracts continually decreases, so that while it always dwindles, {72} it never quite vanishes — however far back in time we go, there is still a bit of universe in existence. Modern science seems to have confirmed the Old Testament prophecy that "the heavens shall melt away like smoke", but it gives no support for the belief that the universe was at any time created out of nothing. In any case, if space were closed right up, it must have contained an infinite amount of matter; and Eddington calculates that even at the beginning of its career it only contained enough to reduce its radius to 1,070,000,000 lt.-yrs.[14]

Remembering, then, that an eternity has passed since the universe commenced its career of expansion and dissolution, we can consider the new picture of Space-Time. Einstein depicted space-time (shown of two spatial dimensions for purposes of illustration) as a cylinder, and de Sitter depicted it as a hyperboloid; in the new picture, it is cylindrical at one end, and gradually develops into a hyperboloid at the other. In the {73} words of Sir James Jeans, "The universes of Einstein and de Sitter may rightly be imagined as placed at two ends of a chain. But we shall go wrong if we imagine them as engaged in a tug-of-war. They merely mark the limits of possible universes, and the universe which starts at or near the Einstein end must gradually slip along the chain to the de Sitter end. As Einstein's unstable universe expands, the matter in it becomes more and more sparse until it ends up as an empty universe of the kind pictured by de Sitter."

We can gauge the rate at which the universe is now expanding by observing the rate at which the distant spiral nebulae are drifting away from our own galaxy, moving outwards to occupy the greater "room" {74}

[14] Editors' note. This sentence has been added as a sort of footnote.



{75} that is being afforded them by space’s expansion. Dr. Edwin P. Hubble and Dr. Millon L. Humason, of Mt. Wilson Observatory, have made extensive investigations in connection with these nebulae. A few years ago Hubble established the relationships between the speed and the distance of the nebulae out to a distance of about seven million light years, where the velocity of recession averaged over 600 miles per second. Later the velocities of even more distant masses were able to be found, and Dr. Humason found that Nebula N.G.C. 7619 about 25,000,000 light-years away, was moving away from our own galaxy at the surprising speed of 2400 miles per second; while later in 1930 Hubble and Humason discovered that a still {76} more distant group of nebulae, about 75,000,000 light years away, appears to be leaving us at no less a speed than 7200 miles per second. From such data as these Eddington has calculated that the universe is at present expanding at the rate of 1 % in 20 million years.

In a recent lecture to a gathering of authors, Sir James Jeans very aptly compared the universe to "a bubble that is still being blown." And as the bubble is blown larger and larger, it becomes flimsier and flimsier, the matter in it steadily melting away. As yet the disappearance of matter in any appreciable quantity occurs only in the hot interior of stars, at temperatures of anything up to 2.200.000.000.000 °C.; but now it has started it is bound to continue, at {77} an ever-increasing rate, right to the last atom. Eddington tells us that at present there are some 12×10^{78} electrons in the universe; but Jeans calculates that the chances against even a single atom ultimately surviving are $10^{420.000.000.000}$ to one. To write this stupendous figure in ordinary notation (by putting down "1" followed by a number of noughts) we should require 6 million books of the size of Jeans' "The Mysterious Universe." Here Jeans very appropriately recalls the speech of Prospero in Shakespeare's "Tempest":-

"The cloud-capp'd towers, the gorgeous palaces,
The solemn temples, the great globe itself,
Yea, all which it inherit, shall dissolve,
And, like this insubstantial pageant faded,
Leave not a rack behind.
We are such stuff
As dreams are made on: and our little life
Is rounded with a sleep."[15]

{138}[16]

A NEW COSMOLOGY

Einstein, it will be remembered, refused to accept De Sitter's alternative cosmology, and defended his own "cylindrical" theory (See p. 44) as long as he could. In 1931, however, he visited America, and there the results of Dr. E. P. Hubble's investigations on the spiral nebulae convinced him that his first theory was wrong, he frankly confessed it. The

[15]Editors' note: See William Shakespeare *The Tempest*, Act 4, scene 1, pp. 148–158, https://www.enotes.com/shakespeare-quotes/we-such-stuff-dreams-made. See also *Essays Literary*, printed in this volume, original page number 146.

[16]Editors' note: This section has been added later — after finished the first version of the essay.

following passage about the matter appears in the "Sphere" for February, 1928: — "Professor Einstein has executed a surprising volte face of late, having abandoned his conception of a universe fixed in immutable size. He has compared the cosmos to a mystery contained in a {139} closed box, and states that until it is lifted no one will know what is inside. The old Einstein revolution — the belief in spherical universe is thus foregone in favour amorphous enigma of previous philosophers and physicist. It is believed that Professor Einstein is holding a theory of an ever widening non-static universe. It is also believed," the paper jocularly adds, "that the Professor will succeed in opening the box."

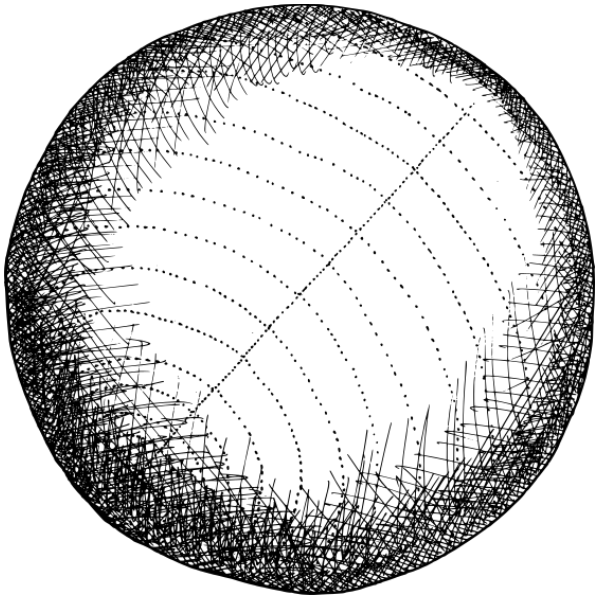
From the statements that he was "holding the theory of a ever-widening, non-static universe," one might have gathered that Einstein had accepted Lemaître's cosmology. This, however, was not so. Einstein only agreed with {140} Lemaître in that he believed the universe was expanding — Hubble's work on the spiral nebulae had shown him that clearly enough. But he did not accept Lemaître's theory in detail. His own views did not appear until October, 1931, when a cablegram from Vienna informed the world that "Professor Einstein, addressing scientists, said he had proved mathematically that the world began from nothing and would reach a certain limit of expansion, afterwards the process would be reversed and it would shrink to its original nothingness."

According to the cosmology of Lemaître, owing to loss of matter as radiation, space becomes less "drawn together", expands, at an ever increasing rate, until, when the last atom of {141} matter has disappeared, there will be nothing to "draw it together" at all, and it will be infinite. But this theory did not take account of the retarding effect of the flood of radiation that is thus being loosed into the universe. According to this latest theory of Einstein's, there is "limit of expansion" at which this retarding effect is so great that the universe cannot expand any more, and in fact begins to contract at an ever-increasing rate until it lastly disappears all together. On Einstein's theory, the rate of expansion of space does not increase as time goes on (as Lemaître supposed it did), but decreases, and finally becomes nil, and the universe starts to contract. This conception renders invalid the arguments given on pp. 70-72 against {142} the idea that the universe had a definite beginning in the finite past. For now, since the universe expands at ever-decreasing rate as we go into the future, it must contract at an ever-increasing rate as we go

into the past, and at some time in the finite past we must reach a point before which there was no space at all. Thus Einstein says that the world begins from nothing, and to nothing it will go.

There are obvious objections to this picture of things, if there was a beginning of time, what was before that beginning? and if there is to be an end, what will come after the end? similar objections arose many centuries ago, when theologians maintained, {143} seemingly against all reason, that Time is finite. "What," it was asked "was God doing before he made the heaven and the earth? for if at any moment he began to employ himself, that means Time." To this St. Augustine replied, "What, then, is Time? The past is not, the future is not, the present - who can tell what it is, unless it be that which has no duration between the two nonentities? There is no such thing as 'a long time', or 'a short time', for there are no such thing as the past and the future. They have no existence, except in the soul."

To modern objections the relativist must make much the same reply. The division of reality into the forms of Space of Time must be regarded as simply an intellectual con-{144}-



cf. Cosmology illustrated on pp. 44, 47, 74

-venience, and when we wish to find absolute truth we must consider Space and Time as blended into the one Space-Time continuum. On this new theory of Einstein's, space-time, robbed of two dimensions, becomes not a plane, nor cylinder, but a sphere. If we select any diameter of this sphere {145} and call it the "time axis" and take corresponding parallels of latitude as representing space at successive moments, then we will find that at the bottom "hole" of such an axis "space" has no size at all, and gradually expands until it reaches its greatest size at the "equator" and then dwindles away again to nothing at the top "hole". But the "time-axis" and the spatial sections are only part of the observer's viewpoint —— in reality there is no "axis", no set division into space and time, but just the "finite yet unbounded" surface representing space-time with the network of world-lines spread over it. Not only space, but space-time itself, and all sections of it, are on this new "finite yet unbounded".

An Astronomical Development. - To come {146} down again from these semi-philosophical discussions of the scientist's Absolute to the aspect of Einstein's new theory which presents itself more readily to the ordinary man, the idea that the spatial universe originated from "nothing" seems to receive confirmation in the latest developments of astronomy.

Of late the astronomies have, as Jeans puts it been "exploring in time" — seeking the origin of things. From the study of heavenly bodies an all stages of their development they have already learned much about the beginnings of things. The earth, for instance, was drawn out from the sun in a tidal wave caused by a passing star, perhaps twelve thousand {147} million years ago. The sun, and a large number of stars in its neighbourhood, in their turn crystallised from a spiral nebulae some five to eight million million years ago. Other stars are much older than this — some perhaps two hundred million million years old[17] — but they all originated from spiral nebulae. These are still spiral nebulae floating around, in many stages of development — great galaxies of stars, some of them, quite as big as our own stellar system, and moving away from our system and from themselves at enormous speeds — 12,500 miles a second, is the latest recorded.

[17] Prior's footnote: Recent facts have shown that these figures must be reduced considerably, and that the whole universe cannot have an age of more than about 1000,000,000 years.

But where did the spiral nebulae come from? And what was the {148} origin of their outward march? According to the latest ideas in astronomy, the ever-spreading spiral nebulae, including our own Galaxy, are the "fragments" from some vast and unthinkably violent "explosion". And that is just how the universe started on Einstein's new theory — a point, immensely massive but without size, in the space of a few seconds becoming a spatial universe of considerable magnitude, the whole process being in the nature of a violent explosion. From "nothing" — to "something" — with explosive suddenness.

After all these years the explosion has naturally died down somewhat, and as we are going at pres-{149}-ent it will be some fourteen hundred million years before the size of space is even doubled. Whether this expansion will continue indefinitely, or whether it will ultimately die down and then turn in to a contraction (as Einstein predicts it will), as yet remains to be seen; but it is to be hoped that some light of a practical nature will be thrown on Einstein's new theory in the next decade or so, when Sir James Hopwood Jeans and other eminent astronomers are to make a methodical investigation of the "explosion" which started the universe's career, and of the end to which the various "fragments" are proceeding.

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{78}

Sweet Nothings

(On Atoms: Old and New)

In Victorian days Science was characterised by a markedly materialistic outlook, but that is not the case today. Physical science seems to be moving further and further away from substantiality, and now deals with entities which the older materialist might well term "sweet nothings." Last century Matter was regarded as something substantial — something upon which we can rest a whole philosophy and a whole religion – but at the beginning of this century Matter was reduced to mere {79} "specks and spaces", and now even the "specks" are regarded as forms of "spaces". The development of this viewpoint forms a subject well worthy of our interest and attention.

SPECKS AND SPACES —

The new ideas of the atom followed from the discovery by Professor Antoine Henri Becquerel, in 1896, of the phenomena of Radioactivity, and the explanation of those phenomena by Professor Sir Ernest Rutherford (b. 1871) (now Baron Rutherford of Nelson) and Professor (now Sir) Frederick Soddy, who supposed that the atoms of matter are not really indivisible, but may, as in the case of the radioactive elements, break up into smaller units. {80}

This gave rise to the electrical theory of the constitution of matter, which owes its first definite formulation to Professor (now Sir) Joseph John Thomson (b. 1856), of Cambridge, and its later developments to Sir Ernest Rutherford and Professor Niels Henrik David Bohr[18] (b. 1885) of Copenhagen.

According to this theory, all atoms are built up of minute charges of electricity. All atoms contain a definite number of negative charges called electrons, which are alike for atoms of all kinds. Since atoms are generally neutral, they must also contain a positively-charged portion to offset the negative charges of the electron. No sound or definite conception of the form taken by this positively-charged portion was {81} reached until in 1911 Rutherford put forward his famous Planetary Theory.

According to this theory, the electrons in the atom revolve around a small positively-charged nucleus much as planets revolve around the sun. Rutherford showed that the nucleus consists of both positively-charged "protons" and negatively-charged electrons, but with a preponderance of the former, so that the resultant charge on the nucleus is positive, and numerically equal to the negative planetary electrons. And like the planets in the solar system, the electrons themselves are very much smaller than their orbits — very much smaller than the atom as a whole. Millikan calculated that the diameter of the electron is {82} 3.8 x 10^{-13} cm., a hundred thousand times as small as the accepted diameter of the average atom, while the proton was found to be even smaller, with a diameter of 2 x 10^{-16} cm. From these figures we may see the aptitude of Findlay's description of the planetary atom as "specks and spaces – and mostly spaces".[19]

[18] Editors' note: Prior writes Niels Hendrik David Böhr.

[19] Editors' note: Prior probably refers to Alexander Findlay: *Chemistry in the Service of*

Although the proton is over five thousand million times as small (in volume) as the electron, it is over 1800 times as massive. In fact, since the protons contribute practically the whole weight of the atom, in any element the number of protons may be considered as equal to the atomic weight. On this theory, the atomic weight of every element should approximate to a whole number, and this is found to be true of most elements. {83}

The atomic weight of some, however, proves to be a number plus a fraction so great as to be unaccountable by the small weight of the electrons. The explanation given for this is that many elements may exist in two or more forms with different atomic weights, and are nearly always found with these forms mixed in the same proportions. Thus chlorine of atomic weight 35 and chlorine of atomic weight 37 are always found in such proportions as to give an apparent atomic weight for chlorine of 35.457. These varieties of an element are called isotopes, and their existence was first proved when Dr. Francis William Aston (b. 1877) isolated the isotopes of Neon.

The criterion of an element {84} is no longer the atomic weight – one element may have many atomic weights. But Henry Gwyn-Jeffries Moseley (1887-1915), a brilliant young scientist who fell in the Great War, showed from his investigations on X-ray spectra that with each element is associated a fixed, definite whole number (quite distinct from the atomic weight) which distinguishes it from all elements. This is called the Atomic Number of the element concerned, and is sometimes loosely defined as the number of planetary electrons. It is more correct to call it the excess of protons over electrons in the nucleus; for although the number of planetary electrons is normally equal to this, in such processes as ionisation planetary electrons are added to, and taken away from, the atom without altering its {85} chemical identity. If, however, electrons and protons are discharged from the nucleus in unequal numbers, as often happens in radioactivity, the properties of the atom are so completely changed as to warrant our saying that a new element is formed.

Bohr's special contribution to this theory was his explanation of the spectral lines of atoms, and of the emission of light by matter. The essential idea of Bohr's theory is that the planetary electrons can only re-

Man, Longmans, Green and co, London 1916.

volve in certain fixed orbits — for each electron there are only a certain number of courses it may take. Each orbit is associated with a "quantum state of energy", and in "jumping" form an orbit of higher energy to one of lower energy, the electron loses {86} energy in the form of a pulse of radiation or light. When worked out mathematically for the single electron of the hydrogen atom this theory predicted the hydrogen spectrum exactly; but when applied to more complex atoms it was hard to make it fit the facts. It was a theory which made the very best of the data available, and was until very recently the only theory that could give even the vaguest hint of the way in which an atom emits light, and for that reason alone it has proved of the greatest value; but for all that it must be regarded as a somewhat premature attempt, mainly because the Quantum Theory of radiation, upon which it was largely based, was then in an extremely imperfect state, and was destined to undergo radical changes which the Bohr {87} atom was unfitted to withstand.

WAVES AND QUANTA

One of the many elementary questions which scientists have found it so difficult to answer is "What is Matter?"; and another, equally difficult is "What is Light?" The phenomena that we call Diffraction and Interference long ago showed that the properties of light cannot be satisfactorily explained except by some sort of wave theory. The first really satisfactory mathematical description of the waves constituting light, and of the medium in which they travelled, was given last century by Professor James Clerk Maxwell (1831-1879), who accounted for Light as a particular type of undulation in an electromagnetic ether or field. Visible {88} light, of course, is not the only type of such undulations; there are other types which, owing to our imperfect senses, we cannot see — radiant heat, for instance, which, though we cannot see it, we can feel. Maxwell predicted the discovery of similar waves even longer than those of radiant heat; such waves were soon after discovered by Hertz, and are now used in wireless telegraphy. Similar electromagnetic waves shorter than visible light are ultra-violet rays, x-rays, gamma-rays, and Millikan's cosmic rays.

The mechanics of Isaac Newton, extended by Lagrange and Hamilton so as to include electromagnetic phenomena, are usually called classical mechanics, a term which is much used in contrast with new

Quantum {89} Mechanics which is being elaborated to explain certain phenomena for which classical mechanics has proved quite inadequate. Maxwell's undulatory theory of radiation, a "classical" theory, was found perfectly satisfactory until the beginning of this century, when phenomena cropped up in connection with radiant heat which led Professor Max Planck (b. 1858) to suppose that energy (at any rate in the form of radiant heat) is not ultimately continuous, but is given out in abrupt parcels or quanta. A few years later Einstein extended this theory to visible light – in fact, to all forms of radiation, and to all other forms of energy besides. It seemed almost a return to the old abandoned "corpuscular" theory of light; and indeed Professor {90} Arthur Holly Compton (b. 1892), of the University of Chicago, suggested that light consists of particles just like electrons and protons, and that we should call these particles photons by analogy.

However, there are certain radical differences between the electrons and protons of matter and the photons or quanta of radiation. Electrons and protons, for instance, are electrically charged, but quanta are not. Quanta move with a fixed speed in any medium (186,000 miles per second in free space), while electrons and protons move with all speeds up to this. The energy or mass of an electron or proton, though it varies with the particular speed, is the same for all electrons, or for all protons, with a particular velocity. "Quanta" of {91} various forms of energy, on the other hand, differ in their mass or energy-content, though behind them all there is one fixed, unalterable quantity, the "atom of action" (i.e. of energy multiplied by time). This quantity is known as Planck's constant and is denoted by the symbol h; Millikan has found its value to be 6.55×10^{-27} erg-seconds. The energy of a "quantum" of any type of radiation is found by multiplying the frequency of the radiation by Planck's constant, or symbolically $e = h\nu$ — a relationship known as Planck's Law.

This theory has been able to explain phenomena hopelessly inexplicable on the classical wave-theory; but unfortunately the Quantum Theory (in the form {92} outlined above) proved equally inadequate to explain such things as diffraction and interference, which only the wave-theory could account for. Consequently physics was for years at a deadlock, from which it seemed impossible to escape. Radiation appeared to obey two hopelessly inconsistent sets of laws, classical and quantum, and to both continuous and discontinuous at once. Attempts were made

by Einstein, J.J. Thomson and others to show that one or other of these aspects alone was real, and the other an illusion; and when these had all failed one after another, Bohr, in conjunction with H.A. Kramers and J.C. Slater, tried to solve the difficulty by supposing that radiation as emitted by matter and radiation as ab-{93}-sorbed by matter were two different processes. This theory in its turn broke down, and at last, in 1925, there appeared a paper entitled "The New Quantum Theory", by Professor Werner Heisenberg, a young scientist of Leipzig, who proposed that we should "rub it all out and start again."

Like Einstein, Heisenberg is a follower of the great Austrian philosopher Ernst Mach (1838-1916), who taught that outer reality might be quite different from our impressions of it, and that we should not be led away by making too much use of "aids to the imagination". With this philosophy as the basis of his thought. Heisenberg did not take long to perceive that the gravest fault of classical mechan–{94}-ics, and to a lesser extend of the earlier quantum theories, was this: the classical laws of motion, etc., and even some conceptions of the quantum mechanisms, were based on the observed behaviour of the relatively large and clumsy bodies around us - billiard balls, ripples on water, etc. - and it is quite on the cards that atoms and radiations may behave in totally different manner from these.

This all-too-human tendency to describe the unseen world of atoms in terms of the objects of everyday life led to the elaboration of all sorts of clumsy pictures, such as the idea just outlined, of planets moving around the sun. So eager were the scientist for "aids to the imagination" that they had elaborated far more {95} "aids" than the imagination really needed, and there crept into our description of the atom all sorts of quantities that had no basis in observed facts - "nuclei" and "planetary electron orbits" and so forth; so Heisenberg suggest that all these should be completely discarded, leaving nothing but quantities which are actually observed. Even such ideas as "frequency" and indeed "radiation" itself are ruled out, leaving only a few such fundamental conceptions as "energy", about whose existence we cannot argue. Basing his work entirely upon observed effects, and eliminating all preconceived notions as to what those effects implied, Heisenberg set out to build up a series of simple mathematical laws and principles inter-relating the 96 fundamental quantities, and applying equally to the subjects of the old "classical" and "quantum" laws.

NUMBERS AND OTHER

From the start Heisenberg's New Quantum Theory met with much positive success, but its effects on higher scientific thought were largely negative and destructive. Heisenberg laid great stress on the fact that before we can hope to discover what Reality is, we must be quite clear as to what it is not. Before we can write anything really new we must wipe the old slate clean — long-standing misconceptions must be thrown mercilessly away.

Mechanical ideas of the nature, for instance, must be discarded. The Victorian physicist admitted [that he] bor-{97}-rowed his conceptions from the engineer, and treated the universe as a vast machine. The folly of this was sufficiently obvious long before the New Quantum Theory appeared, for we can get nowhere by saying that the force which drives the machine is itself a kind of machine. Mechanical pictures of the universe began to fall into disfavour with the advent of the theories of Mach and Einstein, and Heisenberg but struck their final death-blow. The twentieth-century physicist derived his conceptions not from the engineer, but from the mathematician; and instead of trying to describe the invisible in terms of the invisible things which it did not in the least resemble, he was content to denote it by symbols {98} satisfying various mathematical equations.

But the philosophical scientist still liked to puzzle out what his symbols stood for, and here he was apt to fall into trap almost as bad as the one from which he had first been freed. When he borrowed his conceptions from the engineer, the physicist tended to regard Nature as a mere machine; and when he came to borrow his conceptions from the mathematician, he tended to look upon it as a mere piece of arithmetic. He was apt to regard the symbols representing fundamental physical realities as identical with the symbols representing numbers.

The reader may think this a ridiculous mistake to be made by {99} men of high intellectual standing; but let him for a moment think of a number. I am not going to tell him what number he is thinking of, because, for one thing, I don't know, and for another, I am not interested. I would, however, be interested to know how the reader conceives of a pure number. To take the number three as an example. We can all picture the symbol 3, but can we picture the entity which the symbol 3 represents - the number three itself? We can picture three bananas, or

three golden ball outside a pawnbroker's shop, but can we picture the number three itself? Numbers make no appeal to our senses - we cannot see them, nor can we hear them, not smell them, nor taste then, nor {100} feel them. Numbers belong to an ideal world beyond the senses.

Yet it must not be thought that numbers are purely fragments of our imagination. The numbers symbolised in such an expression

$$3+1=8$$

would indeed be figments of someone's imagination, but the numbers symbolised in such an expression a

$$9+16=25$$

are real entities, quite independent of anyone's imagination. There are, moreover, numbers and numbers, and all of them are real. There are, for instance, irrational numbers such as $\sqrt{2}$ and $\sqrt{3}$ and $\sqrt{5}$ and $\sqrt{7}$, and all these are build up from the same {101} invisible, intangible "thought-stuff" as 1 and 2 and 3 and 4. To the physicist, it was only natural to suppose that the entities represented by his symbols were built of the same stuff, and were just types of numbers.

But here one the foremost exponents of the New Quantum Mechanics, Dr. P.A.M. Dirac of Cambridge, has stepped in and said "No!" The realities behind the physicist's symbols are nothing like numbers, and do not even obey the same laws as numbers. Thus, if a number p and another number q are multiplied together, their product pq would be naturally equal to this product qp But in physics, where q represents a "coordinate" and p represents "momentum", {102} the product pq is found to be quite a different quantity from the product qp.

After all, it is rather too much to expect that the fundamental realities of the universe should prove to be nothing more than mere numbers. It is interesting to note, however, how on Dirac's theory numerical relationships gradually arise as these fundamental non-numerical entities group themselves in more complex ways. Thus while the entity called momentum, p, is not a number, and when multiplied by the co-ordinate, q, does not behave as a number would, yet the combination represented by

qp - pq

{103} has a sort of numerical equivalence, $ih/2\pi$, where h is Planck's constant, π is 3.1416 (approximately), and i is the square root of minus one. The equation

$$qp\text{-}pq = ih/2\pi$$

is, as it happens, one of the foundation-stones of the New Quantum Theory. Yet even this does not bring the quantities concerned quite into the realm of true numbers, because i, the square root of minus one, is only "half a number", as it were, and is called by mathematicians "unreal" or "imaginary." However, these fundamental quantities are grouped with greater complexity, they form real numbers, conforming to all the laws of arithmetic and algebra. It is only when we go right to the heart of things that we meet with quan-{104}-tities that are totally beyond the conceptions of our everyday experience - quantities not only expressible in mechanical terms, but even inexpressible in numbers.

THE WAVE ATOM

As far as pictorial representations are concerned, the theories of Heisenberg and Dirac are, as I have said, largely destructive in their effects, but by certain of the new quantum mechanicians a very good attempt has been made to give a constructive pictorial idea of the physicist's fundamental quantities, though such an idea is necessarily vague.

The New Quantum Theory arose from the fact that science as it then stood gave two totally {105} inconsistent pictures of radiation as waves one the one hand and particles on the other. A less drastic way of attacking the problem was proposed at about the same time (1925) by Sir J. J. Thomson, who suggested that radiation, at all times, consists of both waves and particles, the waves merely serving to guide the motion of the particles. This was a masked improvement of the Bohr-Kramers-Slater theory of 1924, which supposed that radiation consists of waves at one time and particles at another; but it required to be completed by a further generalisation. This it received in 1925 at hands of Prince Louis Victor de Broglie (b. 1892), who postulated that not only every quantum of radiation, but every par-{106}-ticle of any kind is accompanied by a wave, which guides its motion.

The larger the particle, however, the smaller, on de Broglie's Theory, was the accompanying wave, so that the particles we meet with in everyday life follow Newtons's laws of particle motion as if there were no

waves with them at all.

When we come to deal with atoms and electrons and protons the accompanying waves should be detected almost as readily as in the wave of light quanta. in 1928 de Broglie's theory was verified by experimental proof that electrons are accompanied by waves, by Dr. C. J. Davisson and Dr L. H. Germer in America, and Professor George Paget Thomson (b. 1892) (a son of Sir J.J. Thomson) and others in the United Kingdom; {107} while in 1929 the waves of the proton was discovered by Professor Arthur Jeffrey Dempster of Chicago.

Even before its confirmation at the hands of these workers, de Broglie's "Wave Mechanics" had been put into a more satisfactory form and elaborated in greater detail by several mathematical physicists, in particular by Professor Edwin Schrödinger, of the University of Berlin. To understand Schrödinger's treatment of it, de Broglie's theory might perhaps be enunciated in a better way than it has been above. It does not imply so much that the fundamental waves and particles are seperate entities "accompanying" one another, as that the fundamental constituent of matter (and readiation) is neither a wave or a particle, but something {108} which combines the property of the two — an entity which Eddington suggests we should call a "waveicle". The universe is not built of numbers, nor of things like tiny billiard-balls, nor of things quite like water-ripples, but of entities which are both "billiard-balls" and "water-ripples" at once. Such entities are, of course, strictly speaking, unpicturable, and neither de Broglie nor any one else can say what a "wavicle"[20] is exactly like; for Schrödinger depicts it as something more like a wave, or a group, or a train of waves, than a particle.

According to Shrödinger primal reality may be depicted as a universal electric plenum or sub-ether ceaselessly agitated by waves or ripples, oscillating at speeds millions of times faster than that of {109} light. A group of such ripples – a "stormy area" - constitutes what appears in the plane of our gross experience as a particle. The velocity at which the individual ripples are vibrating is interpreted as the "energy" possessed by the particle, the relationship between the apparent energy and the actual frequency or velocity of the waves being given by Planck's law. The speed at which such groups of waves move about is, of course, simply interpreted as the velocity of the particles which the groups represent.

[20] Editors' note: According to https://en.oxforddictionaries.com/definition/wavicle this word's origin is the 1920s.

The frequency of individual ripples is determined by the nature of its surroundings. Waves situated in a particular "field of force" can only have certain particular fre-{110}-quencies. Thus, in the field of force exerted by the nucleus of any given atom, the electron-waves can only possess a certain discrete series of frequencies. When these frequencies are calculated, they are found to correspond exactly with the observed "states of energy" of the atom in question. Bohr had tried to explain these "states of energy" as the fixed planetary orbits of the electrons, and this explanation led him into serious difficulties which Schrödinger found it easy to avoid. For Schrödinger, the "state of energy" of a particle means simply the frequency of the waves composing it; and since there can be waves of different frequencies in one group, a particle may have two or more "states of energy" at once. On Bohr's theory, this was inconceivably, because {111} an electron cannot be travelling in two separate orbits at the same time – no particle can be in two places at once.[21]

Let us now see what advantage Schrödinger derived from this — let us try and picture an electron which does possess two states of energy at once, a group of waves which does contain waves of two different frequencies. Such a group or system of waves may be composed to the system of waves set up when two wireless stations of different wavelength are broadcasting near to one another. All radio enthusiasts[22] know that the waves from such stations, if there is the right relationship between their wavelengths, are liable to "interfere" with one another and produce "beats" by their interference. The actual wireless waves, travelling in the electromagnetic {112} ether, move at too fast a speed to affect senses, but the "beats" produced by their interference travel much more slowly, and when communicated to the air affect our sense of hearing as a kind of shriek. In like manner sub-etherial waves of slightly different wave-length produced close to one another within the same "stormy area" are liable to produce "beats", and in like manner also, although the sub-etherial waves themselves travel too fast to come into the plane

[21] Editors' note: In a letter to his communist cousin Hugh Teague dated June 15th, 1938, Prior emphasized the same view. In the letter he formulated a criticism of the analysis of motion offered by Engels and Hegel. Prior stated that "motion essentially means that a body is in different places at different times; at one 'point of time' during the motion, the body is not at several places but in one place." See Mike Grimshaw (ed.): Arthur Prior – A 'Young Progressive'. Letters to Ursula Bethell and to Hugh Teague 1936-1941, Canterbury University Press 2018, p. 162.

[22] Editors' note: Prior writes "enthusiants".

of our gross experience, the "beats" they produce are much slower, and may be communicated to the electromagnetic ether and appear to us there as radiation or light. When this explanation of the emission of light from atoms is worked out in mathematical detail, it is found to give with perfect accuracy the spectral lines of all the {113} elements, and succeeds even where Bohr's theory broke down.

UNCERTAINTIES

The reader by now will be wondering exactly where the "particle" comes in — why, indeed, should we talk about particles if everything has been, as it seems, reduced to waves? We have spoken of a particle as consisting of a "group" or "train" of waves, but that is not the whole story. As Millikan and Whitehead point out, every particle may be appropriately compared to a living organism: Life organises small and simple units (molecules, cells etc.) into organic "wholes" which are greater than the sum of their parts (a human being, for example, is greater than the sum of the cells of which he is composed); and Schrödinger's waves are {114} also organised into "groups" or "wholes" (Gestalten is the original German word, and there is no exact English equivalence) which behave differently from the sum of their constituents waves. These "wholes" and "configurations" of waves constitutes the wave-particle or wavicle; the "particle" aspect of the wavicle may be conceived as a kind of massive point in space (i.e. in the ordinary ether or field) produced by an organised group of sub-ethernal waves acting as a whole.

The properties of the "particle" are determined by the properties of the waves, or groups of waves, causing its appearance. Thus the energy or momentum p of a particle is determined by the frequency waves in the group concerned, and its position q is probably somewhere within the group or "stormy area". The {115} smaller the stormy area, the more definite the position of the particle. As a matter of fact, however, such stormy areas can only be marked off only by the interference of waves of different frequencies; such that if the particle is to have a fairly definite position, the waves producing it must be of different frequencies, and its energy or momentum must therefore be indefinite. If the energy were perfectly definite, and the waves all of one frequency, there would be no interference, and no "stormy area" marked off, and the waves would

spread through the whole of the sub-ether, leaving the particle's position very vague indeed.

This illustrates a very important general principle, enunciated by Heisenberg in 1927, as the {116} principle of indeterminacy (also called the principle of uncertainty), the gist of which is this: The properties of all particles may be considered in pairs, and in each pair, the more accurately one property is defined, the more vague and uncertain the other becomes. Thus at least one half of the facts of Nature can never be accurately determined — our knowledge must always be slightly inaccurate. This applies even to the particles we meet with in our everyday life, but since the inaccuracy is only of the order of magnitude of Planch's constant (a very small quantity) it is not noticeable until we consider very small particles or quantities. For all practical purposes, the laws of nature obeys {117} criket-balls, buns, moons and stars are perfectly accurate, but when we come to deal with things like electrons and protons we find the governing laws shrouded in a mist of uncertainty which it is impossible to dispel.

A good instance of the way in which this principle works, is seen when we consider such properties of an electron as are determined by our seeing it. Now, we can only see things by means of the visible light reflected from them, and as we consider smaller and smaller objects, a time comes when we find them so small that waves of visible light simply curl round them and we do not see them at all. Still, there are many waves shorter than visible light, and although these make no {118} impression of our sight, they may be used to record the electrons properties on a photographic plate. But fortunately as radiation becomes shorter it becomes more and more powerful, so that when it becomes short enough to be reflected by an electron it is so powerful as to knock the electron right out of its position and make its properties just as vague as before.

Thus do our physical aids to knowledge defeat their own purposes, in accordance with the Principles of Indeterminacy. We must be careful, however, not to misinterpret this principle, as Eddington, Compton and others seem to be doing, by saying that it abolishes the old idea of a Universe governed by fixed laws, and thereby confirms the {119} belief in Free-will. In the first place, the Principle of Uncertainty does not imply that the laws of nature are usually indefinite and changing and capricious, but merely that we observers have no way of determining them

with certainty or accuracy. And in the second place, if the Principle of Uncertainty did deny the order and uniformity of Nature, it could only substitute for it an idea of nature as governed by Chance — which is not Free-will.

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II To be added on to p. 119

Time in Atomic Physics

In this book I have taken the attitude of an extreme Einsteinian, but a large number of modern scientists incline to an alternative theory of Relativity to Einstein's, proposed by Professor Alfred North Whitehead (b. 1861), who teaches that the fundamental combination of Space and Time is not to be called Space-Time, but Process; and Space and Time though united in Process, are fundamentally different in nature, Space being a mere mathematical abstraction and Time a substantial reality.

In 1927, this theory was applied in atomic physics by Max Born and P. Jordan, in an alternative to Hei-{151}-senberg's Principle of Uncertainty. According to Born and Jordan, substantial Time enters into the laws of nature as explicitly as do Matter and Energy, its chief effect being to give these laws irreversibility — that is, it makes them dependent on the direction in which Time is passing (from Past to Future), thus giving the passage of Time an objective significance not allowable on Einstein's theory of relativity. On this view the laws of nature may be arranged in a series, in which the effect of the one-way passage of Time becomes more and more marked. The series runs roughly thus :—

(1) The great field-laws, e.g. Gravitation, and the simple {152} laws of mechanics applying to the large and clumsy inanimate objects of our everyday experience. These laws are almost reversible — i.e. it makes no appreciable difference whether the processes to which they refer take place from past to future, or from future to past. With these laws the Theory of Relativity mainly deals, and that is why the Theory of Relativity ignores the one-way passage of time.

(2) Certain fundamental laws about energy, e.g. the Laws of Thermodynamics. The First Law of Thermodynamics simply states that the amount of energy in the universe is invariable, so obviously this law applies whether we go either way in time. But the {153} Second Law

of Thermodynamics, also called Carnot's Law, states that all the energy of the universe tends to reach a state of equilibrium, as we move from past to future — this law is irreversible. This law explains why when energy is different in two places, it always moves from the state of higher energy to the state of lower energy, and we can make it work in this process. It explains why a cup of tea cools — the temperature of the tea being higher than that of the surroundings, heat-energy flows from the tea to its surrounding until both are equal.

(3) Laws of processes within the atom. Here the experimental results of Harnwell are interpreted by {154} Born and Jordan as showing that the one way passage of time is well-marked, and Born says that it is because we have ignored this that we have met with such difficulties in atomic physics and quantum theory in the past. This is an extreme development from the New Quantum Theory as elaborated by Born, Jordan and Heisenberg in 1926, in which a "formal distinction between space and time" (unallowable on Einstein's theory) seemed necessary.

(4) Laws of chemical action, organic growth and evolution, and mental processes, where the one-way passage of time seems fundamental. Organic growth, for example always proceeds from birth to maturity, from maturity to old age and from old age to death, and is never "reversed". This theory, which has much to be said for it, is the fly in Einstein's ointment.

NOTHING

The stuff of which Schrödinger's sub-etherial waves are fashioned is denoted by the symbol ψ. It would, however, be a grave mistake to suppose that ψ is merely {120} matter. Matter is not ψ, but is merely our impression of the vibration of ψ. When, as sometimes occurs, all the ψ -vibrations associated with a particular electron disappear from the sub-ether into the electromagnetic ether, all the "matter" present has then vanished away as radiation — but there is just as much ψ there as before. Matter is just a secondary abstraction derived from the primary concept ψ — matter is just the "vibration" of ψ — so that whatever else ψ may be, it is certainly not matter.

Eddington thinks that ψ may be a "probability" — the more ψ there is floating around, the higher the probability that we will receive the impression that there is a particle of matter there. Einstein, in {121} his

Unitary Field Theory, seems to treat Schrödinger's sub-ether ψ of which it is composed as an aspect of the space-time continuum. According to Einstein's earlier theory, Reality is a network of "world-lines" of particles situated in a space-time continuum riddled with geometrical peculiarities; and in his latest theory he tells us that even the world-lines themselves are geometrical peculiarities of space-time — strange shapes and twists formed by the wreathings of an empty void. And since a material particle is just a spatial section of its world-line, material particles must be regarded as "twists" or "shapes" or "waves" in empty space.

When we arrive at such pictures as these, we begin to be reminded of {122} the poet's address to Nothing as the

"Dear tenuous stuff of which the world was made"

Pshaw! says the prosaic Reader — What ridiculous notions these modern scientists do have, to be sure! A world built out of Nothing indeed! But I must warn him that Nothing is not to be treated as lightly as all that. The more one learns about Everything the more respect one acquires for Nothing; for that which not included in Everthing must of necessity be Nothing — Everthing is but a tiny smudge on the wast a vacuous countenance of Nothing. The mathematician used to fancy that Nothing is a "quantity infinitesimally small"; but believe me, that is all eyewash. There are {123} thousands and thousands of infinitesimally small quantities wandering about this world — why, at embarrassing moments I have often felt like one myself! — but Nothing is greater than Infinity.

Nor, when I say this, do I merely mean to deny that anything could possibly be greater than Infinity — I positively assert that that which we call Nothing is greater than Infinity. For Nothing is not only a synonym for the mathematician's term Nought, nor merely a negation of being; but it is the only word we have for all that is utterly inconceivable all that the human mind can never hope to grasp. The fact that Nothing does not exist is in no way a thing for it to be ashamed of; {124} for it does not exist simply because it is too great, too good, too beautiful to exist. All that is greater than the greatest, all that is better than the best, all that is lovelier than the loveliest, is comprised in the term Nothing.

That is why the Buddhists are so attracted by the idea of non-existence and why so-called atheists have the noblest idea of God. Beauty increases with delicacy and refinement, in Nature as well as in women. Clouds, rainbows, sunsets; thoughts, abstractions, dreams —

these are fabrics from which the greatest loveliness is woven. And beyond them, more delicately lovely still — what? Why, Nothing. All our highest ideas of beauty cannot touch the unutterable loveliness of that which is love-{125}-lier than the loveliest, more beautiful than Beauty itself — Nothing.

Nothing typifies all man's yearnings for something that lies beyond — beyond knowledge, beyond existence. Apart from the impressions he receives from his senses of physical world man can know Nothing. Yet the Reality which lies beyond the senses is just what he is always seeking — what he calls The Absolute. His religious instincts, if he has any, bringing him into close touch with it, and he knows that it is God, but if he approaches it from the purely physical point of view, all he finds of the Absolute is Nothing. Aspiring man pushes his way past the grosser sense-experiences of the world {126} about him, and reaches a world of electrons and protons — specks and spaces; resolutely probing deeper, he finds himself in rippling "wavicles"; rather, feeling the vast Absolute near him, he steps right out of the world of appearances and brings his weary feed to rest on — Nothing.....

Unless he rescues himself by means of a "cosmic religious sense", when, not worrying how the physical aspects fails him at the last moment, he feels from the depths of his heart that, as Einstein says, "the totality of existence is a Unity, full of significance."

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Biographical Appendix[23]

Aston, Dr. Francis William, D.Sc., F.R.S. (b. 1877), of the University of Cambridge. Has made extensive researches on isotopes (see p 83), isolating isotopic forms of many elements.

Bohr[24], Professor Niels Henrik[25] David, D.Sc. (b 1885), of the University of Cambridge. Attempted to explore emission of light by electron

[23]Editors' note: The page numbers in this appendix are Prior's original page number from the handwritten booklet (placed in curly brackets in the transcribed edition).

[24]Editors' note: Prior writes "Böhr".

[25]Editors' note: Prior writes "Hendrik".

"jumps" (see p. 85). Attempted in 1924, with Kramers and Slater, to explain radiation as two distinct processes (see p. 100). Elaborated Heisenberg's Principle of Indeterminacy of 1927 (see p. 116). Nobel Prizewinner, 1922

Born, Max. A prominent Quantum mechanician who with his colleague P. Jordan, joined Heisenberg in {128} 1926 in the elaboration of the New Quantum Theory, their joined contribution being called Matrix Mechanics. In 1927 Born and Jordan elaborated an alternative to Heisenberg's Principle of Indeterminacy, based on Whitehead's philosophy (see p. 150)

Broglie[26], Prince Louis-Victor de. (A brother of the X-ray physicist, the Duc Maurice de Broglie) (b. 1892). Introduced "Wave-Mechanics" (see p. 105). Nobel Prizewinner, 1929.

Compton, Professor Arthur Holly, A.M., Ph.D., Sc.D, LL. D. (b. 1892) of the University of Chicago. In 1924 showed conclusively the particulate nature of light (see p. 90). Elaborated Heisenberg's Principle of Indeterminacy (see p. 110). Nobel Prizewinner, 1927.

Davisson, Dr. C. J., and Germer, L. H., of the Bell Telephone Laboratories, 129 in 1928 gave experimental proof of the wave nature of the electron (see p. 106)

Dempster, Professor Arthur Jeffrey, of the University of Chicago. In 1929 gave experimental proof of the wave nature of the photon (see p. 107)

Dirac, Dr. P. A. M. of the University of Cambridge. In papers of 1925, 1926, 1930, etc., showed that the fundamental physical Reality was non-numerical (see p. 101).

Eddington, Professor Sir Arthur Stanley, Kt., M.A., D.Sc., LL.D., F.R.S. (b. 1882) of the University of Cambridge. Astronomer. Developed Weyl's affine Geometry in 1921 (see p. 56). Introduced Lemaître's Cosmology to England in 1930 (see p. 68).

[26]Editors' note: Prior writes "Bröglie".

Einstein, Professor Albert, Ph.D., D. Sc. (b. 1879), of the University of Berlin. Introduced Principle of Relativity, 1905. {130} Special Theory of Relativity, 1905-1908. General Theory of Relativity, 1915. Cosmology, 1916. Developed Weyl's Affine Geometry, 1923 and 1925. Unitary Field Theory 1929-1930. Cosmology, 1931. (See Essay on Relativity). Also developed Planck's Quantum Theory (see p. 89). Nobel Prizewinner 1921.

Heisenberg, Professor Werner, of the University of Zürich. Introduced the New Quantum Theory, 1925 (see p. 93). With Born and Jordan, Matrix Mechanics, 1926. Principle of Indeterminacy, 1927 (see p. 110).

Hubble, Dr. Edwin Powell, B.Sc, Ph.D., A.M., F.R.A.S. (b. 1889) and Humason, Dr. Milton L., of Mt. Wilson Observatory. Studied the Spiral Nebulae with important results in Cosmology (see p. 50 and 75). Hubble calculated the radius of space, 1926 (see p. 23) {131}

Jeans, Professor Sir James Hopwood, Kt., M.A., D. Sc., LL.D., F.R.S. (b. 1877). Astronomer. Introduced hypothesis of Annihilation of Matter, 1904 (see p. 63). Investigated the Quantum Theory. Elaborated Lemaître's Cosmology (see p. 73, 77). Wrote many books of popular science.

Lanczos, K. In 1924 attempted to put Einstein's earlier cosmology (see p. 44) in an improved form. Lanczos pictured a "universe in stationary rotation".

Lodge, Professor Sir Oliver Joseph, D.Sc., LL.D., F.R.S. (b. 1851.), a scientist of the old school. Showed that the ether is not carried around by the motion of matter (see p. 10). Yet believed in a substantial materialistic ether, always opposing Einstein and Jeans in this matter. Before the eclipse in 1919, 132 Lodge maintained that Einstein's predictions would not come true — but they did, and ever since then Lodge has been trying to explain them away. We are indebted to Lodge for much early research of wireless.

Lorentz, Professor Hendrik Antoon (1853-[1928]), of the University of Leyden. Elaborated Maxwell's electromagnetic theory. Attempted (simultaneously with Fitzgerald) to explain the results of the Michelson-Morley experiment by a universal contraction of moving matter (see

p. 11). Also elaborated methods for determining the size of a quantum of light. Nobel Prizewinner, 1902.

Mach, Professor Ernst (1838-1916). Austrian philosopher and physicist. Thought that it was science's work to find universal notions as opposed to those dependent on the observer. His philosophy forms 133 the basis of the work of Einstein and Heisenberg (see p. 2, 93).

Maxwell, Professor James Clerk (1831-1879). A Scottish physicist, associated with Michael Faraday. Both studied electricity and magnetism. Maxwell elaborated ideas of electromagnetic fields, the general electromagnetic field of ether; and light (see p. 7, 85)

Michelson, Professor Albert Abraham (1852-1931) of the University of Chicago. Performed many highly accurate experiments to find the velocity of light in various directions, and showed that it was the same in all directions (see p. 19). Nobel Prizewinner, 1904.

Mie, G. Attempted in papers of 1912, 1913 and 1917 to show that Matter is but a form of space. To his papers Weyl was much indebted in {134} his explanation of electromagnetic phenomena (see p. 53).

Millikan, Professor Robert Andrews, A.M., Ph.D., Sc.D., LL.D. (b.1868), of the University of California. Electrician. Found various data in connection with the electron (see p. 81). Investigated the Cosmic Rays (see p. 66). Nobel Prizewinner, 1923.

Minkowski, Professor Hermann (1864-1909), of the University of Göttingen. Elaborated in 1905-1908 a theory of space and time as blended into one continuum (see p. 15, 22).

Moseley, Henry Gwyn-Jeffry (1885-1915)[27]. Discovered Atomic Numbers (p. 84).

Planck, Professor Max, Ph.D. (b. 1858), now of the University of Berlin. Introduced the Quantum Theory (see p. 89). Nobel prizewinner, 1918.

[27] Editors' note: The correct year of birth is 1887.

Riemann, Professor Georg Friedrich Bern-135-hardt, (1826-1866), of the University of Göttingen. Elaborated a system of non-Euclidian geometry, which was the basis of Einstein's General Theory of Relativity (see p. 15).

Rutherford, Professor Sir Ernest. Kt, O.M., D. Sc., F. R. S. (b 1871) (now Baron Rutherford of Nelson) of the University of Cambridge. Introduced, with Soddy, the disintegration theory of radioactivity (see p. 79). Investigated the Proton, and elaborated the Planetary Theory of Atomic Structure (see p. 81). Nobel Prizewinner, 1908.

Schrödinger, Professor Edwin, Ph.D., of the University of Berlin. Elaborated de Broglie's Wave-Mechanics (see p. 107)

Sitter, Professor Willem de, of the University of Leyden. Astronomer. Elaborated alternative cosmology to Einstein's in 1917 (see p. 46).

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Soddy, Professor Sir Frederick, M.A., F. R. S., of the University of Oxford. Elaborated, with Rutherford, the disintegration theory of radioactivity (see p. 79)

Thomson, Professor George Paget (b. 1892), of the University Aberdeen. In 1928 showed experimentally the wave nature of the electron (see p. 106).

Thomson, Professor Sir Joseph John, Kt., O. M., D. Sc., Ph. D., LL. D., F. R. S. E., F. R. S. (b. 1856) of the University of Cambridge. Father of the preceding. Elaborated electrical theory of the atom. (see p. 80). Investigated isotopes with Aston (see p. 83). Proposed wave-particle theory of light in 1925 (see p. 105). Nobel Prizewinner, 1906.

Tolman, Dr. Richard C., of the Institute of Technology, California. Elaborated Lemaître's Cosmology, 1930 (see p. 68).

Weyl, Professor Hermann, of the University of Zürich. Mathematician. Supplemented de {137} Sitter's Cosmology (See p 47) with a hypothesis regarding the world-lines of stars. Attempted a geometrical explanation of electricity and magnetism in 1918 (see p. 53)

Whitehead, Professor Alfred North, Sc. D., LL.D., F. R. S. (1861), of Harward University. Logician, mathematician, physicist and philosopher. Elaborated alternative to Einstein's Theory of Relativity. Taught that the universe is built, not of matter but of Process, that all Process is Organic, and that time, entering explicitly the composition of Process, is substantial and even atomic (see p. 150).

Wilson, Professor Charles Thomson Rees, M. A., F. R. S., of the University of Oxford. Gave visible evidence of the existence of electrons. Nobel Prizewinner, 1927. {138}

Appendix
My Ideal Library*

I. SCIENTIFIC, PHILOSOPHY & RELIGION[1]

Albert Einstein's "Relativity: the Special and General Theory" (1920); "The Unitary Field Theory" (1930); and "Cosmic Religion" (1931).

Sir James Hopwood Jeans's "Eos: or The Wider Aspects of Cosmogony" (1929); "The Universe Around Us" (1929), "The Mysterious Universe" (1930), and "Stars in Their Courses" (1931).

Sir Arthur Stanley Eddington's "Stars and Atoms" (1927), "The Nature of the Physical World" (1928), and "Science and the Unseen World" (1929).

Henri Louis Bergson's "Time and Free will" (1889), "Matter and Memory" (1896), "Creative Evolution" (1907), "Mind-Energy" (1919), "Duration and Simultaneity" (1922).

*This text has been edited by Jørgen Albretsen and Peter Øhrstrøm. Two versions or drafts of this text have been located. A version of this text is found in connection with "Essays Literary" (Draft 1). This manuscript in photocopy is kept in the Macmillan Brown Library, University of Canterbury, Christchurch, New Zealand as a part of the MS Labelled "Manuscript 194", Accession Number 729. Another version (Draft 2) is kept in the "Ann Prior Collection" at the Bodleian Library, Oxford, box 13. Its pages are numbered 58-69, and they are apparently torn out of a notebook like the ones used for "Essays Scientific" and "Essays Religious". The rest of this notebook is not known. The present text is an attempt to merge the drafts into one text consistent with what seems to have been the young Prior's intention.

[1]Editors' note: Here Draft 2 reads "SCIENTIFIC AND PHILOSOPHICAL".

Alfred North Whitehead's "Mathematical Concepts of the Material World" (1926), "The Concept of Nature" (1920), "Science and the Modern World" (1926), and "Process and Reality" (1930).

L.L. Whyte's "Archimedes: or the Future of Physics" (1928), and "Critique of Physics" (1931).[2]

Jonathan Edwards's "Treatise on the Freedom of the Will" (1754), "Dissertation on the Final End for which God created the World" (1758), "The true Nature of Christian Virtue" (1758), "Essay on the Trinity", and "Original Sin".[3]

II. POETRY & DRAMA

Complete Poetical Works of

Percy Bysshe Shelley

Edgar Allan Poe (with prose poems).

John Keats.

Samuel Taylor Coleridge.

Thomas Moore.

George Gordon Noel-Byron, 6th. Baron Byron of Rochdale.

George William Russell.

Edward Fitzgerald's "Rubaiyat of Omar Khayyam".

[2]Editors' note: This reference only appears in Draft 2.
[3]Editors' note: This reference only appears in Draft 1.

Sir Edwin Arnold's "Light of Asia" and "Song Celestial".

Wolfram von Eschenbach's "Parzival".

William Shakespeare's plays, esp. "The Tempest", "King Lear", "Macbeth", "Hamlet", "Merchant of Venice" and "Midsummer Night's Dream".

George Bernard Shaw's Plays, esp. "Man and Superman", "Back to Methuselah", "Androcles and the Lion", "The Apple Cart", "Caesar and Cleopatra", "St. Joan" and "The Devil's Disciple".

Johann Wolfgang Goethe's "Faust" (Both Parts I and II).

Maurice Maeterlinck's works, esp. "The Blue Bird" & "The Mind of Space".
Oscar Wilde's works, esp. "Dorian Gray" and "Profundis"

III. MISCELLANEOUS

The Dialogues of Plato.[4]

Complete Short Stories of

Matthew Phipps Shiel

Edgar Allan Poe

Herbert Geroge Wells

P.G. Wodehouse.

Hilaire Belloc

[4]Editors' note: The item is only included in Draft 1.

John Burdon Sanderson Haldane

Robert Andrews Millikan

Gilbert Keith Chesterton.

Gilbert Keith Chesterton's "The Flying Inn"

Bram Stoker's "Dracula".

Mary Wollstonecraft Shelley's "Frankenstein".

"Merlin" (trans. of Vulgate version)

"Lancelot", "Quête del Saint Graal" and "Grand Saint Graal" by Walter Map.

Tristan and Iseult, by Helie de Boron.

On Nothing & Kindred Subjects, by Joseph Hilaire Pierre Belloc

Ferdinand Ossendowski's "Beasts, Men and Gods".

Major Haldane Macfall's "The Three Students".

Herbert George Wells's "Outline of History".

"Nature" and "Scientific American" (periodicals).

"Who's Who" (in England & America; and in France and America, if they have them there).

"Holy Bible" (with Apocrypha).[5]

[5]Editors' note: In Draft 1 "The Holy Bible" is listed as the very first item along with references to Shelley, Goethe and Plato.

Father Time

"Who shall contend with Time?" wrote Henry Kirke White in 1805, and to anyone with a pretence of education it must be obvious that the answer he intended was "Mach, Einstein, Jeans, Whitehead and Bergson."

In the latter portion of last century the great Austrian physicist and philosopher, Ernst Mach, reduced the concept of Time to a kind of meaningless figment of the imagination based on the observed succession of events. Space he reduced to a similar abstraction based on the way in which bodies may have different relative positions. Albert Einstein in 1905 proclaimed himself a follower of Mach and elaborated a very similar idea of space and time as "mere shadows", based on his Theory of Relativity. But he was not content with that, and showed that although Space and Time in themselves are merely subjective things varying with different observers, the union of the two called Space-Time is something fixed and absolute, and is the basis of all reality.

Sir James Jeans, Einstein's most popular English interpreter, does not treat Time in itself so lightly, and tells us that" the Universe is like a great Thought, of which God is the thinker and Time the process of thinking." Jeans does not, however, go so far as Alfred North Whitehead and his followers (L.L. Whyte, M. Born, P. Jordan etc.) who hold that Time is something substantial like we have supposed Matter to be, and enters into the very composition of all things. Whitehead pushes this idea of the substantiality of Time so far as to picture Time as "epochal", that is, as built up of discrete "Time-atoms" like the atoms of Matter!

Even more importance is attached to Time by the great French philosopher, Henri Louis Bergson, who holds that to argue about the nature of Time is futile, for Time is the only thing which exists, and Matter, Mind and Spirit are alike but aspects of it. Time, according to Bergson, is not just a sort of abstract background against which events take place, but is rather the one living Reality of which we are all but parts and aspects. For Bergson we are all like ripples[6] and eddies on the stream of Time, a stream of "unceasing becoming, which preserves the past and creates the future."

[6]Editors' note: In his original MS Prior used the word "bubbles" in the first place – and then crossed it out.

"In my young days, when I was green in judgement," I used to style myself a Bergsonian, but now, philosophically speaking, I prefer Einstein's view, and try to paint on the tableau of my mind his picture of Space-Time as a vast void wreathed into the strange and shadowy shapes of stars and atoms and life and humankind. But one cannot be philosophical all the time, and in fanciful moments I am not above picturing Time as an old man with a white beard and wings; and though he carries a scythe in his hand, Father Time has been a kind old man to me, and has healed many a wound of my rather susceptible heart. There was one girl, for instance, for whom I had a hopeless but persistent infatuation; for a year I did not see her, and when I did, thanks to the old gentleman we are discussing, she was so unconscionably ugly that I preferred to think no more about her. And yet another instance: the most beautiful girl on the face of this earth once gave me nothing but black looks for weeks on end, because I had been a trifle "fresh"; but Father Time passed by, and yesterday, when it was suggested that I take the chair at a meeting, she was so wildly enthusiastic that her friends had to pin her to chair, and even then she broke away and waved her hand with a glad smile. So what I say is, whether old Father Time is the one living reality or a mere shadow like the rest of us, he is a good sport, and here's to his health!

Masterton 1.8.31.

Human Limitations

Professor Eddington was surely right when he said, "Not once in the dim past but continuously by conscious mind is the miracle of creation wrought;" and even in these enlightened days man (including Professor Eddington) is continually "creating God in his own image." A few bright spirits like Shelley and Einstein attempted to remind us that "the deep truth is imageless"; and against them we find not only the ignorant masses but even some of the most brilliant thinkers of our time. Not only do we witness plays such as "In Green Pastures", in which God is an old negro smoking ten-cent cigars and spending his Saturdays at a celestial "fish fry". But Millikan, the brilliant American electrician, speaks of "a watchful Creator keeping the Universe wound up like a clock", and Sir James Jeans, the English mathematical physicist, tells us that we and the things around and about us are "algebraic symbols in the Great Mathematician's equations" — if this is not "man creating God in his own image", I ask you what is?

Masterton, 1.8.31

As Arthur Prior was completing his studies at Wairarapa High School, he wrote three essays on science, literature and religion respectively. The essays were all written during September and October 1931, when Prior was just 16 years old. This volume contains all three essays, along with four chapters analysing and discussing Prior's texts.

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