

APPENDICES

INDICES and DOCUMENTS

Mogens True Wegener

INDEX OF GREEK WORDS

ἀγαθόν	agathon	kindness
ἄγγελος	aggelos	angel
ἀήρ	aer	air
αἰθήρ	aither	ether
(ὁ) αἰών	aion	eternity
αἰτία	aitia	cause
αἴσθησις	aisthesis	perception, sensation
ἀλήθεια	aletheia	truth, veracity
ἀλληγορία	allegoria	imaginary speech
ἀνάγκη	ananke	necessity
ἀναλογία	analogia	analogy, proportion
ἀναμνησία	anamnesia	recalling
ἀριθμός	arithmos	number, rhythm
ἁρμονία	harmonia	concord
ἀρχή	arche	origin, beginning
ἀστέρια	asteria	stars
αὐτάρκεια	autarkeia	self-sufficiency
Γαία	Gaia	Earth
γεωμετρία	geometria	geometry
γῆ	ge	earth
γνωθή σῆαυτόν	"know thyself"	(word of Delphian oracle)
γράφω	grafo	write
Δημιουργός	Demiourge	divine artificer, Mastergod
διαλεκτική	dialektike	discussion as an art
δόξα	doxa	opinion, belief
δύναμις	dynamis	possibility, force
εἶδος	eidos	form (Platonic, Aristotelian)
εἰκόν	eikon	icon, copy, (holy) picture
ἐκλειπτική	ekleiptiki	ecliptic, circle of animals
ἐμπειρία	empeiria	sense-experience
ἐνέργεια	energeia	energy, work
ἐπιστήμη	episteme	knowledge, science
ἐπιστροφή	epistrofe	return
ἐποχή	epoche	temporal divide
ἔρος	eros	love as desire
εὐδαιμονία	eudaimonia	happiness, well-being

εὐαγγέλιον	evaggelion	gospel, happy message
(τό) ἑξαφνές	exafnes	the sudden, "an eye's twinkle"
ζῶα	zoa	animal, living being
(ὁ) Θεός	(ho) Theos	God
θεολογία	theologia	"divine science"
θέση	these	thesis
ἦθος	ethos	behaviour
ἠθική	ethike	ethics
ἰδέα	idea	form (Plato)
ἱστορίη	historie	inquiry, investigation
κατηγορία	kategoria	category
κίνησις	kinesis	motion, change
κόσμος	kosmos	ornament, the universe
κριτής	krites	judge
Κρόνος	Kronos	"Old Fool", father of Zeus
κωμωδία	komodia	comedy
λόγος	logos	word, concept, language
λογική	logike	logic
μαθηματικά	mathematika	mathematics
μεταφυσική	methaphysike	metaphysics
μέθεξις	methexis	participation
μίμημα	mimema	copy, image, picture
μίμησις	mimesis	imitation, reproduction
μοῖρα	moira	(goddesses of) fate, destiny
μοναδολογία	monadologia	monadology
μονή	mone	unit
μύθος	mythos	fabulous tale
νόησις	noesis	reason as calculation
νόμος	nomos	law, rule, code
νοῦς	nous	reason as understanding
ὅλον	holon	totality, wholeness
ὁμοίοσις	homoiosis	equating, making equal
Οὐρανός	Ouranos	(the god of the) Heaven
οὐσία	ousia	thing, substance
(τό) ὄν	(to) on	being
ὀντολογία	ontologia	the doctrine of being
(τό) πᾶν	(to) pan	everything, the universe
πάντα ῥέει	panta hrei	everything flows
παράδειγμα	paradigma	example, model
παράδοξο	paradoxo	enigma, what defies reason
πατέρ	pater	father, originator

πίστις	pistis	conjecture, belief, faith
πλανήται	planetai	planets, ramblers, rovers
ποιήτης	poietes	poet, creator, originator
πολιτεία	politeia	city state, nation
πολυεδρόν	polyedron	many-sided figure
πρόβλημα	problema	problem
πρόγραμμα	programma	program
πρόνοια	pronoia	foresight, providence
πρόδος	proodos	going out, transcendence,
πύρ	pyr	fire
σημαντική	semantics	doctrine of meaning
σκεπτικισμός	skeptikismos	scepticism
σοφιστής	sofistes	sofist, "tutor in wisdom"
σῶμα σημα	soma sema	the body (is) a tomb (for the soul)
στάση	stase	stopover, stance
συμβούλιον	symbolion	symbol, token
σύνθεση	synthese	synthesis, composite thought
σύστημα	systema	unity of parts, complex structure
τάξις	taxis	order, regulation
τέλος	telos	goal, purpose
τόπος	topos	place, position
τύχη	tyche	chance, casualty
ὑβρις	hybris	conceit, arrogance, vainglory
ὑδωρ	hydor	water
ὑπόθεση	hypothese	surmise, conjecture, supposition
φαινόμενα	fainomena	phenomena, appearances
φαντασία	fantasia	phantasy, imagination
φιλία	filia	love, affection
φιλοσοφία	filosofia	philosophy, devotion to wisdom
ἡ φυσικῆς	he fysikes	physics
φώς	fos	light
χάος	chaos	disorder, confusion
χίμαιρα	chimaira	fabulous appearance
Χριστός	Christos	Christ, God's anointed
χώρα	chora	void, cleft, abyss
χωρισμός	chorismos	gap, break, disconnection
χρόνος	chronos	time
ψεύδης	pseudes	false
ψυχή	psyche	mind, soul
σώσειν τὰ φαινόμενα		saving the appearances
(τὰ) μετά τὰ φυσική		(the roll on the book shelf) after the physics

INDEX OF LATIN WORDS

<i>aeternitas</i>	<i>eternity</i>
<i>ab urbe condita</i>	<i>from the founding of the city (Rome)</i>
<i>actus purus</i>	<i>pure act</i>
<i>adaequate</i>	<i>adequate</i>
<i>adaequatio</i>	<i>correspondence</i>
<i>ad hoc</i>	<i>to this (purpose)</i>
<i>ad hominem</i>	<i>to (against) the person</i>
<i>ad partem bonum</i>	<i>to the good part (:Heaven)</i>
<i>ad partem malum</i>	<i>to the bad part (:Hell)</i>
<i>aequator</i>	<i>"circle of identity" (Plato)</i>
<i>aliquid</i>	<i>something</i>
<i>á posteriori</i>	<i>according to experience</i>
<i>á priori</i>	<i>anticipating experience</i>
<i>bene fundatum</i>	<i>well founded</i>
<i>canis</i>	<i>dog</i>
<i>caput mortuum</i>	<i>skull</i>
<i>caritas</i>	<i>charity (Augustine)</i>
<i>causa sui</i>	<i>cause of itself (Spinoza)</i>
<i>conjunctio</i>	<i>conjunction, a welding together</i>
<i>contingent</i>	<i>fortuitious, incidental</i>
<i>contradictio in adiecto</i>	<i>contradiction by addition</i>
<i>contrapasso (ital.)</i>	<i>just retribution (Dante)</i>
<i>copula</i>	<i>connection, attachment</i>
<i>creatio ab aeterno</i>	<i>creation of eternity</i>
<i>creatio ex nihilo</i>	<i>creation from nothing (Augustine)</i>
<i>creatio in principio</i>	<i>creation in the beginning (Thomas)</i>
<i>credo quia absurdum</i>	<i>I believe because it is absurd (Tertullian)</i>
<i>credo ut intelligam</i>	<i>I believe in order to understand (Augustine)</i>
<i>cum grano salis</i>	<i>with a grain of salt</i>
<i>de facto</i>	<i>according to fact</i>
<i>de jure</i>	<i>according to law</i>
<i>Deus sive Natura</i>	<i>God or Nature (Spinoza)</i>
<i>docta ignorantia</i>	<i>learned ignorance (Socrates, Cusanus)</i>
<i>Dominicans</i>	<i>mendicant order, "black friars"</i>
<i>"domini canes"</i>	<i>"dogs of the lord", members of the inquisition</i>
<i>dominus</i>	<i>(the) lord</i>

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<i>ductus lacrymalis</i>	<i>the duct of tears</i>
<i>ecliptic</i>	<i>"circle of difference" (Plato)</i>
<i>emanatio</i>	<i>emanation, overflow</i>
<i>ens creatus</i>	<i>created being</i>
<i>ergo</i>	<i>so, therefore</i>
<i>ex(s)istentia</i>	<i>appearance (in time and space)</i>
<i>ex nihilo nihil fit</i>	<i>nothing comes from nothing</i>
<i>explanandum</i>	<i>what is to be explained</i>
<i>explanans</i>	<i>the explaining instance (reason / cause)</i>
<i>explanatio</i>	<i>the explanation itself</i>
<i>ex post facto</i>	<i>according to the facts</i>
<i>factum brutum</i>	<i>hard fact</i>
<i>flatus vocis</i>	<i>empty talk</i>
<i>Franciscans</i>	<i>mendicant order, "grey friars"</i>
<i>glandula pinealis</i>	<i>the pineal gland</i>
<i>gratia</i>	<i>grace, mercy, kindness</i>
<i>idem</i>	<i>the same</i>
<i>identitas</i>	<i>identity, sameness</i>
<i>immanens</i>	<i>immanent, inherent</i>
<i>intellectus</i>	<i>intelligence, understanding</i>
<i>intelligo</i>	<i>I understand</i>
<i>ipsum</i>	<i>self</i>
<i>justus</i>	<i>just, righteous</i>
<i>lex</i>	<i>law, code, rule</i>
<i>Lucifer</i>	<i>the bearer of light (Satan)</i>
<i>maius</i>	<i>bigger, greater</i>
<i>mea culpa</i>	<i>my fault, my guilt</i>
<i>melius</i>	<i>better</i>
<i>mens</i>	<i>mind</i>
<i>miraculum</i>	<i>wondrous event</i>
<i>modus de dictu</i>	<i>mode of speech</i>
<i>modus de re</i>	<i>mode of being</i>
<i>mos</i>	<i>habit, custom</i>
<i>nunc fluens</i>	<i>the now as flowing</i>
<i>nunc stans</i>	<i>the now as standing</i>
<i>peccare</i>	<i>to sin</i>
<i>peccatum</i>	<i>a sin</i>
<i>peccator</i>	<i>a sinner</i>
<i>perficio</i>	<i>make perfect</i>
<i>perpetuum mobile</i>	<i>eternally in motion</i>
<i>plenum formarum</i>	<i>a plenitude of forms</i>

<i>posse</i>	<i>to be able</i>
<i>praedicamenta</i>	<i>(the ten) predicaments (Aristotle)</i>
<i>prima causa</i>	<i>the first cause (Aristotle)</i>
<i>primum mobile</i>	<i>the uttermost sphere (Aristotle)</i>
<i>primus motor</i>	<i>the first (unmoved) mover (Aristotle)</i>
<i>pulchrum</i>	<i>beautiful</i>
<i>ratiocinatio</i>	<i>calculation</i>
<i>ratio sufficiens</i>	<i>sufficient reason (Leibniz)</i>
<i>studium rerum gestarum</i>	<i>"the study of the past" (Hegel)</i>
<i>res cogitans</i>	<i>a thinking thing (Descartes)</i>
<i>res extensa</i>	<i>an extended thing (Descartes)</i>
<i>res gestae</i>	<i>past feats (Hegel)</i>
<i>scala naturalis</i>	<i>the ladder of nature</i>
<i>sensorium</i>	<i>"space of sensing" (Newton)</i>
<i>Soli Deo Gloria</i>	<i>God alone be honoured</i>
<i>speculum</i>	<i>mirror</i>
<i>sub luce aeternitatis</i>	<i>in the light of eternity (Dante)</i>
<i>sub specie boni</i>	<i>under the angle of the good (Augustine)</i>
<i>sub specie mali</i>	<i>under the angle of the bad (Augustine)</i>
<i>tertium non datur</i>	<i>there is no third (option)</i>
<i>tollere</i>	<i>nullify, withdraw</i>
<i>transcendens</i>	<i>beyond experience</i>
<i>transcendentalia</i>	<i>basic concepts of experience</i>
<i>unum</i>	<i>one</i>
<i>veritas</i>	<i>truth</i>
<i>verae causae</i>	<i>true causes (Galileo)</i>
<i>via affirmativa</i>	<i>the way of affirmation</i>
<i>via negativa</i>	<i>the way of negation</i>
<i>visio dei</i>	<i>the vision of God</i>
<i>vis viva</i>	<i>"living force", energy (Leibniz)</i>
<i>Entia ad libitum sunt multiplicanda</i>	<i>Things may be multiplied as it may please</i>
<i>Entia non sunt multiplicanda praeter necessitatem (Ockham?)</i>	<i>Things may not be multiplied unnecessarily</i>
<i>Nihil sciri nisi veritas (Thomas ab Aquino)</i>	<i>Nothing can be known except the truth!</i>
<i>Ubi extensio, ibi materia, et ibi geometria (Descartes, Galileo):</i>	<i>Where there is extension, there is matter and geometry.</i>
<i>Unum quodque, quando est, oportet esse (Leibniz):</i>	<i>When something is, it has to be (: to deny a fact implies contradiction).</i>

INDEX OF NOTABLE TERMS

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<i>absurd, absurdity</i>	9,14,43,49,53f,73,93.105,143,162,165f,177,208
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European Society for Analytic Philosophy

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ECAP 2

European Congress of Analytic Philosophy

Leeds, 5-7 September 1996

Mogens Wegener
Department of the History of Ideas
Ndr. Ringgade, B.328
University of Aarhus
DK-8200 Aarhus
Denmark

20.06.96

Dear Mogens Wegener

I am pleased to tell you that your paper

"St. Anselm's Proof of God"

has been accepted for presentation at ECAP 2.

Presentations should last 30 minutes, allowing 20 minutes for discussion.

Could I please ask you to provide me with a shorter abstract, of not more than one side of A4 paper, for the congress abstracts volume.

I or my assistant will be in touch with you shortly about accommodation.
Thank you for your contribution and I look forward to welcoming you in Leeds.

Yours sincerely



Peter Simons
President, ESAP



Twentieth World Congress of Philosophy
Paideia: Philosophy Educating Humanity
Boston • August 10–16, 1998 • USA

October 24, 1997

Prof. Mogens Wegener
Dept. of the History of Ideas
Aarhus University
Bygning 328
DENMARK

Dear Prof. Wegener,

I am pleased to inform you that your paper, "Dante on Time and Eternity", has been accepted for presentation in the Philosophy and Literature Section at the *Twentieth World Congress of Philosophy*.

The schedule of the Congress will be posted at the Congress website early in 1998. Consult the website at www.bu.edu/WCP for information regarding the program, including the time of your presentation.

This Congress, which promises to be extensive in numbers of participants and rich in content beyond any precedent, will bring together philosophers from all over the world and feature much of the best current work in philosophy. Given the scholarly significance of this Congress, and its potential for intellectual exchange across cultures and traditions, we hope that you will be able to secure institutional resources to defray part or all of your expenses.

May I also ask that you read carefully the attached information from the American Organizing Committee as it pertains to the technical aspects of your paper and abstract and to the registration process. Close attention and adherence to these requirements will greatly help the administrative work of the AOC, Inc.. Please be advised that negotiations concerning the publication of the Congress *Proceedings*, in whole or in part, are still in progress. We cannot provide a definitive statement regarding the policy of publication at this time.

With all best wishes from the Program Committee, I remain,

Sincerely yours,

Ernest Sosa
Co-Chairman, Program Committee
International Federation of Philosophical Societies

Encl.

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745 Commonwealth Avenue, Boston, Massachusetts 02215
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MOGENS J. WEGENER

ANDRÉ MERCIER

GOD, WORLD, AND TIME

With a Preface by

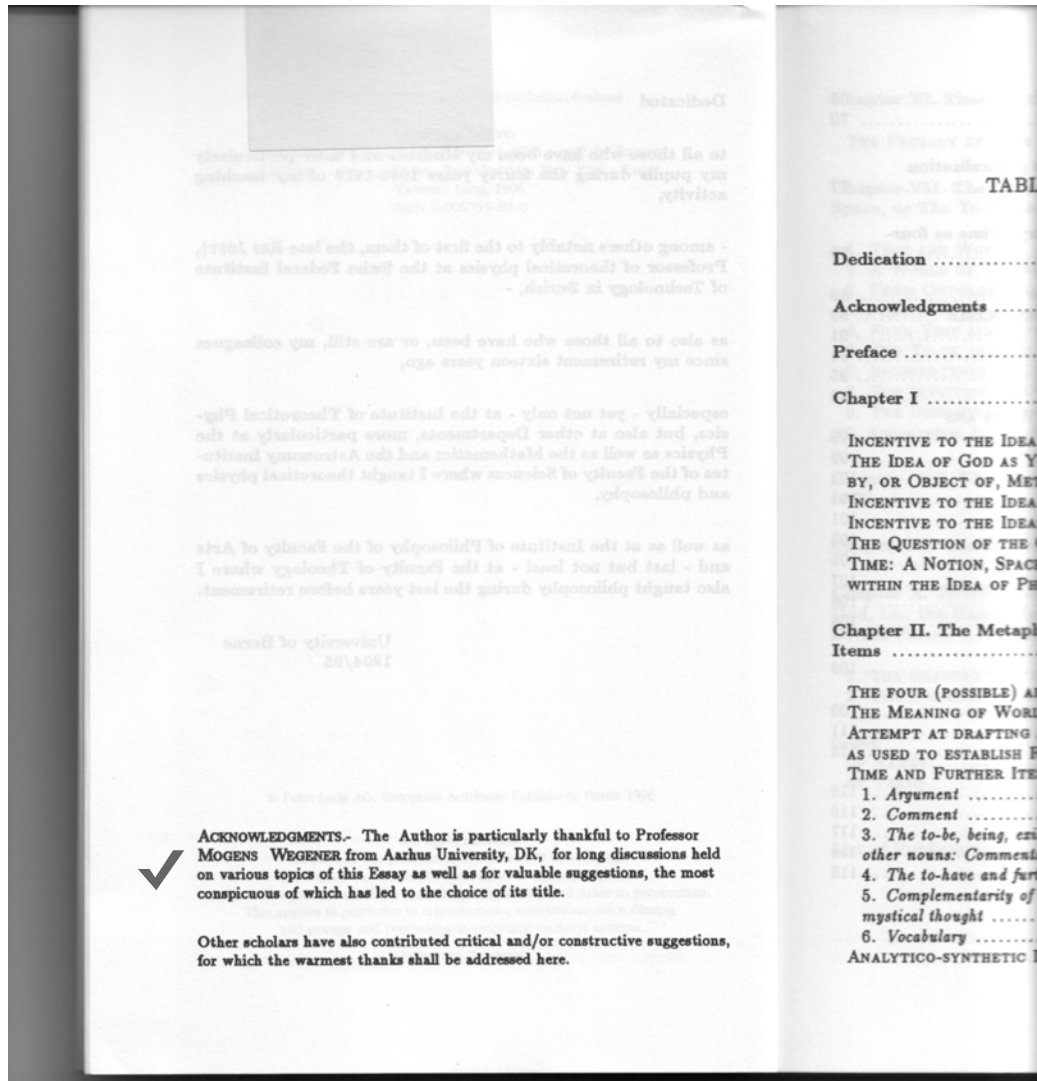
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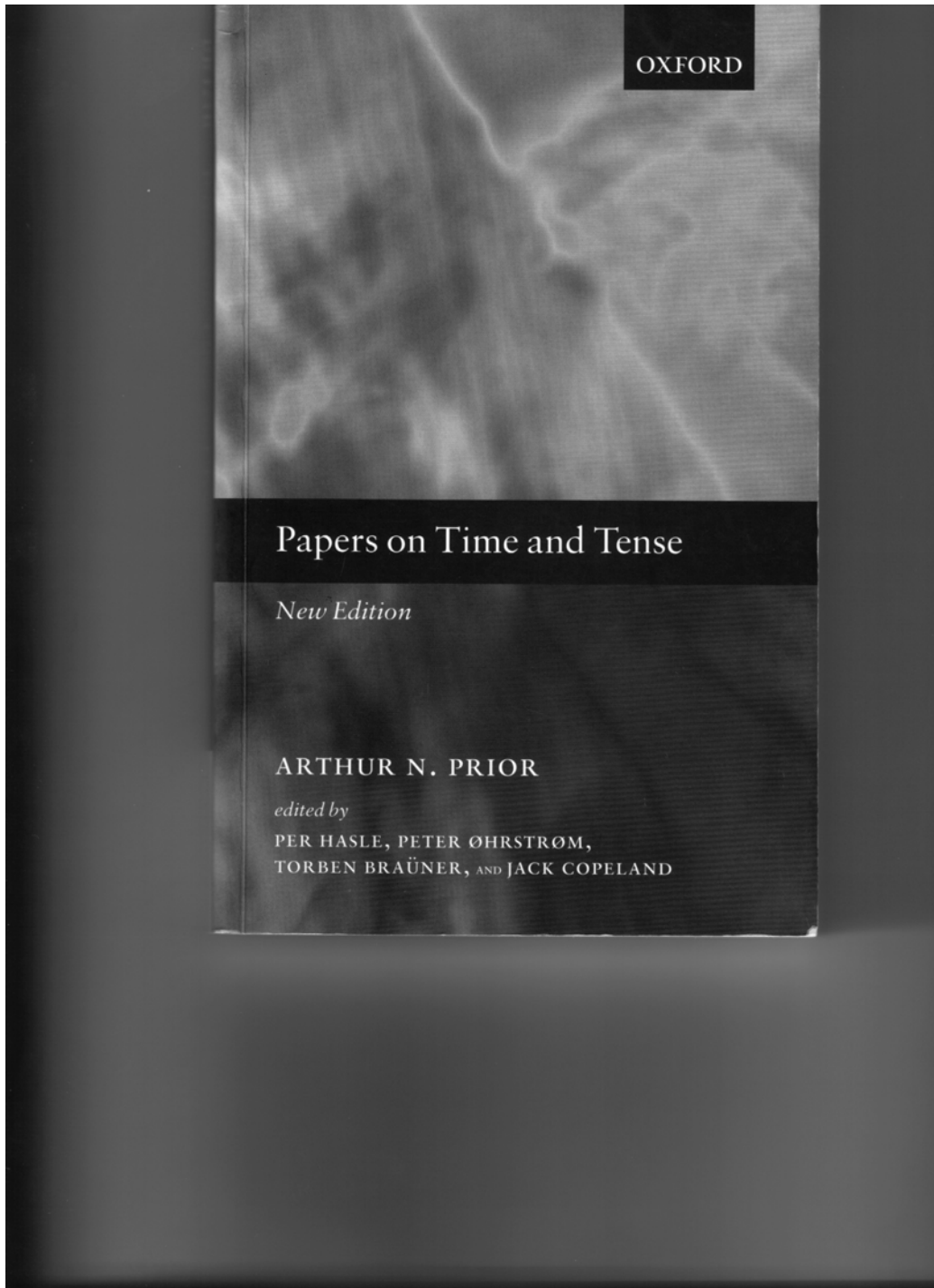
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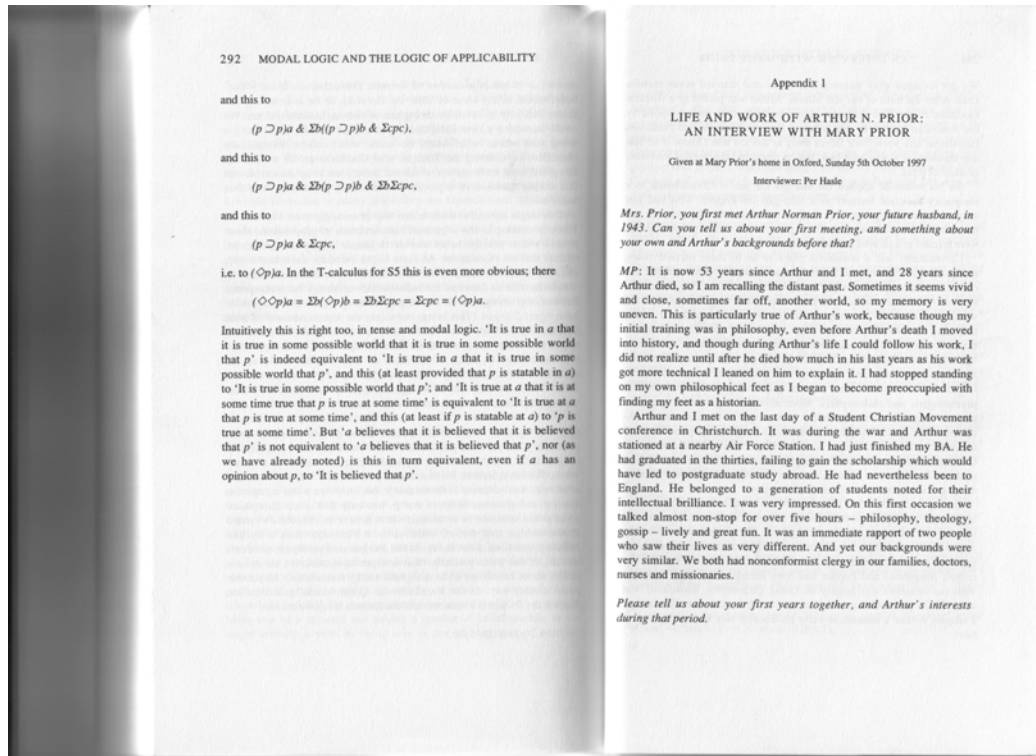


PETER LANG

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childhood. But its God lacked humanity. I think sometimes he entertained Calvinism in its various forms rather than quite believing it. He was very aware of the dilemmas it posed. Perhaps his failure to resolve them was a reason why despite so much preparation the book on Scottish Theology never came to anything. In his later work I think he was prepared to go where logic led him, but the idea of the future as open to choice, where the past and present were not, may also have had deeper emotional attractions. But here I speculate.

✓ Recently, Arthur Prior's tense logic has been likened by some, notably Mogens Wegener,⁸ to the philosophy of Søren Kierkegaard, who also considered the notion of the 'now' to be of crucial importance. Kierkegaard, of course, took a special interest in the existential implications, whereas tense logic rather naturally emphasises the logical importance of the 'now'. But we do know that Arthur studied Kierkegaard with interest as a young man, and also wrote a bit about him.⁹ We wonder whether you can add something about Arthur's view on Kierkegaard, and the possible relation between Kierkegaard's thought and Arthur's.

✓ I find Mogens Wegener's suggestion that Arthur's tensed logic can be likened to that sketched by Kierkegaard fascinating. It would be interesting to know whether Arthur had read the passages in Kierkegaard in which it was developed (*Philosophical Fragments* and the *Concept of Dread*) [Kierkegaard 1985/Kierkegaard 1980]. If he read them it was when he was reading Kierkegaard as a young man and it must have lain fallow. But he read him in the years before I met him. The only work of Kierkegaard I know he possessed was a translation of *Lidelsernes Evangelium* (*Gospel of Sufferings*) [Kierkegaard 1991] which appeared in 1955. It was translated by a friend, W.S. Ferrie, a Birmingham Presbyterian clergyman. I don't know how much was accessible to Arthur pre-1943 in English or French. In this period he read a lot of European philosophy and literature. Refugees from Nazi

✓ ⁸ See [Wegener and Øhrstrøm 1997], which suggests this line of thought, albeit indirectly. The issue is further dealt with in a manuscript in Danish, as well as in an as yet unpublished English-language manuscript, both by Wegener.

⁹ See [Prior 1940] and also 'Children of the Damned' under 'Boxes' → 'Box 1-11' → 'Contents of Box 6'. An interesting and more mature reference to Kierkegaard can also be found in [Prior 1956, p. 96].

oppression were flooded Zealand providing a rich

Arthur Prior also had poor and otherwise op and do they relate to his

Arthur was left-wing fi felt something had gon arguments if they had e ceased to relate to the re of course dialectic had. However, I doubt if he his first wife, was a car ended in middle age by a

In December 1956, yo About two years lat professorship in Manch us about those last two y

Although Arthur did na 1959 – we held Christm yet to be created second

The last two years im save that Arthur's co looked forward to mo remember at that time f sea voyage took a month logician in NZ is not cut

In this period, howev the JSL [Journal of Sy associate editors, and as 1959] for consideration highlight of these years years, and indeed, from John Mackie, who had c to the Wellington Chair, and once the examining

the
Arguments
of
TIME

edited by
Jeremy Butterfield

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x Notes on Contributors

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Michael Tooley is Professor of Philosophy, University of Colorado at Boulder. He is author of *Time, Tense, and Causation* (OUP, 1997); *Causation: A Realist Approach* (OUP, 1987); and *Abortion and Infanticide* (OUP, 1983); and co-editor (with Ernest Sosa) of *Causation* (OUP, 1993). He is a Fellow of the Australian Academy of the Humanities. Address: Philosophy Department, University of Colorado at Boulder, Boulder, Colorado, 80309, USA.

✓ **Roberto Torretti**, formerly Professor of Philosophy at the University of Puerto Rico, is the author of: *Philosophy of Geometry from Riemann to Poincaré* (Reidel, 1978); *Relativity and Geometry* (Pergamon, 1983); *Creative Understanding* (University of Chicago Press, 1990); and *The Philosophy of Physics* (CUP, forthcoming). Address: Casilla 20017, Correo 20, Santiago, Chile.

✓ **Michel Treisman** has spent most of his career as a Lecturer and Reader in Experimental Psychology at the University of Oxford, with an interruption of five years when he was Head of the Department of Psychology at the University of Reading. His interests, and publications, have been in psychophysics and memory, with a side-line in evolutionary biology. He is now an Emeritus Fellow at New College and Emeritus Reader in Experimental Psychology at Oxford. Address: Department of Experimental Psychology, South Parks Road, Oxford OX1 3UD, UK.

Preface

✓ In 1996, the British Academy asked its sections to consider preparing a volume in their discipline to commemorate the Academy's centenary in 2002. The Philosophy Section decided that, rather than presenting retrospective essays about philosophy in the twentieth century, or essays about the present state of philosophy's various branches, it would be better to take a single theme.

✓ Time soon emerged as a suitable theme, for several reasons. It is a perennial source of philosophical puzzlement. It has been much discussed in twentieth-century British metaphysics, from McTaggart and Russell onwards. With the advent of relativity theory, it became a central topic in philosophy of science. And it is addressed in allied disciplines, linguistics and psychology, which are represented in the Academy.

I was very complimented when the Philosophy Section asked me to choose and invite prospective authors, and to edit the volume. I am also grateful for the Section's indulgence in allowing me to tilt the contents of the volume to the topics closest to my own interests as a philosopher of physics. I offer two excuses, one retrospective and one prospective. First, the twentieth-century revolution in the physical understanding of time brought about by Einstein's relativity theories had a profound influence on both metaphysics and epistemology within analytic philosophy, through such authors as Russell, Whitehead, Schlick and Reichenbach. Second, and much less widely known among philosophers, the nature of time continues to be a controversial topic in present-day fundamental physics, and it is a controversy with many philosophical aspects.

For advice at an early stage I am very grateful to David Luscombe, the Academy's Publications Secretary; to Tim Smiley and other philosophical colleagues; and to Alan Baddeley. For expert help and guidance throughout the production of the book, it is a pleasure to thank James Rivington and Janet English at the Academy, Campbell Purton for the index, and especially Elizabeth Teague.

JNB

Mogens True Wegener

at the time when the prediction is made, from the truth conditions for conjectures, which are easier to satisfy since they hold only after the event.

The lengthening of the trunk can be seen also in terms of a different account, which holds that the future is unreal, and only the present and past are real. The passage of time is then the accretion of fresh slices of reality.³⁰ The ontological account is slightly less good than the modal account, because it does not distinguish between unreal futures that are quite impossible and unreal futures that are quite possible but not yet realized in actuality. Nevertheless, the ontological account captures important insights about individuals: future individuals do not exist; there are no moral problems over abstinence as there are with abortion—if I fail to sow my wild oats, there are no possible people to complain that they have been deprived of existence, whereas an embryo arguably has a right not to be terminated. Prior explores the logic of the modal and ontological accounts in chapters VII and VIII of his *Past, Present and Future*, and the two have been combined into a single treatment by Wegener.³¹

Quantum mechanics seems to support a modal understanding of time, with time as the passage from the open future through the actuality of the present to the unalterable fixity of the past; and this in turn supports an ontological picture, with the passage of time being marked by the accretion of unalterable truth. These characterizations of time seem profound. They enable us to give a non-circular definition of terms like 'before' and 'after', or 'earlier' and 'later', terms which advocates of tenseless accounts need, but cannot give content to in a purely tenseless way.

5. Alpha and Omega

Cosmologists speculating about the origin and destiny of the universe have raised difficult questions about time. In the middle of the twentieth century continuous creation was in favour, drawing support from the homogeneity of time which holds that no date should be special. But the empirical evidence of the background radiation told against it. We are still picking up the echoes of the Big Bang, when our universe exploded into existence. It was natural for thinkers to wonder whether the beginning of the universe was also the beginning of time, or whether there had been time before the Big Bang, and if so, mindless of Augustinian dangers, to ask what had been happening then.

³⁰ Broad (1923, ch. 2, pp. 66–67, 73). See also Godfrey Smith (1978) and Lloyd (1978).

³¹ Wegener and Olsson (1997). The formalism has been improved and simplified in a paper by Wegener (with Olsson), entitled 'A New Tense Logic for Created Truths', forthcoming.

Positivists deny that there could be time without change, and conclude that before there was a universe in which change could happen, there could not have been any time. But although we may need change to measure time, change is not a necessary concomitant of time. We can have time passing without there being any change.³² The mere fact that the universe had a beginning does not of itself constitute a beginning of time too. Time may have begun then, or may have begun earlier, or may have been beginning-less.

Beginning-less time can be understood in two ways: metrically and topologically. If time can be measured, then either there is some finite number of years (or some other suitable isochronous intervals) that have elapsed since the beginning of time, or there is not: if the former, time began that number of years ago; if the latter, time had no beginning but has been flowing from everlasting. It is important to specify that the intervals be isochronous; otherwise the condition becomes vacuous—there are infinitely many finite intervals between 1 AD and 2 AD of the form $[1+1/2^{(n+1)}, 1+1/2^n]$ with n running from 0 to ∞ ; and more generally, any finite magnitude can be transformed into an infinite one by a suitable strictly monotonic function. Isochronous intervals are determined by periodic processes, such as the rotation of the earth, its orbiting round the sun, the vibration of a caesium atom. It is a contingent fact that these processes all keep in step; it could be that there were two families of processes, each in internal harmony, but out of step with each other,³³ the infinite past of the one constituting only a finite past as measured by the other, with accompanying difficulties in deciding which, if either, was more fundamental. But, so far as we know, natural processes all keep in step: there is "a natural rhythm to the universe", which would support an unambiguous extrapolation backwards beyond the Big Bang, provided we can attach meaning to natural processes or a natural rhythm then. Many cosmologists deny it, holding that the Big Bang was a spacetime singularity at which all the laws of nature broke down. But we might view it along the lines of Plato's *Timaeus*, in which the Demiurge creates in accordance with pre-existent patterns: we might hold that quantum mechanics did not just happen to be true in our universe, but *he* in some relevant modality necessarily true, so that even if caesium atoms did not exist, we could still counterfactually count the number of vibrations that would have occurred. In that case it would be a perfectly definite question whether there had thus far been only a finite number or an infinite number of possible caesium vibrations, and hence whether time had a beginning or was beginning-less.

³² This has been shown most convincingly by Shoemaker (1969). See also Newton-Smith (1980, ch. 2, sections 5 & 6, pp. 19–28); Williams (1986) and Le Poidevin (1991, ch. 6).

³³ As suggested by Milne (1948, pp. 224–225); see also Swinburne (1996).

Post-program: **Windows Eudora Light Version 1.5.4 (16)**
Til: **Mogens Wegener <idemw@hum.aau.dk>**
Fra: **John Randolph Lucas <john.lucas@merton.oxford.ac.u**
Emne: **A New Time Logic**
Afsendelsesdato: **Thu, 11 Jun 1998 20:42:51 +0000**

Dear Dr Wegener,

I am afraid I have been an unconscionable time in responding to you paper
``A New Tense
Logic for Created Truth",
but have been much occupied in trying to get something off my chest.
That is now done, and I have (re)turned to time,
and have read your paper several times through, with much interest and plea

- ✓ Of course, I am sympathetic to what you are trying to do, and hence not a severe critic.
One point I think especially valuable is that you are welding together chapters VII and VIII of Prior's *Past, Present and Future*.
This brings into sharp relief the fact that there are two separate metaphors used by the
``Friends of Time" (as I call them):
1. A modal account---time is the passage from possibility through actuality to fixity/necessity/unalterability.
2. An ontological account---the future does not exist; only the present and past exist, and the passage of time is a continual accretion of factual existence. (Broad is the exponent of this view that I know best, though there are many others.)

- ✓ Many years ago I played around with 2, but never managed to articulate it satisfactorily.
It is a great merit of your W that it does this at the same time as dealing with the future in terms of possibility;
just to say the future is unreal is too negative---some putative future events are quite possible, whereas others are impossible.

You criticize me for not discussing Peirce.
But I am not a Peircean.
I want to give an account of the ``actual future" as well as of future necessity and future possibility.

Mogens Wegener

-- 1 --

Thu, 9 Jul 1998 11:55:16

In order to avoid logical determinism, I allow only valedictory truth to be ascribed to actual future propositions;
I am here an Occamist in Prior's terminology (though I don't discuss Ockham either).
I found it v. difficult to blend the two approaches, though I hope my ``sub-tree semantics" does the trick.

I also reject Peirce's way out as expressed in your quotation from him in section 10.
It seems to me that a timeless God could be an object of worship but not someone to whom prayers could be meaningfully addressed, nor someone who is supposed to have intervened in history, either to chastise ancient Israel for their sins or to save mankind from theirs.
Although it was put forward by Boethius, and has been generally accepted as orthodox,
I don't think Aquinas succeeded in making sense of it.

There can be problems in ascribing dates to counter-factual world-states.
You secure them by including clocks.
Michael Lockwood has an interesting discussion in ``As Time Goes By", International Studies in the Philosophy of Science, 11, 1997, pp.40-45.

I noted three very small omissions or misprints.
I expect you have already picked them up, but list them here in case you have missed one:
Section 4, line 3 possible is what is true in <at least> one
next page, 3/5ths down effect a transl[at]ion
same page 3rd line from bottom necessarily exist[s]

I have started on Tooley, *Time, Tense & Causation,*, but have not mastered it yet.

I shall think of more things to say, but shall not delay any longer this very tardy response, which comes with my apologies---and good wishes.

Yours sincerely

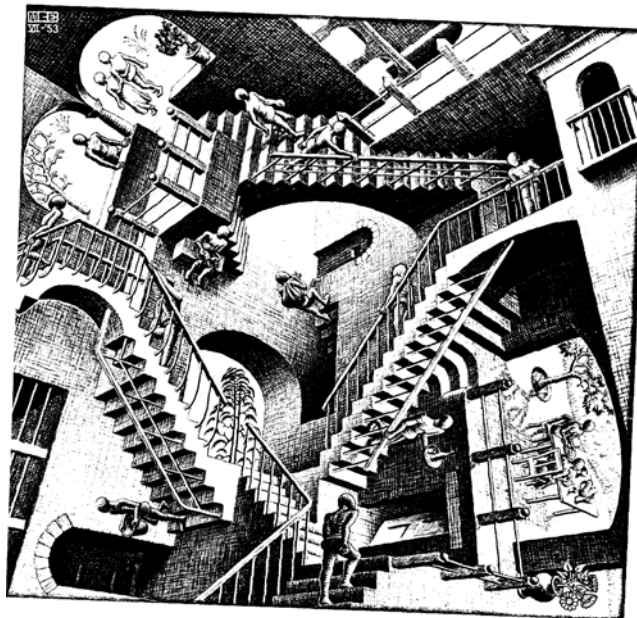
J.R. Lucas
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East Lambrook

Mogens Wegener

-- 2 --

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PREFACE

The title given to this selection, *Recent Advances in Relativity Theory*, derives from a suggestion originally made to the academic committee by one of its members, Prof. F. Selleri. Of course, this could not have been the title given to a series of conferences: one cannot decide, but only hope, that a planned series of scientific conferences will issue in theoretical advances. In retrospect, however, one may get a feeling that the hope has not been entirely in vain.

So, by adopting the proposed title instead of the original title of the conferences

Physical Interpretations of Relativity Theory

the editors wanted to hint at the fact that the present selection of papers, which covers the years 1988-1996, in their opinion offers more than mere interpretations, or re-interpretations, of an entrenched theory of modern physics, namely that of Relativity. Indeed, already the attempt to convene not only a single meeting but a whole series of meetings focussing on this topic was a strong signal that the one and only initiator and organiser of these meetings, Dr. M.C. Duffy of the University of Sunderland, did not see the subject as closed nor the usual conclusions as final. It demands courage to send such a signal to the establishment, and it presupposes both a strong health, a great administrative talent and a large measure of diplomacy to realize such an attempt. I believe that I speak on behalf of all participants in these meetings when I say that their success, the extent of which is yet to be judged by the readers of this volume as well as the one to follow, is due almost entirely to a single person: Michael Ciaran Duffy.

The present volume, together with the one in preparation, comprises 2×30 papers of approximately 2×280 pp. Considering this amount to be too much for a single volume, it was decided to split it up into two. Realizing that it was problematic to organize all papers according to their subject-matter, an alphabetic order was chosen for each volume. Finding it awkward to let the two volumes be distinguished by an arbitrary letter, say *Q*, an attempt was made to suggest a preliminary separation of thematic priorities by distinguishing the contents of the volumes according to the kind of interpretation favoured by the papers. So we chose to settle on a very rough division of the papers according to whether they - *prima facie* - represent what might be called *formal interpretations* (vol.1) or what might be called *material interpretations* (vol.2). Proceeding thus, a certain affinity to the original title of the meetings was preserved.

In place of an explicit organization of the material - which seems almost predestined to become "one-dimensional" - it would be possible to suggest various strategies of reading. However, in order not to impose my own views upon the reader I prefer not to be too explicit. But that much should be said: It appears that the papers of Ghosal & Chakraborty, Jennison, Kostro, Kroes, Øhrstrøm, Sjödin, Sklar, Tonkinson, and Törnebohm, constitute an important group treating crucial aspects of the formal structure of relativity theory (no priority intended). The papers of Barrett, Comte, Paparodopoulos, and Prokhovnik, place the theory of relativity firmly within a cosmological context. Advanced mathematical possibilities are investigated by Roscoe, Santilli, and Tavakol. Central metaphysical issues are discussed by Craig and Mercier. The inclusion of purely philosophical papers is justified by the sponsorship of BSPTS.



Mogens Wegener

Mogens True Wegener

INTRODUCTION

This volume contains papers written by participants in the *Physical Interpretations of Relativity Theory* conferences, sponsored by the British Society for the Philosophy of Science. The meetings, which are biennial, took place in the years 1988-1996 and are still continued; they were organised from the School of Engineering and Advanced Technology, Sunderland Polytechnic, now School of Computing, Engineering & Technology, University of Sunderland. The majority of the papers selected for inclusion in this volume were read at Imperial College, London, by their authors; but in some instances the authors were not able to read their paper at location, and their work was included in the conference proceedings as "supplementary papers". The present volume contains a first selection, and it is intended to issue others in the future.

The original objective of the meetings was to review the various interpretations of the mathematical formal structure of relativity theory, and to examine the models, analogues, and second interpretations, with which the mathematical formulations are sometimes accompanied. Relativistic ether theories and models, which interpret the accepted formal structure of relativity were included as themes fit for review. The relationship between current expositions of relativity and previous expositions, as e.g. the Poincaré-Lorentz or the Einstein-Minkowski expressions, was examined in meeting sections dealing with historical and philosophical aspects of physics. Experience gained through the meetings so far held has justified the impression that history and philosophy deepen insight into the various interpretations of the formal structure of relativity.

The use of the word "physical" in the title of the meetings implied no adverse criticism of the general prevalence of mathematical and geometrical formulations in 20th century physics. It indicated that the meetings were organised to review not only geometrised and mathematical expositions, but physical models of various kinds and experimental technique and equipment. They were also intended to review the range of meanings ascribed to the term "physical", as compared to "geometrical" or "mathematical". In order to do this, the programs were organised to bring together mathematicians, physicists, engineers, historians and philosophers in the hope that the work of each would disclose fresh and fruitful insights to colleagues working in other disciplines. The meetings fully demonstrated that much is to be gained from cross-fertilisation between those disciplines in which expertise in, and respect for, relativity theory are found.

A broad approach was taken, and papers were accepted dealing with the relationship between relativity and other basic fields in physics, such as quantum theory and cosmology. Whether or not the papers concentrated on mathematical, philosophical, experimental or other issues, the objective was to deepen insight into relativity, to provide a comprehensive review of contemporary issues, and so assist in the solution of outstanding problems. It cannot be claimed that traditional areas of dispute have been entirely removed. The controversies concerning ether formulations of relativity, the relative advantages and disadvantages of the Poincaré-Lorentz or the Einstein-Minkowski expositions, the ever-recurring discussions of the clock-paradox, and the criticisms of particular expressions of the relativity principle, have not been terminated. Nevertheless, the organisers hope that progress has been made towards bringing the several parties forward towards a fuller understanding of each other's position.

The conference objectives have remained substantially unchanged. The main objective was, and is, to explore the advantages, or disadvantages, of the various physical, mathematical and geometrical interpretations of the formal structure of relativity; to review differences of opinion concerning them; and to clarify them by calling on a range of disciplines including history, philosophy and epistemology, as well as the obvious disciplines within physical science. Permanent sections of the program include relativistic aspects of gravitation, cosmology, and space-time structure, as well as the nature of *vacuum*. Specialist sections were devoted to time, the reference frame, present-day relativistic ether theories and models, and to the relationship between physical, mathematical and geometrical concepts. The section devoted to consider the experimental aspects of relativity turned out to be particularly fruitful.

The organisers encouraged free discussion and criticism in a rational scientific spirit. The scope of the meetings was predicated on the accuracy and excellence of the principles and formal structure of relativity, special and general. They were organised to examine aspects of the various interpretations of this formal structure, including history, philosophy, methodology, in addition to technical and conceptual detail. Criticism of established opinion and theory was, of course, admitted - but it was decided to exclude papers of a polemical nature, particularly those written in an anti-Einstein, and anti-relativity spirit.

The papers selected for this first volume have been chosen in part to reflect the wide range of themes covered by the meetings and thereby to indicate the many aspects of relativity related to the interpretation of the established mathematical formal structure.

Considerable assistance was given by Sunderland Engineering Education Development Service, and School of Mechanical and Manufacturing Engineering, University of Sunderland, which provided facilities and funding to launch the conferences in 1988. Through the successive reorganisations of the engineering departments, resulting in the current School of Computing, Engineering and Technology, valuable assistance, support, and facilities, were provided which contributed greatly to the success of the conferences.

Valuable publicity for the meetings was provided by the Europhysical Society, the Fondation Louis de Broglie; London Mathematical Society; Royal Astronomical Society; Institute of Mathematics and its Applications; Institute of Physics; British Journal for Philosophy of Science; Foundations of Physics; General Relativity and Gravitation; International Journal of Theoretical Physics, and American Institute of Physics.

✓ Prof. M. Wegener must be honoured for his outstanding contribution to the publication of the present selection of papers. In every way he has been the chief editor, and he has been the prime mover in contacting authors, liaising with the publishers, editing the scripts, and preparing the collected papers in standard format.

Special thanks are also due to Prof. G.H. Keswani, Dr. P. Rowlands and Dr. M. Surdin for their kind advice and assistance by selecting and refereeing the papers.

Finally, I want to express my gratitude to the Institute for Basic Research, Florida, and its director, Prof. R.M. Santilli, for their generous offer to publish this selection.

Michael C. Duffy

Mogens True Wegener

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To
Professor M. Wegener
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Aarhus 8000c, Denmark
E-mail: idemw@hum.aau.dk

Date: February 11, 1999

Dear Prof. Wegener

Subject: Manuscript - *The Concept of Lorentz Invariant Clocks*

Please find enclosed the corrected manuscript entitled "*The Concept of Lorentz Invariant Clocks*" by P. Chakraborty and myself.

I once again appreciate your thoughtful editing of our paper. The presentation could not have been better. So kind of you! Apart from some typographical errors, that I have indicated on the copy by pencil mark I have nothing to say about your corrections and language.

However I would like to add a paragraph under a new heading ACKNOWLEDGMENTS the following :

The authors are indebted to Professor M. Wegener of the University of Aarhus, Denmark for his contribution towards improvement of the manuscript. One of the authors (SKG) would also like to thank Professor M. C. Duffy for his kind invitation to take part in the PIRT conference held at Imperial College, London.

I would like to further suggest that the name and address part in the first page (after the title) be changed a little. You may consider using a smaller font if you are constrained to accommodate this in one line. The suggested changes are written by pencil on the copy. I also enclose a page containing a list of suggested corrections. Thanks.

With Kindest regards,

Yours sincerely

A handwritten signature in ink, appearing to be 'S.K.' followed by a flourish.

S. K. Ghosal (Dr)

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E-mail: ghosal@nbu.ernet.in
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From: Emeritus Professor Roger C. Jennison, Ph.D., B.Sc., F.I.E.E.
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Prof. Morgens Wegener,
Dept. History of Ideas, Bygn328,
University of Aarhus,
N. Ringgade,
Aarhus 8200N,
Denmark.

1st February 1999.

Dear Prof. Wegener,

Many thanks for sending the proofs of my contribution to the Book.

I thought that I had responded some time ago but things have been a bit hectic here and I must have forgotten! Your rendering of the paper deserves the fullest praise. I have only spotted one minor spelling error - on the second page, third paragraph, third line - "propper" should read "proper".

I regret that I never had the pleasure of knowing Milne in person.

I have only had time to glance at your very interesting 1996 paper, but I hope to have the opportunity to read it properly when I return my 103 year old mother-in-law to the north of Scotland in a couple of weeks.

With very best wishes,

Yours sincerely,



Mogens True Wegener

Afsendelsesdato: **Fri, 26 Feb 1999 09:29:41 -0500**
Fra: **Institute for Basic Research <ibr@gte.net>**
Send svar til: **ibr@gte.net**
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Til: **Mogens Wegener <idemw@hum.au.dk>**
Emne: **Re: Santilli's PIRT-paper**

Dear Prof. Wegener,

Thanks for your consideration. I accept all your changes on the fact, the paper is now better and more understandable by a general audience.

Regards

R.M.Santilli
--

Prof. Ruggero Maria Santilli
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25121 BRESCIA 30th November 99

My dear Mogens Høegener,
you have actually done an excellent work in
editing the book of the chosen papers of PIRT.
I am enclosing our paper with small corrections.
You have been very careful and I can imagine
the time required for the whole book!
I think you have now acquired a great knowledge
of relativity.

I take occasion to ask you any news about
the late Proceedings of the last Conference
(PIRT 98).

Thanking you very much for your patient
and precious work, please receive my
warmest regards

Giancarlo Cavalleri

Foundations of Physics, Vol. 34, No. 11, November 2004 (© 2004)
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The Idea of a Cosmic Time¹

Mogens Wegener²



Received September 5, 2004

The paper shows the standard definition of time at a distance to be beset with ambiguities that may be solved by making a fresh start taking its point of departure in the idea of a cosmic time as proposed by the British tradition of relativistic cosmology.

KEY WORDS: temporal evolution; timelessness of reality; relativistic cosmology; cosmic time.

1. INTRODUCTION

In a special issue of *Scientific American* dedicated to *time* (vol. 287 no. 3, September 2002) a notable sceptic makes fun of the fact that *smart people often believe weird things*. The innocent reader may be surprised to learn that this ironical remark—targeting at phenomena like astrology, clairvoyance, magnetotherapy, and ufology—is also applicable to some of the allegedly 'scientific' views which are promoted in that issue, such as the opinion reported below.

Scientific American is generally acknowledged to be a serious magazine and Paul Davies, scientist of high repute, is considered to be one of the more reliable mediators of modern physics. Nevertheless Paul Davies makes himself a spokesman of the opinion that the idea of *temporal flux* is nothing but an illusion from the point of view of science. He even tries to underpin this view by appealing to the special theory of relativity, invoking the creator of that theory as his main witness. Indeed, Einstein made

¹This paper is written in honour of Franco Selleri, faithful defender of reason in physics, who committed his efforts to "the liberation of time from the enslavement to space."

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interesting suggestions is the theory proposed by Milne (Milne, 1952) several years ago, later reconsidered by Wegener (Wegener, 2004) in which gravity emerges as local deviations from global symmetry of the Universe. ...

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THE IDEA OF A COSMIC TIME.

... The questions about the ontological and epistemological role of curvature imply the search of alternative physical mechanisms able to originate gravity. One of the most interesting suggestions is the theory proposed by Milne (Milne, 1952) several years ago, later reconsidered by Wegener (Wegener, 2004) in which gravity emerges as local deviations from global symmetry of the Universe. NASA results confirm, with 0.4% margin of error, that universal space is "flat" (NASA, 2013). ...

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