

Centre for Advanced Study

at the Norwegian Academy of Science and Letters

# Annual Report 2004





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Centre for Advanced Study

at the Norwegian Academy of Science and Letters <sup>1</sup>

# ANNUAL REPORT 2004

The Centre for Advance Study (CAS) is a private foundation. The CAS was established by the Norwegian Academy of Science and Letters in 1989, but its activities did not commence in full until the autumn of 1992. Its purpose is to bring Norwegian basic research and interdisciplinary theoretical work up to the highest international level within the humanities/theology, the social sciences/law, natural sciences/medicine and mathematics. In 1993 an Operating Fund was established for the purpose of ensuring the running of the Centre. This fund is administered by the Board of the Centre.

<sup>1</sup> The Norwegian name is Senter for grunnforskning ved Det Norske Videnskaps-Akademi.

# 1. Administrative matters

The Board is the highest governing body of the Centre. Its composition is regulated by Article 4 of the Memorandum of Association, which reads as follows: “The Board of the Norwegian Academy of Science and Letters and the Universities and Colleges Council each appoint two members with alternates to the Board of the Centre. In agreement with the Universities and Colleges Council the Academy appoints one additional member who shall be the chairman of the Board, and it appoints the latter member’s alternate. ... The State nominates the sixth member of the Board. In agreement with the Universities and Colleges Council the Academy appoints one of the other members to be vice-chairman of the Board. ... The Board of the Norwegian Academy of Science and Letters has the right to appoint one of its members to serve as an observer on the Board of the Centre for Advanced Study.” The representative of the State is appointed by the Research Council of Norway (RCN)

The majority of the sitting members of the Board and their alternates were appointed with the same term of office in 1999. For this reason the number of retirements was greater in 2004 than earlier. In order to ensure gradual renewal and continuity in the Board’s work, the Board decided, in consultation with appointing bodies, that the new members of the Board and their alternates should be appointed with varying terms of office. In the light of this the following replacements/reappointments were made in the period covered by this Report:

## *Members of the Board:*

Professor Aanund Hylland, University of Oslo (chairman)

Professor Tore O. Vorren, University of Tromsø (vice-chairman), until 1.3.2004

Pro-rector Gerd Bjørhovde, University of Tromsø (vice-chairman), from 1.3.2004

Professor Kenneth Hugdahl, University of Bergen, re-appointed 1.11.2004

Professor Bjørn Tysdahl, University of Oslo – NASL, until 31.12.2004

Professor Kathrine Skretting, NTNU, Trondheim, until 1.3.2004

Rector Eivind Hiis Hauge, NTNU, Trondheim, from 1.3.2004

County Governor Ann-Kristin Olsen, County of Vest-Agder, until 1.4.2004

County Governor Leif Arne Heløe, County of Troms, from 1.4.2004 (formerly an alternate)

Secretary General Professor Reidun Sirevåg, observer

*Alternates:*

Professor Ragni Piene, University of Oslo (for Hylland), until 31.3.2004

Professor Ivar B. Ramberg (for Hylland), from 1.4.2004

Professor Jens G. H. Iversen, University of Oslo, (for Huggedahl), re-appointed 1.11.2004

Professor Sølvi Sogner, University of Oslo (for Tysdahl), until 31.12.2004

Professor Hanna Mustaparta, Trondheim (for Vorren), until 1.3.2004

Professor Erik H. Egeberg, University of Tromsø (for Skretting), until 1.3.2004

County Governor Leif Arne Heløe, County of Troms until 1.4.2004

Secretary General Anne Lise Ryel, (for Heløe), from 1.4.2004

Pro-rector Rune Nielsen, University of Bergen (for Hauge), from 1.3.2004

Research Director Ingvild Broch, University of Tromsø (for Bjørhovde), from 1.3.2004

The Board had four meetings in 2004. At these the following main items of business were discussed and/or decided: Selection of research groups for 2006/2007, amendment of the evaluation routines, accounts 2003, budget 2004, Annual Report from the Board 2003, half-yearly accounts 2004, the Operating Fund, approval of the co-operation agreements with the Norwegian School of Economics and Business Administration and the Agricultural University of Norway, revision of the co-operation agreement with the University of Tromsø, implementation of the process for finding candidates for 2007/2008, evaluation of the nomination process for the research groups 2006/2007, the CAS' participation in NetIAS – European Network of Institutes of Advanced Study, the term of appointment for members of the Board, organisation/funding of multi-

disciplinary and interdisciplinary research at the CAS, new filing and library system, pay adjustments and miscellaneous decorating and maintenance projects.

## 1.1 Management and administration

The administration consisted of four members of staff engaged on a full-time basis and three collaborators with part-time affiliation. Professor Willy Østreng has been engaged for a fixed term as Scientific Director with responsibility for the daily running of the Centre and its academic activity. Office Manager Unn Haaheim Hagen is in charge of the daily administrative activity, while Senior Executive Officer Maria Sætre's principal duties concern the running of the filing and library services as well as updating and maintenance of the Web pages. Executive Officer Marit Finnemyhr Strøm is responsible for manning the switchboard, registering researchers, sending out post and information material as well as general administrative support. In addition Project Manager Bjarne Røsjø at *Faktotum Informasjon A/S* was editor of the CAS Newsletter and was involved on the production side in the CAS project that resulted in the book: *Synergies. Interdisciplinary Communications 2003/2004*. Mikal Kolbein Gule and Geir Emblemsvåg at the *University of Oslo's Centre for Information Technology (USIT)*, were responsible for the running of the computer system and the provision of computer assistance to the researchers.

The permanent administration has weekly meetings at which matters of importance for the current activity are discussed, and at which plans are made for the future. Among other things Nettpost's integrated filing and library system was introduced and supplemented with a physical back-up archive. The work on establishing a collection of books and journals in science and the humanities was also continued in 2004. The work on the Centre's Web pages has now gone into a new phase. The firm of consultants Ravn Webveverier A/S has been engaged to provide a new design for its launching of the Centre's new Web pages. This work will be completed in Spring 2005. There was an upgrading of the Centre's computing facilities with the acquisition of 16 new machines in addition to a scanner, colour printer and server.



In the course of the year a number of meetings were held between the administration and the leaders of the research groups that will be coming to the Centre at a later date. The purpose of these meetings is to support the groups in the planning of and preparations for their stay. Experience has shown that those groups that put an effort into the planning phase get academic gains in the implementation phase. The administration therefore places great weight on these meetings.

Co-operation with the Contact Committees at the four universities was strengthened, inter alia through annual meetings between the respective committees and the Scientific Director. The co-operation agreement with the University of Tromsø (UiTø) was revised in the period covered by this Report. The revised version inter alia opens the way for group leaders from UiTø to be granted extraordinary research leave with full pay on a par with what applies in the case of the Centre's other co-operating partners. Researchers from UiTø who are invited to the Centre must still use their ordinary research period.

The negotiations that were initiated with the Agricultural University of Norway (NLH) at Ås and the Norwegian School of Economics and Business Administration (NHH) in Bergen in the latter half of 2003 resulted in two five-year co-operation agreements with the Centre. These agreements have the same content as applies in the case of the Universities of Oslo, Bergen and Trondheim. That is to say that group leaders and researchers who are invited to the Centre are granted extraordinary research leave and full pay by their employer.

Of academically oriented measures it may be mentioned that the Centre continued the lunch seminars that it had instituted in the autumn of 2003. The purpose of these seminars is to stimulate communication, dialogue and contact cutting across research fields, groups and disciplines. This measure is intended to strengthen the Centre's interdisciplinary purpose and profile. Contact was continued with the Research Council of Norway, University of Tromsø and the Heyerdahl Institute with a view to positioning the Centre in relation to the efforts that are now being made to organise and strengthen interdisciplinary and multidisciplinary research in Norway. The Centre also attended the founders' meeting of NetIAS – European Network of Institutes of Advanced Study – in Wassenaar in the Netherlands in April 2004. Representatives of the EU

attended this meeting. The objective was to make the EU aware of the quality targets at which these institutes are aiming and to discuss measures to ensure EU funding for the general raising of the quality of research. A new dialogue meeting between NetIAS and the EU will be held in Brussels in April 2005.

The editorial staff of the Newsletter have planning meetings prior to the publication of each issue based on preceding discussions at the administration meeting. Each issue contains an account of the research groups' work and a leader that addresses current research-political topics of interest and importance to the activity of the CAS.

## 1.2 Other matters

The working environment at the Centre is considered to be good, and there is very little absence on account of illness among the staff. There were 28 days of sick leave out of a total of 4 man-years in 2004. The Centre's activity does not pollute the external environment.

# 2. The purpose and work of the centre

The Centre sees it as an important task to further the work of realising the ambitious objectives that were formulated in the Memorandum of Association:

- A. The academic activity at the Centre shall be known to satisfy the highest international standards and thereby contribute to raising the level of basic and interdisciplinary theoretical research in Norway within the fields of the humanities/theology, social science subjects/law and the natural sciences/medicine/mathematics.
- B. The academic activity of the Centre shall be long-term, independent and of a permanent nature.
- C. The Centre shall be a national institution, and contribute to wide publicising of the results that are produced.

- D. The Centre shall provide the setting for close academic co-operation between researchers from Norway and abroad.

An important element in the task of realising these aims is the recruitment of collaborators who can show evidence of international academic results on the highest level. At the same time the Centre wishes to encourage the broadest possible co-operation within the framework of the system of thematic groups. This form of teamwork appears to be functioning extremely well with the size, the academic weight and the youthful constituents (at post-doctoral level) that each group has. The social and academic contact between the three subject groups reinforces both the academic and the social sense of community at the Centre. The weekly lunch seminars are one of several measures to promote such contact. Thirty joint seminars were held between the different research groups in 2004. These seminars will be continued in 2005 and they will constitute a permanent part of the interdisciplinary and multidisciplinary activity of the Centre. In 2004 the Centre published the book: *Synergies. Interdisciplinary Communications 2003/2004*, based on the lectures in the academic year 2003/2004.

The increase in the budget from the Ministry of Education and Research (UFD) in recent years has made possible a reinforcement of the administrative service provision to the visiting researchers, and of the direct financial support to the projects. Both contribute to making the Centre a more attractive place for outstanding researchers and thus also to realising the Centre's aims.

The three groups have at their disposal 6 offices each, of which some may accommodate more than one researcher. Nevertheless, there is at times a great shortage of space, and it would have been desirable to have a further increase in the number of available offices. In the long term the Centre also needs more space for the library, archives and meetings. For the time being there is not sufficient office space to be found in the Academy of Science and Letters for such expansion.

### 3. Research groups and academic activity

The three groups that started their work in the autumn of 2003 and continued their projects in the spring of 2004, worked on the following topics:

- ***Food-webs, Stoichiometry and Population Dynamics***  
headed by Professor Dag Hessen, University of Oslo
- ***Towards a Comprehensive Model of Human Memory***  
headed by Professors Svein Magnussen and Tore Helstrup,  
University of Oslo
- ***Towards a New Understanding of the Mental***  
headed by Professors Bjørn Ramberg and Olav Gjelsvik,  
University of Oslo

The project *Food-webs, Stoichiometry and Population Dynamics* focused on the relationship between the elements carbon, nitrogen and phosphorus as limiting factors for production in most ecosystems. Analyses of the elemental ratios and balance (stoichiometry) in food-webs may provide fundamental information on the uptake, allocation and sequestration of carbon in both individual cells and food networks. The relative abundance of important nutrient minerals is crucial not only to plant growth (primary production), but also to grazers' secondary production. If there is too little phosphorus or nitrogen, the ecosystems become vulnerable. The project therefore aimed to analyse the relationship between these elements from the level of the cell, through the ecosystems and up to the global climate. The data provided a good foundation for modelling and model development.

The researchers used data from approx. 500 Norwegian lakes and corresponding data from the USA and the Netherlands. In addition a number of supplemental marine datasets were used. These data were then compared with data from experiments with what are called chemostats, i.e. laboratory experiments in which algae and animal plankton can grow under controlled conditions, and more theoretical analyses and models

that describe carbon flux and ecosystem dynamics. The project's approach was interdisciplinary. For a more comprehensive presentation of this project, see page 29.

The project *Towards a Comprehensive Model of Human Memory* aimed to develop a model for describing human memory in an overarching meta-cognitive perspective. The purpose was to include the external and internal factors that generate errors and distortions in human memory and to sew the different explanatory fragments together into a holistic model. The point of departure for the project was that most memory models are based on model studies in laboratories that to a high degree focus on the *quantitative* aspects of memory – how much do we remember. This project paid attention to the *qualitative* aspects of memory – how well do we remember what really happened. The project was directed at memory as it manifests itself in daily life. It involved studies of the significance of external information, social aspects of memory, the significance of co-operation and exchange of information, emotional factors and personality. The study also included topics such as autobiographical memory, memory in the perspective of aging, memory for actions and events and memory for places and geographical routes, meta-cognition and witness psychology. The project was interdisciplinary and multidisciplinary. For a more comprehensive presentation of the project, see page 41.

The project *Towards a New Understanding of the Mental* aimed to contribute to a new approach to the study of the relationship between the mental and the physical, between mind and body. The point of departure was the notion of man both as a physical/physiological system, and as an acting, thinking and moral/normative system, where it is far from obvious how a system can display both these properties at the same time. The group was particularly concerned with investigating how a physical system like man cannot exist without free will and the possibility for independent actions. To shed light on this relationship the researchers dealt with the following problematic issues: How can mental phenomena be included in the right way in causal connections? Why can non-physical systems of the kind to which human beings belong exist without intentional or meaning-bearing phenomena? Can the intentional phenomena that physical systems bring into the world display the form of subjectivity

and normativity that thinking and experiencing subjects manifest? The group was discipline-oriented and consisted of philosophers. For a more comprehensive presentation of the project, see page 60.

In August 2004 the research groups for the period 2004/2005 started their work. The research topics for these groups are:

- ***Attention-Deficit/Hyperactivity Disorder ADHD – from genes to therapy***, headed by Professor Terje Sagvolden, University of Oslo
- ***Linguistic Theory and Grammatical Change***, headed by Professor Jan Terje Faarlund, University of Oslo
- ***Turbulence in plasmas and fluids***, headed by Professors Hans L. Pécseli and Jan Trulsen, University of Oslo

*Newsletter* No. 2, 2003 provides an account of the 2003/2004 groups' activity, while *Newsletter* No. 1, 2004 gives an account of selected research topics for these projects.

*Newsletter* No. 2, 2004 provides an account of the 2004/2005 groups' activity.

These Newsletters are to be found in both English and Norwegian editions on the Centre's Web pages: [www.cas.uio.no](http://www.cas.uio.no).

In June 2004 the Board completed its business relating to the nomination of those groups that are to be at the Centre in 2006/2007. The number of proposals received was 21, which was more than the year before. After the Board had dealt with the matter on two occasions, 10 proposals were sent for international peer review in the spring of 2004. Altogether 56 evaluation reports were procured from outstanding, independent international researchers. On this basis the Board resolved to invite the following research groups for the academic year 2006/2007:

- ***Notions of Transformation. Resurrection, Taxonomy and Transformative Practice in Early Christianity***, headed by Professor Turid Karlsen Seim, University of Oslo

- *Changed Family Patterns in Norway and Other Industrialised Countries: Causes, Consequences and Extrapolations*, headed by Professors Øystein Kravdal and Nico Keilman, University of Oslo
- *Spin and Charge Transport in Nanostructures*, headed by Professors Arne Brataas and Asle Sudbø, Norwegian University of Science and Technology in Trondheim

In the autumn of 2004 the selection process was begun for 2007/2008. The Centre received a large number of proposals, a total of 24, of which 18 went further to the next round. Never before had the Centre received more nominations than for that year.

## 4. Other academic activities

In the course of 2004 the Scientific Director produced several academic works, including the editing and revision of two books. He was also invited to national and international conferences and meetings within his own area of research. (See Appendix 2)

## 5. Objectives and results

In the spring of 2004, 20 researchers were working at the Centre for long stays (of more than one month's duration). Of these, 8 researchers were Norwegian and 12 came from other countries. In addition the Centre was the place of work for 1 post-doctoral fellow. Altogether 25 researchers contributed written works to the three projects in the spring of 2004. In addition come a large number of seminar participants who made contributions to the individual project groups (See the Group Reports, pages 29–74).

In the autumn of 2003, 22 researchers were working at the CAS for long stays, of whom 11 were leading Norwegian researchers, 11 were researchers from abroad, and there were 4 younger researchers

(1 doctoral degree student and 3 post-doctoral fellows). A number of researchers from abroad were also guests at the Centre for shorter periods. The total number of researchers in the autumn semester amounted to 31 individuals. In addition come a large number of external seminar participants. In the course of the whole period covered by the Report, 58 researchers made written research contributions to the Centre's 6 projects. The international element was large. Researchers from 16 countries<sup>2</sup> in 5 continents had research tasks connected with the Centre in 2004.

Major seminars and workshops with broad national and international participation have now become a natural part of the academic activity in all the groups. In addition a number of internal working seminars are arranged within the groups.

The interaction between the researchers from abroad and those from Norway, and the many lectures given by the researchers from abroad at Norwegian universities and in other academic fora (such as the Norwegian Academy of Science and Letters) represent an important contribution to the internationalisation of Norwegian research in general, and are a significant result in themselves.

The Centre is expecting numerous publications in the form of books, articles in international journals, and databases as a result of its activity. On account of the long delay before material is printed, it is impossible at the present time to have a complete overview of the results of the work performed in 2004. Some works have already been published, but most of them are either being evaluated, are available in manuscript form or are the object of further treatment and evaluation. A complete survey of the results of the work carried out in 2004 will not be available for some years. The Centre will be working in the years ahead to establish a better documentation system for this purpose. This work has hitherto been somewhat delayed on account of a lack of administrative resources. The reports from the research groups for 2003/2004 show that the provisional number of published reports and/or reports in the course of processing

<sup>2</sup> Italy, Poland, the USA, Canada, Israel, South Africa, England, the Netherlands, Germany, New Zealand, Iceland, France, Sweden, Japan, Wales and Norway.



and publishing has already reached 177 works. In addition come the 26 articles that have been published in the book: *Synergies. Interdisciplinary Communications 2003/2004*, CAS, Oslo 2005.

In addition the following objectives were achieved in 2004:

- The selection procedure for new research groups now maintains a high international level and is constantly being improved.
- The Newsletter has now achieved a good form and maintains a high quality. It appears twice a year in Norwegian (12,000 copies) and English (1000 copies), and is distributed to all those working with basic research in Norway, and to researchers from abroad who have been previously affiliated to the Centre.
- The Centre's Web pages are in the process of being revised, improved and modernised.
- Contact with good Norwegian researchers outside the Oslo area has been improved, and there has been a significant increase in the number of nominated group leaders and project participants from other universities.
- Contact with the subject communities is ensured through the Contact Committees that have been established at all the universities and co-operating colleges. This arrangement is functioning well and work is in progress to strengthen and develop the contact with these committees, among other things through annual meetings between these and the Scientific Director. Furthermore, plans are being made to gather all the Contact Committees at a joint event to discuss the content of the established co-operation and measures to improve this.
- The co-operation arrangement that the CAS has with the four Norwegian universities has been extended to include the Agricultural University of Norway (Norwegian University of Life Sciences, UMB) and the Norwegian College of Economics and Business Administration. Co-operation agreements with these institutions came into effect in the summer/autumn of 2004. The purpose of this extension is gradually to include all of the heavyweight basic research communities in Norway in this co-operation. The University of Stavanger is a probable candidate for such discussions in the next round.
- The excellent, constructive and mutually obligating co-operation with the universities and colleges in Norway, the Norwegian Academy of

Science and Letters, the Universities and Colleges Council and the Research Council of Norway was carried further in the period covered by this Report.

- Work on establishing closer contact with international sister organisations was strengthened in 2004. This resulted in the establishment of NetIAS, which is a co-operation network for institutes of basic research in Europe.
- Talks on functional/formalised co-operation between the CAS and the *Swedish Collegium for Advanced Studies in the Social Sciences* in Uppsala have been initiated with a view to strengthening the Nordic component in the international co-operation that is taking place within inter alia SIAS (Six Institutes of Advanced Studies) and NetIAS.
- The multidisciplinary and interdisciplinary component of the Centre's work has been strengthened through the weekly lunch seminars.
- External publicising of the activities at the Centre was until recently to a great extent by means of published works in particular subjects and the CAS Newsletter. The book, *Synergies*, is also, in addition to being an instrument designed to stimulate the interdisciplinary component of the Centre's work, an instrument that in shorthand form conveys the results of ongoing research at the Centre.

## 6. Finance

### 6.1 The Centre for Advanced Study

The state grant for 2004 amounted to NOK 13,605,000. Compared with the previous year the increase in the sum received from the State was NOK 482,000, i.e. 3.7%. This increase compensates mainly for price and pay adjustments and has therefore not brought the Centre significantly closer to the grant target of around 15 million 2003-kroner that the evaluation committee (the Bjørge Committee) recommended as early as 1997. There is still the sum of approx. 1.5 million kroner to go before the contribution from the State is on the recommended level. The absence of any real increases the last two years means that the work on building up a reference library and a collection of books and journals in science and the humanities is coming to a standstill. The same applies to the

much-needed improvement of computer support for the researchers. The CAS' sister organisations in other western countries have computer officers and librarians working full-time.

The reordering of priorities on the Centre's budget for 2004 made it possible to increase the groups' budgets for 2003/2004 to 2.8 million each. This was an increase on the preceding year of NOK 300,000 to each of the groups. The money that the Centre makes available is spent on project costs as well as fellowships and buying out researchers from abroad, including accommodation, travel, conference and seminar expenses. The available resources were until recently far too limited for a sufficiently large number of really leading international researchers to be brought to Norway. To the extent that the financial circumstances permit, the Centre will give greater priority to this in the future. In order to be able to buy out the best researchers from abroad for a lengthy research stay, each group will need an increase in available funds of NOK 1.2 million in relation to today's level. That is to say that each group ought in the long term to be given a budget of 4 million 2004-kroner.

As in previous years the university agreements represent considerable additional funding, since visiting researchers from Norwegian universities and co-operating colleges are in the main paid by their respective home institutions. This additional funding represents approximately 9 man-years.

The Norwegian Academy of Science and Letters also contributed to relieving the CAS' financial burden in the form of a favourable lease. The lease was renegotiated in 2001 and although the rent was adjusted upwards relatively steeply, it is still acceptable in comparison with market prices. In addition the Academy puts meeting premises at the disposal of the research groups in return for a small payment.

The Centre's Statement of Accounts for the year 2004 shows an apparent surplus of NOK 2,970,224. This sum includes transferable funds for the research groups 2004/2005 amounting to NOK 1,998,287. This money will be spent by the groups in the spring of 2005. The research groups' expenses are greater in the spring semester than in the autumn semester. There thus remains a surplus of NOK 971,937 which at the present moment is being set aside to cover unforeseen expenses and academi-

cally justified expenses that exceed the group budgets of NOK 2.8 million. The surplus in the accounts is therefore to a great extent a result of the fact that the academic year does not follow the budgetary year.

The balance sheet shows a balance of NOK 7,406,814. Of this sum NOK 1,772,222 represents short-term debt, while NOK 1,998,257 is transferable money for the research groups 2004/2005. The Centre's net liquidity at the end of 2004/beginning of 2005 was approximately NOK 4.2 million.

The Accounts were audited by the firm of auditors Nitschke AS. The Accounts for 2004 were produced on the assumption that operations would continue.

## **6.2 The Operating Fund at the Centre for Advanced Study**

The Centre enters into binding agreements for periods up to three years ahead. The Operating Fund was established as a form of security in relation to these long-term obligations. The Operating Fund consists of the basic capital, which is untouchable, and disposable funds. No money from the Operating Fund was spent in 2004. Net income from interest amounting to NOK 108 676 was added to the Fund so that the total capital of the Operating Fund at the end of the year was NOK 8,513,122.

The Accounts were audited by the firm of auditors Nitschke AS. The Accounts for 2004 were produced on the assumption that operations would continue.

Centre for Advanced Study, 26 February 2005



To the  
Centre for Advanced Study

STATSAUTORISERTE  
REVISJONER

Independent member

BKR

REVISJONSFIRMA

#### AUDITORS' REPORT FOR 2004

We have audited the Annual Report and Accounts of the Centre for Advanced Study for 2004, which show a surplus of NOK 2,970,248,-. The Annual Report and Accounts, which comprise the profit and loss account, balance sheet and notes, were presented by the Board of the Centre. Our responsibility is to express our views on the annual accounts and other matters in accordance with the requirements of the Auditors Act.

We have performed our audit in conformity with the Auditors Act and good auditing practice in Norway. Good auditing practice requires that we plan and conduct the audit in order to achieve a satisfactory level of certainty that the annual accounts do not contain any materially incorrect information. The audit comprises an examination of selected parts of the evidence in support of the information in the annual accounts, an assessment of the accounting principles applied and of important accounting estimates, and an evaluation of the content and presentation of the annual accounts. To the extent required by generally accepted standards of good auditing, the audit also includes an examination of the Centre's assets management and of its accounting and internal control systems. We believe that our audit provides a satisfactory basis for our statement.

We are of the opinion that

- the annual accounts have been presented in conformity with statute law and regulations and reflect the Centre's financial situation on 31 December 2004 and its result for the financial year in accordance with good auditing practice in Norway
- the management has fulfilled its duty to ensure orderly and clear registration and documentation of information relating to the accounts in conformity with statute law and good accounting practice in Norway
- the information in the Annual Report concerning the assumption that operations would continue is consistent with the annual accounts and is in conformity with statute law and regulations.

Stabekk, 18 February 2005

Nitschke AS

Morten Hurum

State-authorized auditor

Nitschke AS

Gamle Dronningensv. 40, Postal address: P.O. Box 25, 1221 Stabekk.

Telephone: 67 10 77 40, Fax: 67 53 59 89, E-mail: firmapost@nitschke.no, www.nitschke.no

Bank giro: 8260 02 04855, Post giro: 0807 3808 403, Org. No.: 914658314 VAT

# 7. Accounts

## 7.1 Accounts 2004 Centre for Advanced Study

Balance at 31 december	2004	2003
<b>Assets:</b>		
<i>Cash:</i>		
Cash, bank deposits etc.	(Note 5) 7 406 814	7 007 551
Other claims	(Note 6) 0	0
<i>Total cash:</i>	<i>7 406 814</i>	<i>7 007 551</i>
<b>Total assets</b>	<b>7 406 814</b>	<b>7 007 551</b>
 <b>Liabilities and capital and reserves</b>		
<i>Capital and reserves</i>		
Basic capital	(Note 7) 114 900	113 800
Capital account	(Note 9) 6 119 692	5 150 544
<i>Total capital and reserves</i>	<i>6 234 592</i>	<i>5 264 344</i>
 <i>Short-term liabilities</i>		
Payable to the Norwegian Academy of Science and Letters	100 000	100 000
Payable tax deductions, National Insurance contributions, holiday pay etc.	374 642	374 618
Other short-term liabilities	(Note 8) 697 580	1 268 589
<i>Total short-term liabilities</i>	<i>1 172 222</i>	<i>1 743 207</i>
 <b>Total liabilities and capital and reserves</b>	 <b>7 406 814</b>	 <b>7 007 551</b>

Oslo 18 February 2005

Board of the Centre for Advanced Study

Aanund Hylland,  
Chairman of the Board

Gerd Bjørhovde,  
Vice-Chairman

Eivind Hiis Hauge

Kenneth Hugdahl

Leif Arne Heløe

Hans M. Barstad

<b>Profit and loss account</b>	2004	2003
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**Income from operations and running expenses:**

*Income from operations:*

State grant from Ministry of Education and Research	13 605 000	13 132 000
The Research Council of Norway (Note 1)	0	55 000
Other contributions (Note 1)	0	66 211
<b>Total income from operations</b>	<b>13 605 000</b>	<b>13 253 211</b>

*Operating expenses:*

Expenses relating to research fellows (Note 2)	5 552 717	5 801 109
Salaries, fees etc. (Note 3)	2 151 376	2 058 772
Office furniture, furnishings, computer equipment	420 162	448 493
Other operating expenses (Note 4)	2 596 538	2 281 128
<b>Total operating expenses</b>	<b>10 720 793</b>	<b>10 589 502</b>

<b>Operating result</b>	<b>2 884 207</b>	<b>2 663 709</b>
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**Financial income and financial expenditure:**

Income from interest	94 317	197 332
Bank charges	8 276	5 817
<b>Net financial income</b>	<b>86 041</b>	<b>191 515</b>

<i>Annual balance</i>	2 970 248	2 855 224
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which is to be allocated as follows:

To the Basic capital	1 100	1 100
To(from) the Capital account	2 969 148	2 854 124

**Accounting principles:**

The Accounts have been set out in conformity with the Accounting Act and good accounting practice.

Cash and short-term liabilities normally include items falling due within one year. Pension premiums are linked to the employer's share of the premium payable to the Public Service Pension Fund.

<b>Notes on the Accounts</b>	2004	2003
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**Note 1 Other contributions:**

The Research Council of Norway	0	55 000
Mellon Foundation	0	66 211
<b>Total;</b>	<b>0</b>	<b>121 211</b>

**Note 2 Expenses relating to research fellows:**

Fellowships etc. researchers	2 571 769	1 869 376
Rent for researchers' flats	1 057 843	1 525 505
Travel expenses	663 296	914 673
Publications, printing, equipment	309 009	388 962
Seminars/Workshops	915 065	995 276
Miscellaneous expenses research groups	35 735	107 317
<b>Total;</b>	<b>5 552 717</b>	<b>5 801 109</b>

**Note 3 Salaries/fees:**

Salaries/holiday pay	1 669 452	1 623 116
Pension premiums	113 052	110 751
National Insurance contributions	239 830	241 583
Manpower services	89 512	48 847
Auditors' fees	37 820	32 860
Social expenditure	1 710	1 615
<b>Total;</b>	<b>2 151 376</b>	<b>2 058 772</b>

The sum of NOK 35,000 was paid out as remuneration to members of the Board  
Auditing expenses cover in their entirety auditing services



<b>Note 4 Other operating expenses</b>	2004	2003
Lighting, heating, cleaning, rent, insurance, security	608 515	585 522
Telephone, fax, postage	130 965	140 124
Equipment, copying, computing	541 181	341 020
Books, library service, printing	489 512	459 738
Operating equipment, maintenance	200 145	188 041
Running the canteen, social measures and representation	374 537	291 190
Travel expenses	56 203	67 897
Miscellaneous expenditure	195 480	207 596
<b>Total;</b>	<b>2 281 128</b>	<b>2 597 965</b>

#### **Note 5 Bank deposits**

Of the bank deposits entered in the books, the sum of NOK 215,796 represents withheld tax deductions

Specification of bank deposits on 31.12:

DnB NOR, account 8200.01.17044	kr	215 796	213 736
DnB NOR, account 1607.83.68385	kr	7 170 594	6 779 164
DnB NOR, account 1644.14.60264	kr	4 374	4 324
DnB NOR, account 8210.04.35809	kr	1 335	1 540
Total bank deposits	kr	7 392 099	6 998 764
Cash balance 31.12.	kr	14 715	8 787
<b>Total cash, bank etc.</b>	<b>kr</b>	<b>7 406 814</b>	<b>7 007 551</b>

#### **Note 6 Claims**

Claims are put at their nominal value

#### **Note 7 Basic capital**

10% of a calculated yield on the Basic capital throughout the year is allocated to the Basic capital

#### **Note 8 Other short-term liabilities**

This entry consists of items with a time limit at the end of the year.

#### **Note 9 Capital account**

The sum of NOK 2,000,000 was transferred to the Operating Fund at the Centre for Advanced Study in 2004

## 7.2 Accounts 2004 Operating Fund at the Centre for Advanced Study

Balance at 31 December	2004	2003
<b>Assets:</b>		
<i>Cash:</i>		
Bank deposit (Note 1)	8 513 122	6 404 446
<i>Total cash</i>	<i>8 513 122</i>	<i>6 404 446</i>
<b>Total assets</b>	<b>8 513 122</b>	<b>6 404 446</b>
<b>Liabilities and capital and reserves</b>		
Capital and reserves:		
Basic capital (Note 2)	1 262 510	1 251 610
Disposable funds (Note 3)	7 250 612	5 152 836
<i>Total capital and reserves</i>	<i>8 513 122</i>	<i>6 404 446</i>
<b>Total liabilities and capital and reserves</b>	<b>8 513 122</b>	<b>6 404 446</b>

Oslo 18 February 2005

Board of the Centre for Advanced Study

Aanund Hylland,  
Chairman of the Board

Gerd Bjørhovde,  
Vice-Chairman

Eivind Hiis Hauge

Kenneth Hugdahl

Leif Arne Heløe

Hans M. Barstad

<b>Profit and loss account</b>	2004	2003
<b>Income:</b>		
Income from interest	108 676	227 384
Bank charges	0	0
<b>Annual balance</b>	<b>108 676</b>	<b>227 384</b>

which it is proposed to allocate as follows:

To the basic capital	10 900	22 800
To Disposable funds	97 776	204 584
	<b>108 676</b>	<b>227 384</b>

## Notes on the Accounts for the period ending 31.12.2004

### Note 1 Bank deposit

Specification of bank deposit for the period ending 31.12.2004:

Sparebanken NOR, account 8200.06.22903, balance 8 513 12	6 404 446
<b>Total</b>	<b>kr 6 404 446</b>

### Note 2 Basic capital

The Basic capital has increased by 10 % of the annual yield.

### Note 3 Disposable funds

The sum of NOK 2,000,000 from the Centre for Advanced Study has been added to Disposable funds



To the Operating Fund at the  
Centre for Advanced Study

STATSAUTORISERTE  
REVISORER

Independent member

BKR

INTERNASJONALE

#### AUDITORS' REPORT FOR 2004

We have audited the Annual Report and Accounts of the Operating Fund at the Centre for Advanced Study for 2004, which show a surplus of NOK 108,676,-. The Annual Report and Accounts, which comprise the profit and loss account, balance sheet and notes, were presented by the Board of the Centre. Our responsibility is to express our views on the annual accounts and other matters in accordance with the requirements of the Auditors Act.

We have performed our audit in conformity with the Auditors Act and good auditing practice in Norway. Good auditing practice requires that we plan and conduct the audit in order to achieve a satisfactory level of certainty that the annual accounts do not contain any materially incorrect information. The audit comprises an examination of selected parts of the evidence in support of the information in the annual accounts, an assessment of the accounting principles applied and of important accounting estimates, and an evaluation of the content and presentation of the annual accounts. To the extent required by generally accepted standards of good auditing, the audit also includes an examination of the Centre's assets management and of its accounting and internal control systems. We believe that our audit provides a satisfactory basis for our statement.

We are of the opinion that

- the annual accounts have been presented in conformity with statute law and regulations and reflect the Centre's financial situation on 31 December 2004 and its result for the financial year in accordance with good auditing practice in Norway
- the management has fulfilled its duty to ensure orderly and clear registration and documentation of information relating to the accounts in conformity with statute law and good accounting practice in Norway
- the information in the Annual Report concerning the assumption that operations would continue is consistent with the annual accounts and is in conformity with statute law and regulations.

Stabekk, 18 February 2005 Nitschke AS

Morten Hurum  
State-authorized auditor

Nitschke AS

Gamle Drammensvev, 48. Postal address: P.O. Box 23, 1321 Stabekk.

Telephone: 47 10 77 08, Fax: 47 51 59 89, E-mail: firmapost@nitschke.no, www.nitschke.no

Bank giro: 8280 02 06853, Post giro: 0907 3808 403, Org. No.: 914858314 VAT

## 8. Reports from the research groups of 2003/2004

### *Food-webs, Stoichiometry and Population Dynamics*

Report by Dag O. Hessen  
Group leader 2003/2004

#### 1. General description

Analysis of elemental ratios (stoichiometry) in food webs may provide fundamental information on the uptake, allocation and sequestration of carbon (C) and key nutrient minerals like phosphorus (P) and nitrogen (N) from the cellular level to ecosystems. In sum these processes will also play a major role for the global cycling of these elements. The relative abundance of key nutrient minerals like phosphorus (P) and nitrogen (N) is not only instrumental to primary production. Also secondary production (grazers) may be directly limited by the relative abundance of P and N, and when C:N or C:P ratios are high in primary producers, an increasing share of C will be in excess, relative to the grazers' demands. This will have implications not only for energy transfer in food webs, but also community composition and system stability. It will also be a major determinant of CO<sub>2</sub>-uptake at the base of the food-web to yield at the top.

The project has consisted of 22 scientists who have analyzed these aspects in cells and ecosystems, covering topics from the role of P for cellular RNA and growth rate to large-scale ecosystem analysis and models. The work has addressed from three points of departure: continued work with existing data, projects and publication, analysis of large datasets from various databases and theoretical works and models.

The year has resulted in a number of papers in top-ranking journals including *Nature*, *Science*, *American Naturalist*, *Ecology* and *Ecology Letters*. It has also sparked off new research ideas and new research application. Finally, an international workshop at Finse (“Woodstoich 2004”) was arranged. The workshop involved 5 working groups of selected (upon application) PhD students, postdocs, and young faculty who had been meeting on-line on an assigned web-site to develop manuscripts to identify emerging frontiers and key challenges in ecological stoichiometry. During the workshop they finalized their papers scheduled for publication in the journal *Oikos*. Last, but not the least, our group has initiated a continuing development within this developing branch of biology, and thus the full output of this year in the form of ideas, concepts and papers will continue for several more years. The list of papers from the workshop is attached.

## 2. Participants and co-workers

Core members:

- Dr. Tom Andersen, University of Oslo/Norwegian Inst. for Water Research
- Dr. Thomas R. Anderson, Southampton Oceanography Centre, UK
- Prof. James Elser, State University of Arizona, USA
- Dr. Bjørn Faafeng, Norwegian Institute for Water Research
- Research fellow Per Færøvig, University of Oslo
- Prof. Dag O. Hessen, University of Oslo, Group Leader
- Prof. Edward McCauley, University of Calgary, Canada
- Post.doc. Jannicke Moe, University of Oslo
- Post.doc. Robert Ptachnik, University of Kiel, Germany/University of Oslo
- Prof. Robert W. Sterner, University of Minnesota, USA
- Prof. Jotaro Urabe, Tohoku University, Japan
- Prof. Ellen Van Donk, Netherland Institute of Ecology, Netherlands

Associated members:

- Dr. Maarten Boersma, Max-Planck Institute Plön, Germany
- Dr. Pål Brettum, Norwegian Institute for Water Research
- Dr. Erik Jeppesen. Miljøcenteret Silkeborg, Denmark

- Post.doc. Francois Darchambeau, University of Namur, Belgium
- Prof. Salm Kooijman, University of Amsterdam, Netherlands
- Post.doc. David Mayntz, University of Oxford, UK
- Prof. David Raubenheimer, University of Oxford, UK, Univ. Auckland, New Zealand
- Prof. Dietmar Straile, University of Konstanz, Germany
- Dr. Tobias Vrede, University of Uppsala, Sweden
- Dr. Bjørn Walseng, Norwegian Institute for Nature Research
- Dr. Karen Wiltshire, Helgoland Biological Station, Germany

### 3. Seminars and workshops

#### 3.1 Seminars

At the opening of the 12th academic year of the Centre for Advanced Study, September 3rd 2003, Professor Dag O. Hessen gave the presentation: “Ecological stoichiometry; the causal link from cells, via food webs to atmospheric CO<sub>2</sub>”.

One of the group members, Professor Elser, presented two guest lectures at the University of Oslo, and also led a seminar series with graduate students during fall 2003.

The group arranged four internal seminars at CAS, two in fall 2003 and two in spring 2004.

Group members presented several seminars at the CAS luncheon seminar series:

- Andersen, Tom: “Biodiversity and Nature’s services”
- Elser, James J.: “Stoichiometry in Evolution and Disease”
- Hessen, Dag O: “Genetic determinism?”
- Ptachnik, Robert: “Omnivory – The Strategy of Eating your Competitor”
- Wiltshire, Karen: “‘Bananas on Helgoland’ – A realistic Scenario?” (Long time monitoring of the Northern Sea)

### 3.2 Woodstoich 2004

The Finse workshop “Woodstoich 2004” represented a final seminar for the group, but it was for practical reasons held in August 2004 (<http://www.woodstoich.org/index.php>). The workshop involved 5 working groups of PhD students, postdocs, and young faculty who had been meeting on-line during spring and summer 2004 to develop manuscripts to identify emerging frontiers and key challenges in ecological stoichiometry. In total there were 35 participants, including some senior lecturers. The papers were finalized during the workshop. We have arranged with the highly recognized journal *Oikos* to publish accepted versions of these papers. In one of the innovative features of this workshop, an experiment in scientific peer review was carried out, in which these papers were *peer-reviewed within 24 hours of their submittal*. That is, the papers were completed during the first two days of the workshop, peer-reviewed on the third, and then (if recommended for publication) revised and finalized by the end of the fifth day. The papers are highly conceptual, and meant to be stimulating and forward thinking. The authors and titles of contributed papers are given under the list of papers.

“Senior” participants and lecturers:

- James J. Elser, University of Arizona, USA
- Dag O. Hessen, University of Oslo
- Timothy Lenton, School of Environmental Sciences, UK
- Therese A. Markow, University of Arizona, USA
- Robert W. Sterner, University of Minnesota, USA

Regular participants:

Group 1 – Evolution, ecology, and stoichiometry:

- Adam Kay (leader), Postdoc, USA
- Isabel Ashton, Student, USA
- Elena Gorokhova, Postdoc, Russia
- Andrew Kerkhoff, Postdoc, USA
- Antonia Liess, Student, Sweden
- Elena Litchman, Postdoc, Russia



Group 2 – Behavioral, physiological, and metabolic mechanisms in stoichiometry:

- Paul Frost (leader), Postdoc, USA
- Michelle Evans-White, Student, USA
- Zoe Finkel, Student, USA
- Andie Huberty, Student, USA
- Thomas Jensen, Student, Denmark
- Virginia Matzek, Student, USA

Group 3 – Stoichiometry and the dynamics and organization of populations and communities:

- Jannicke Moe (leader), Postdoc, Norway
- Jonathan Benstead, Postdoc, USA
- Tanguy Daufresne, Postdoc, France
- Rebecca Forman, Student, USA
- Stan Harpole, Student, USA
- Takehito Yoshida, Postdoc, Japan

Group 4 – Big stoichiometry: watersheds, landscapes, regions, and biosphere:

- John Schade (leader), Postdoc, USA
- Francois Darchambeau, Assistant professor, Belgium
- Javier Espeleta, Postdoc, Costa Rica
- Megan McGroddy, Postdoc, USA
- Steve Thomas, Postdoc, USA
- Lixia Zhang, Assistant professor, China

Group 5 – Applications of stoichiometric theory to environmental and biological problems:

- Robert Ptacnik (leader), Postdoc, Germany
- Justin Brookes, Postdoc, Australia
- Darrell Jenerette, Student, USA
- Christopher Klausmeier, Researcher, USA
- Angelo Solimni, Postdoc, Italy
- Antonie Verschoor, Postdoc, Netherlands

### 3.3 Network and contacts

During the academic year at the CAS, several meetings were arranged between group members and Norwegian researchers or students. In total four joint grant applications were written and submitted to the *National Science Foundation* (USA) with US, Norwegian and other collaborators, two joint applications were submitted to the *Norwegian Research Council*, and one for the *Dutch Research Council*.

A large network was built (and is to be expanded) as a result of the workshop “Woodstoich 2004) which attracted considerable international interest, also via its web-site: <http://www.woodstoich.org/index.php>.

## 4. Major results and achievements

Much of the ground for the establishment of our group at the CAS was an international workshop held at *The Academy of Sciences and Letters* in 2000, hosted by D. Hessen and covered by the *European Science Foundation* via the program “Linking species and ecosystems”. This workshop focused on evolutionary and metabolic perspectives of ecological stoichiometry, and after the meeting it was decided to approach the leading journal *Ecology* to sound the possibility to present the highlights from the meeting as a “Special Feature”. This was approved by the editorial board of *Ecology*, and after a long delay the accepted papers were finalized during the onset of the CAS-period in early fall 2003 and appeared in *Ecology* spring 2004. These four papers did in some way set the stage for the more theoretical works that were published or initiated at the CAS.

The group has worked with aspects from the molecular scale up to ecosystems. Perhaps the most important output from the group at the “big scale” end was the discovery, based on a huge database of thousands of marine and freshwater data worldwide, that elemental proportions (carbon:nitrogen:phosphorus, C:N:P – the widely used Redfield ratio) in lakes and oceans differ substantially from what had been previously assumed. More specifically, biological material in lakes and oceans is far richer in C than previously assumed (e.g. the atomic C:P-ratio is 133 rather than 116), hence substantially more C may be sequestered per mole of P or N. This has wide implications for several ecological

processes, but most important is that it will have strong impact on the calculations of the global carbon cycle, where Redfield ratio and oceans play a major role. Models of long-term fluctuations in global oxygen and CO<sub>2</sub> concentrations build to a large extent on the Redfield ratio, and the new data emerging from our group will play an important role for large-scale biogeochemical models. The work has been submitted to *Nature*.

Another major achievement has been to test stoichiometric and ecological effects of the strong increase on increased anthropogenic N-deposition. Norwegian data is particularly suitable in this regard, owing to the very strong gradient in N-deposition from south to north, where the south is heavily influenced by anthropogenic N-deposition originating mostly from continental Europe, while the north represents pristine conditions. N-deposition data was merged with the large lake database and statistical analysis demonstrated a major impact of N-deposition on N:P-ratios of the lakes and trophic structure. These findings are intriguing since they demonstrate a potentially strong coupling from the global disturbance in the N-cycle via effects on elemental ratios to ecosystem effects. Also this paper is scheduled for *Nature*.

Three of the group members (Andersen, Elser and Hessen) were invited to write a review on population dynamics and stoichiometry for the leading journal *Ecology Letters*. This paper summarizes and explores the difference between “standard” models of population dynamics (i.e. models that only consider quantitative interactions) and models that include food quality in terms of elemental ratios as well as feedback effects from consumer to resource in terms of stoichiometric recycling of nutrient elements N and P. As explored in this paper, mathematical models of population dynamics that include stoichiometric principles do predict some features of these dynamics quite different from models that do not include multiple elements. First it gives some examples of deviation from density-dependent effects, second it predicts increased system stability and third it predicts a possibility of consumption extinction under some scenarios with high food abundance but very low food quality. The paper is now available on-line from *Ecology Letters*.

Another theoretical work did analyze the flux and fate of carbon in zooplankton, combining a physiological approach with stoichiometric theory. The model predicts how the release of C may shift between

organic and inorganic carbon (CO<sub>2</sub>). This may have major impact on the ecosystems, since organic and inorganic C may play fundamentally different roles in the ecosystem. This model is also a major achievement originating from discussions within the group, and it has been accepted for publication in another top-ranked journal, *The American Naturalist*.

Finally the group initiated works on two other large databases, the first is related to biodiversity and is described above, the second on what could be called “large scale stoichiometry”, or coupled regulation and interactions of the elements C, N, P, and Si in lakes and watersheds – finally entering the sea. This has inspired a couple of large grant applications to the *Norwegian Research Council* with a number of collaborators, and is expected to form the basis of several papers and future projects. A presentation of some of these results was given by D. Hessen at the international ASLO congress in February 2004. An analysis of net carbon flux in aquatic food-webs, and the balance between CO<sub>2</sub>-uptake and release in aquatic ecosystems was also presented by D. Hessen as the invited, plenary Kilham Memorial Lecturer at the XIX International SIL-conference in August 2004. Also this presentation built on the large databases, and the presentation is also to appear as a printed paper.

In addition to this, a number of more specific papers are in various stages of progress, all originating from the year at the CAS, and the “Woodstoich” event at Finse also aroused strong interest internationally and has given birth to a stoichiometrically focused web-based forum for discussions and exchange of ideas.

*To summarize, our group at the CAS has been highly successful not only in terms of producing papers, but also in establishing networks and pointing to future prospects and directions for this emerging field.*

## 5. Publications

### 5.1 Papers that were initiated earlier but finalized and published during the stay at CAS

Hessen, D.O. 2004. “Too much energy?” *Ecology*, 85: 1177–1178.

Hessen, D.O., Andersen, T., Brettum, P. and Faafeng, B. 2003. "Phytoplankton contribution to sestonic mass and elemental ratios in lakes." *Limnol. Oceanogr.*, 48: 1289–1296.

Hessen, D.O., Faafeng, B. and Brettum, P. 2003. "Autotroph:herbivore biomass ratios; carbon deficits judged from plankton data." *Hydrobiologia*, 491: 167–175.

Hessen, D.O., Blomqvist, P. Dahl-Hansen, G., Drakare, S and Lindström, E.S. 2004. "Production and food web interactions of Arctic freshwater plankton and responses on increased DOC." *Arch. Hydrobiol.*, 159: 289–307.

Hessen, D.O., Ågren, G.I., Anderson, T.R., Elser, J.J. and De Reuter, P.C. 2004. "Carbon sequestration in ecosystems: the role of stoichiometry." *Ecology*, 85: 1179–1192.

Hessen, D.O., Rueness, E. K. and Stabell, M. 2004. "Circumpolar analysis of morphological and genetic diversity in the Notostracan *Lepidurus arcticus*." *Hydrobiologia*, 519: 73–84.

Hessen, D. O. 2004. "A freshwater perspective on climate variability and its effect on marine ecosystems." In: Stenseth and Ottersen (Eds.) *Climate and the North Sea*. Oxford Univ. Press, pp. 159–164.

Kooijman, S.A.L.M, Andersen, T. and Kooi, B.W. 2004. "Dynamic Energy Budget representations of stoichiometric constraints to population models." *Ecology*, 85: 1230–1243.

Stige, L.C., Hessen, D.O. and Vøllestad, L.A. 2004. "Severe food stress has no detectable impact on developmental instability in *Daphnia magna*." *Oikos*, 107 (3): 519–530.

Vrede T., Dobberfuhl, D.R., Elser, J.J. and Kooijman, S.A.L.M. 2004. "The stoichiometry of production – fundamental connections among organism C:N:P stoichiometry, macromolecular composition and growth rate." *Ecology*, 85: 1217–1229.

Ågren, G.I., Hessen, D.O., Anderson, T.R., Elser, J.J. and DeReuter, P. 2004. "Element Interactions: Theoretical Considerations." *Scope*, 61: 135–150.

## 5.2 *Papers that were entirely written and completed during the stay at the CAS*

Andersen, T., Elser, J.J. and Hessen, D.O. 2004. "Stoichiometry and population dynamics." *Ecology Letters*, 7: 884–900.

Anderson, T.R., Hessen, D.O., Elser, J.J. and Urabe, J. "Metabolic Stoichiometry and the Fate of Excess Carbon and Nutrients in Consumers." *American Naturalist* (in press).

Elser, J.J. and Hessen, D.O. "Biosimplicity via stoichiometry: the evolution of food-web structure and processes." In: Belgrano, Scharler, Dunne and Ulanowicz (Eds.): *Aquatic Food Webs: an Ecosystem Approach*. Oxford. Univ. Press.

Elser, J.J., Andersen, T. and Hessen, D.O. "Determinants of cyanobacterial biomass in lakes." Ms, ready for submission.

Hessen, D.O. "Aquatic food webs; stoichiometric regulation of flux and fate of carbon. (Invited Kilham Lecture, at the international SIL-congress)." *Int. Verein. Limnol. Verh.* In press.

Hessen, D.O., Faafeng, B.A., Brettum, P. and Andersen, T. "Early eutrophication and trophic transfer efficiency in lakes." *Limnol. Oceanogr.* Subm.

Hessen, D.O., van Donk, E. and Gulati, R. "Seasonal seston stoichiometry: Effects on zooplankton in cyanobacteria-dominated lakes." *Freshw. Biol.* Subm.

Mayntz, D., Raubenheimer, D., Salomon, M., Toft, S. and Simpson, S.J. 2005. "Nutrient-specific foraging in invertebrate predators." *Science*, 307 (5706): 111–113.

McCauley, E., Hessen, D.O., Andersen, T., Faafeng, B., Sterner, R.W. "Extrinsic and intrinsic drivers for N:P-ratios in lakes." *Nature*, subm.

Sterner, R.W., Andersen, T., Elser, J.J., Hessen, D.O., Hood, J., McCauley, E. and Urabe, J. "Updating Redfield C:N:P relationships in surface waters of lakes and oceans." *Nature*, subm.

Urabe, J., Hessen, D.O. and Elser, J.J. "Origin of lake detritus an empirical analysis of Norwegian Lakes." Ms.

### 5.3 *Papers that were initiated during this year but are still in progress*

Note that we anticipate further papers to emerge as a direct result of the year at CAS, but so far it is premature to suggest titles and authors of these.

Andersen, T., Brettum, P., and Faafeng, B. "Phytoplankton diversity." Website and 1–2 papers derived from this.

Anderson, T.R., Elser, J.J. and Hessen, D.O. "The concept of threshold elemental ratios." *J. Theor. Biol.*, Ms.

Elser, J.J. and Hessen, D.O. "Elements of Ecology and Evolution." *Oikos*, subm

Frost, P., M.A. Evans-White, Z.V. Funkel, T.C. Jensen and V. Matzek. "Are you what you eat? Physiological constraints on organismal stoichiometry in an elementally imbalanced world." *Oikos*, subm.

Hessen, D.O., Boersma, M., Andersen, T., Elser, J.J., McCauley, E. "Stoichiometry and trophic efficiency in lakes." *Ecological Monographs*, Ms.

Hessen, D.O., Andersen, T. and Skjelkvåle, B.L. "Catchment stoichiometry, the linkage of carbon and major elements in watersheds." Ms.

Hessen, D.O. and Walseng, B. "Determinants of zooplankton diversity in lakes." *Ecology*, Ms.

Jeppesen, E., Faafeng, B.A., Hessen, D.O. Jensen, J.P. and Søndergaard, M. "Lake morphometry as a determinant of N:P-ratios." Ms.

Jeppesen, E., Hessen, D.O., Faafeng, B.A., Jensen, J.P., Lauridsen, T. and Søndergaard, M. "Zooplankton community structure as related to lake morphometry." Ms.

Kay, A.D., Ashton, I.W., Gorokhova, E., Kerkhoff, A.J., Liess, A. and Litchman, E. "Toward a stoichiometric framework for evolutionary biology." *Oikos*, subm.

Moe, J, Forman, M.R., Harpole, W.S., Stelzer, R. and Yoshida, T. "Stoichiometry and the dynamics and organization of populations and communities." *Oikos*, subm.

Ptachnik, R., Darell Jenerette, G., Verschoor, A.M., Hubert, A.F., Solimni, A.G. and Brookes, J.D. "Applications of ecological stoichiometry for sustainable acquisition of ecosystem services." *Oikos*, subm.

Schade, J., Espeleta, J., Klausmeier, C.A., McGroddy, M.E., Thomas, S.A. and Zhang, L. "Stoichiometry from Ecosystems to Landscapes." *Oikos*, subm.

Walseng, B., Halvorsen and Hessen, D.O. "Zooplankton diversity in lakes; benthic species as major contributors." Ms.

Walseng, B. and Hessen, D.O. "Size does not matter: zooplankton diversity versus lake area and morphometry." Ms for *Nature*.

Wiltshire, K., Brettum, P. Andersen, T. and Hessen, D.O. "Phytoplankton size structure and zooplankton responses – mutual feedbacks." In progress.

#### 5.4 *Other publications and outlets*

- Towards the end of our period at the CAS, a major effort was devoted to finalizing a large Norwegian database of planktonic species diversity that will later be linked to ecosystem parameters such as productivity and stoichiometry. This also forms a unique dataset for describing current species distribution of phyto- and zooplankton in Norway based on surveys in more than 4000 lakes. For the zooplankton, an earlier effort had been made to do scans of Sars' original hand-colored drawings of the cladocerans that had not yet been published. As a first outlet of these efforts, a CD and a book are about to be finalized. The distribution of all species is visualized with maps. Almost all species descriptions are accompanied with Sars' delicate color drawings and some data for key ecological determinants of their distribution. This is truly quite unique information of plankton diversity and will form the basis for a number of forthcoming papers.
- Group presentations in CAS Newsletters 2003 and 2004.
- Upon request from the series editor, an edited book (Springer/Kluwer Publishers) is planned for 2006 based on the Finse "Woodstoich" Workshop, the web-based discussions on the dedicated website and an expressed interest from both participants and the large number of applicants who not were selected to participate.



# *Towards a comprehensive model of human memory*

Report by Tore Helstrup and Svein Magnussen  
Group leaders 2003/2004

## **1. General description**

The main goal of the project was to develop a general framework for understanding human memory in the context of everyday memory. After preliminary discussions at the beginning of the project, we decided to pursue this goal along two paths of joint activities: First, to write a book on everyday memory that sums up the state of the art and adds novel contributions to the literature, and second, to carry out a large-scale national survey of what people believe about memory – are people's ideas about memory in harmony with scientific beliefs?

The memory survey was carried out in two steps, in November 2003 and in March 2004, on both occasions a representative sample of 1000 adult Norwegians were recruited and asked a total of 13 questions probing people's beliefs on such general issues as the possibility of training memory, capacity limitations of memory, memory and aging, how far back can we remember, memories for emotional events, social influences on memory and so on. The results of this survey, which to our knowledge is the first such survey conducted, will be published as a separate paper. The paper is co-authored by all participants.

The main report of the CAS activities of the memory group is the volume on *Everyday Memory*. A contract has been signed with Psychology Press, UK, and the book is scheduled to appear in 2005. Below we briefly outline the content of the book as it gives an idea of the variety of themes covered by the concept of everyday memory. The project group was established with this variety in mind and represents a wide spectrum of research interests, and the book is a genuine team product, as the various

chapters were written by changing author teams, where each participant contributed to at least two chapters. The chapters are marked with an \* in the list of publications from the group.

The book is organized in four thematic sections headed by an introductory chapter devoted to a discussion of what people believe about memory and how they talk about memory. The chapter reports results from the survey, and discusses the folk psychology conception of memory by analysing the everyday metaphors people use. Psychological questions tend to be understood in metaphorical terms. Does a scientific understanding of memory transcend or does it remain within metaphoric confines?

The first thematic section of the book contains three chapters on types of memory. One chapter deals with visual-spatial thinking, imagination, and remembering, and explains different ways of using visual information, examines different cognitive systems for processing such information, and looks specifically at visual aspects of memory and thinking. A special chapter is dedicated to olfactory memory, which in many contexts has been associated with long-forgotten aspects of autobiographical memory. Traditionally, smell has not been conceived of as a central cognitive mechanism. Recent research suggests, however, that this may be wrong. The chapter explores the implications of olfactory memory research, including implications for forensic contexts. The third chapter in this section considers memory for action events, specifically whether one remembers actions in the same way as one remembers visually or verbally presented information. The chapter examines how people perceive and understand action events as they take place in everyday situations. Actions normally represent an interpersonal type of event. Action memory can thus be seen as individual remembering of a type of social event.

This leads to the second thematic section of the book, which focuses on memory in social contexts. The first chapter in this section looks at collaborative memory. Does one remember better, or worse, if one recollects previous experiences together with other persons having the same experiences? The chapter discusses research findings and practical applications. It is a common observation that people like to reminisce about their common past. But there is little systematic research on the

dynamics behind this activity. Are there, for instance, gender or age differences in reminiscence, and what is the functional significance of such mental activity? The second chapter on social aspects of memory presents research results based on a new questionnaire constructed to measure proneness to reminiscence. Sometimes memory fails us. The last chapter in this section discusses memory illusions and false memories in the real world. A brief outline is given of this research domain, and examples from everyday situations are discussed. It is concluded that studies of false memories may highlight the operation of memory in everyday contexts, also when memory functions in a satisfactory way.

The third thematic section focuses on control processes in memory. Memory is not only governed by “bottom-up” processing mechanisms, but is at least under partial control by the person having specific memorial intentions. The first of the chapters on control processes examines the regulation of learning and remembering. This means one must consider the nature and operation of meta-cognition (i.e. cognition about cognition), the persons’ knowledge about their own and others’ cognition. The chapter outlines how people can adequately monitor their own cognition and memory, and shows how meta-cognition may fail, thus following up the themes discussed in the chapters on social aspects of memory. Meta-cognition is established and built up through social interaction. The second of the control chapters presents a retrieval model of cognitive search for episodic memories. Such retrieval is seen as an interaction between direction by cognitive mechanisms and meta-cognitive control.

The last thematic section examines individual and group differences in everyday memory. The first of these chapters looks at memory expertise. It is well known that people differ in memory performance and in the speed and amount of forgetting. Is this due to abilities or memory strategies? This chapter discusses conceptions of memory skill and different types of memory expertise. What happens when memory fails? This is the topic of the second chapter in this section. Different kinds of compensatory mechanisms as used by special populations of people with memory problems are described. Memory changes throughout one’s life. Age-related memory issues are the focus of the two last chapters. The first of these covers early age, and the last one memory among the elderly.

In sum, the everyday memory project has examined memory in real life from a unified but broad theoretical perspective, and checked this perspective against common-sense beliefs about memory. This examination has led to new insights and expanded the scope of memory research.

## 2. Participants and research activities

The following scientists have participated on the memory project:

- Dr. Jan Andersson (University of Linköping, Sweden)
- Prof. Cesare Cornoldi (University of Padova, Italy)
- Prof. Rossana De Beni (University of Padova, Italy)
- Dr. Tor Endestad (University of Oslo, Norway)
- Prof. Gail Goodman (University of California, Davis, USA)
- Prof. Tore Helstrup (University of Oslo, Norway)
- Prof. Asher Koriat (University of Haifa, Israel)
- Dr. Maria Larsson (University of Stockholm, Sweden)
- Prof. Svein Magnussen (University of Oslo, Norway).
- Dr. Annika Melinder (University of Oslo, Norway)
- Prof. Lars-Göran Nilsson (University of Stockholm, Sweden)
- Prof. Jerker Rönnerberg (University of Linköping, Sweden)
- Dr. Hubert Zimmer (University of Saarland, Germany)

The following list provides brief descriptions of the main research activities of the participants while at the Centre of Advanced Study:

Jan Andersson has collaborated with other CAS members on the chapters on collaborative memory and on false memory. During the project year he focused on the social psychology of team collaboration, such as team effectiveness, team problem solving and the relationship between team communication and team performance. In addition, a number of experiments have been planned in collaboration with other CAS members within the area of collaborative recall and the SPT paradigm. The literature on collaborative recall reveals that individuals are often negatively affected by collaboration. Given the results from SPT it could be speculated that collaborative memory performance would not be affected by collaboration and that we might even receive some positive

effects of collaboration. The work has led to an increased understanding of team effectiveness, especially integrating different focuses on teams and groups.

Cesare Cornoldi has collaborated with other CAS members on three main topics concerning reminiscence proneness, retrieval control processes and memory expertise. The project on reminiscence proneness was specifically developed at the CAS, in collaboration with R. De Beni and T. Helstrup, with a focus on individual differences and the existential implications of the use of memory. The concern was not on the truth value of memories, but on the functions involved by the use of memory. People can rely on and give different importance to the use of their memory. The different proneness to the use of memory appears correlated with other cognitive and personality characteristics. In the study of individual differences in cognitive processes, during his period at the CAS, he further developed preceding research lines on blindness and learning disabilities. Publications related to the CAS activity are on different aspects of everyday memory and, in particular, a paper on “leopardismo” (the Italian name for the construct of reminiscence proneness) and a paper on orienteering which proposed the issues which were then developed respectively in the chapters on reminiscence proneness and expertise

Rossana De Beni organized the CAS collaborative research on memory expertise, on proneness to reminiscence (memory sensitivity) and on retrieval pathways, trying to establish how basic memory processes can be applied to everyday memory. In the work on expertise, she took advantage of the fact that different members of the group had studied memory experts in a sample of different representative areas. In particular, studies on spatial cognition show how people can become experts in navigation. The study of expertise has important implications for our understanding of the organization of memory. In the study of individual differences in cognitive processes, during her period at the CAS, she focused on working memory and text processing. Publications related to the CAS activity concern mental imagery, working memory and, in particular, a paper on “leopardismo” and a paper on orienteering co-authored by Cornoldi, which created the bases for the chapters on reminiscence proneness and expertise, respectively.

Tor Endestad has examined memory metaphors in Norwegian linguistic expressions, the results of which are presented in the introductory chapter of the book. He has also analysed spontaneous false memories reported by participants in a reality-television series, where the true story was videotaped. The results of this analysis are presented in the chapter on false memories. He has written on source memory for pictures and words following literal and metaphorical decisions, and worked on problems in studying memory with modern imaging techniques, such as fMRI. This work has led to the establishment of collaborative activities between Oslo University Hospital and CAS co-workers.

Gail Goodman has collaborated on book chapters concerning young children's autobiographical memory, as well as concerning false memory in children and adults. In the chapter on autobiographical memory, she describes a new model of the development of autobiographical memory, which integrates memory development research with attachment theory. Specifically, she describes how memory for attachment-related events, as well as negative events more generally, serves as an important cornerstone for the development of autobiographical memory generally. Further articulated is the influence on autobiographical memory of parent-child discussion as regulated by attachment systems. In the chapter on false memory, she writes about developmental differences in false-memory formation and why children may be more susceptible than adults to false report. Other contributions by Professor Goodman connected to the memory project include a series of papers on trauma and memory and forensic interviewing of children.

Tore Helstrup is co-organizer of the project and co-editor of the book, to which he has contributed to the chapters on action memory, collaborative memory, memory sensitivity, and memory control. He has also worked on developing a pathway model of episodic memory. The pathway model is specifically designed to account for retrieval of autobiographical memories and is intended to be of help in eyewitness interviewing. As an overarching and unifying conceptual framework for understanding cognition, he wrote a book called "Personlig kognisjon" (personal cognition). This book emphasizes the often neglected, personal control aspects of human cognition – an important issue in everyday

memory. Thus, Helstrup's research during the Centre period concentrated on integrating memory within an encompassing framework for understanding cognition, with special focus on the control question.

Asher Koriat has contributed two chapters to the book, one on meta-cognitive aspects of memory and one on memory pathways. The chapter on meta-cognitive aspects of memory summarizes the everyday use of monitoring and control processes in learning and remembering. In addition, work continued on the preparation or completion of several papers on meta-cognition, with themes such as predicting one's own forgetting, correcting experience-based judgments, inflation of conditional predictions, and on illusions of competence in monitoring one's knowledge. In parallel, talks were prepared for conferences.

Maria Larsson has contributed to three chapters of the book project. One chapter on autobiographical and forensic perspectives in olfaction, one chapter on memory and aging with a specific focus on the relationship between subjective perception of memory ability and objective performance in men and women, and a third chapter on memory expertise, in which her major contribution is on wine experts. Other work conducted at the CAS involves further work in two longitudinal projects: (1) the Betula project with special emphasis on olfactory functioning across the adult life span, and (2) the PART study addressing relationships between affective disorders (i.e., anxiety, depression) on cognitive functioning in population-based samples. Several papers on this topic were finalized during the project period and several papers on these topics are in progress.

Svein Magnussen is co-organizer of the project and co-editor of the book, for which he has co-authored four chapters: On people's beliefs about memory, visual-spatial thinking, memory expertise and on false memories. He was responsible for organizing the large-scale survey on people's beliefs about memory, and for preparing the research paper that will be submitted for publication in August 2004. During the CAS year Magnussen completed a book (in Norwegian) on perception and memory of everyday events from the perspective of eyewitness testimony. He has co-authored a number of papers on perception and memory in laboratory and everyday contexts. Together with Gail Goodman he has supervised an extensive cross-national (South Africa, Norway and USA) study

of the development of own-race bias in the discrimination and memory for faces. Together with Annika Melinder he received the prize of the *Journal of the Norwegian Psychological Association* (the Björn Christiansen Memorial Prize) for the best article published in 2003 on children as eyewitnesses.

Annika Melinder has contributed to three chapters, on memory development in children, on olfaction and memory and on compensation strategies. In addition, during the CAS period she submitted three articles for publication concerning police interviewing techniques with children, children's everyday memory of personal events, a study of preschool aged children's suggestibility as measured with a structural test, and completed her doctoral thesis (defended June 6, 2004). Finally, she has been working on a source monitoring study with 3-, 5-, and 6-year-old children and a design for a study of children's and adults processing of emotional pictures. Together with Svein Magnussen she received the prize of the *Journal of the Norwegian Psychological Association* (the Björn Christiansen Memorial Prize) for the best article published in 2003 on children as eyewitnesses.

Lars-Göran Nilsson has contributed two chapters to the book project, one chapter on memory and aging with special emphasis on comparisons between objective and subjective measurements of memory in males and females, and one chapter on memory for actions. Other work conducted at the CAS involves further work on the Betula project with special emphasis on the role of various genes on memory function in non-demented individuals. Several papers on this topic have been finished during the project period and several papers on this topic are in progress. The work on Betula also included analyses of sibship size and memory, and birth order and memory. He has also given a lecture at the Norwegian Academy of Science.

Jerker Rönnerberg collaborated with several of the CAS-members during the production of the book on everyday memory, contributing to the chapters on disability, ability and every day memory compensation, on collaborative memory, on memory expertise, and on visual-spatial aspects of working memory and cognition. In addition, Rönnerberg has prepared his state-of-the-art lecture and chapter on cognitive and neuroscience perspectives on speech and sign processing for the 28th



International Congress of Psychology in Beijing, a chapter with L-G Nilsson on memory and learning, and he has published papers on working memory for signs and on mental reversal of spoken words. He also became the editor-in-chief for the *Scandinavian Journal of Psychology* (2004–01) and the leader of the Swedish Institute for Disability Research (SIDR) in 2004.

Hubert Zimmer contributed to two chapters of the project book: One chapter on action-events in everyday life and their remembering, dealing with memory for imagined and self-performed actions. The second chapter is on visual-spatial thinking, imagination, and remembering, where a model of visual-spatial working memory that can be applied to everyday visual-spatial processing is developed. Both chapters extend former scientific approaches, as the focus of research had so far been on laboratory paradigms. In addition, he completed two papers on event-related potentials and recognition, a paper on route learning for navigation and how memory can be enhanced by pictorial input, and a paper on methods of how egocentric spatial disorientation caused by misaligned spatial maps can be avoided by a user-adapted design of ‘you are here maps’.

### **3. Workshops and seminars**

#### *3.1 Workshops*

The first workshop, in August 2003, was devoted to mutual exchange of information on ongoing research and plans for research activities during the CAS year, the initial plans for the joint volume on everyday memory, and the initial establishment of the various author teams.

The second workshop, in December 2003, included presentations of proposed outlines for the various chapters, and adjustment of author teams. A final draft of chapter lists and themes was decided.

The third workshop, in June 2004, included discussions of first drafts of the various chapters, and discussions within the author teams.

### 3.2 Seminars

A seminar was organized in November 2003, with invited participants from the University of Oslo. Professor James P. Thomas, Department of Psychology, University of California, Los Angeles, lectured on the use of signal detection analyses in memory research.

*CAS luncheon seminars given by members of the memory group:*

- November 12: Professor Jerker Rönnerberg: “Cognition, Communication and Disability”
- January 14: Professors Cesare Cornoldi and Rossana De Beni: “Imagery in the Blind”
- February 4: Professor Tore Helstrup: “Cognitive Control: By what or whom?”
- February 25: Professor Lars-Göran Nilsson: “Genes and Memory”
- March 3: Professor Svein Magnussen: “What people believe about memory”
- March 10: Research Fellow Annika Melinder: “Witness Psychology”
- April 14: Associate Professor Maria Larsson: “Odor Memory”
- April 21: Professor Asher Koriat: “Knowing and the Feeling of Knowing”
- May 26: Associate Professor Tor Endestad: “Metaphors and Memory”

## 4. Evaluation

The main visible outcome of the project period is a jointly authored book on everyday memory. To write and compose this book has been a challenge because it has required close cooperation across the participants of the project group. With expertise background in different fields of cognition and human memory, the participants have made an effort to arrive at a joint focus defined by everyday memory issues. The carrying out of this project has, in our opinion, resulted in improved understanding of the examined everyday memory topics, as well as a contribution to a broader platform to understand human memory in general.

Within the broader project frame the group members have also had occasion to, and have been inspired to, cooperate on different related research questions that will be followed up in laboratories subsequent to the project period at the Centre. Thus, for example, Cornoldi and Helstrup

have discussed how to design better tests of visual-spatial span task performance, so as to be able to extend the methods to cover three dimensional task situations. Zimmer, Magnussen, Endestad and Melinder have initiated a broader collaborative project on the utilization of electrophysiological methods (evoked potentials in the EEG) for evaluation of eyewitness memory; a series of experiments concerning false memory has been proposed. Additionally, they decided to enhance their collaboration on research into memory for pictorial events and on the development of neuropsychological memory paradigms. Larsson and Melinder have developed a project on source memory for odors in a forensic context, and Goodman, Magnussen and Melinder have planned a larger study on the development of cross-gender and cross-age facial recognition.

The opportunity for concentrated work over the two-semester period also gave both project leaders occasion each to write books already in the process of being published about themes that are anchored in the memory project.

In sum, the working conditions at the Centre for Advanced Study made possible unusually close cooperation among research group members and they also made it possible for the participants to concentrate on particularly interesting and important problems.

## 5. Publications

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Airaksinen, E., Larsson, M., & Forsell, Y. (in press). "Neuropsychological functions in anxiety disorders: Evidence of episodic memory dysfunction." *Journal of Psychiatric Research*.

Alexander, K., Quas, J., Goodman, G.S., Ghetti, S., Edelstein, R., Redlich, A., Cordon, I. & Jones, D.P.H. (in press). "Traumatic impact predicts long-term memory of documented child sexual abuse." *Psychological Science*.

\*Andersson, J., Helstrup, T. & Rönnerberg, J. (in preparation). "Collaborative memory: how is your ability to remember affected by the interaction with others?" Chapter for T. Helstrup & S. Magnussen (Eds). *Everyday memory*. UK, Psychology Press.

Bergdahl, M., Habib, R., Bergdahl, J., Nyberg, L. & Nilsson, L.-G. (submitted). "Natural teeth and preserved cognitive function in humans."

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Chotai, J., Smedh, K., Nilsson, L.-G. & Adolfsson, R. (in press). "A dual vulnerability hypothesis for seasonal depression is supported by the seasonal pattern assessment questionnaire in relation to the temperament and character inventory of personality in a general population." *Journal of Affective Disorders*.

Chotai, J., Smedh, K., Johansson, C., Nilsson, L.-G. & Adolfsson, R. (in press). "An epidemiological study on gender differences in self-reported seasonal changes in mood and behaviour in a general population of northern Sweden." *Nordic Journal of Psychiatry*.

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Cornoldi, C. & Lucangeli, D. (2004). "Arithmetic education and learning disabilities in Italy." *Journal of Learning Disabilities-US*, 37, 42–49.

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# *Towards a New Understanding of the Mental*

Report by Olav Gjelsvik and Bjørn Ramberg  
Group leaders 2003/2004

## **1. General description**

Key themes for the group are: (i) the relationship between common knowledge of mental phenomena and various special sciences involving or approaching the mind (psychology, biology, neurology, sociology, economics) and (ii) the relationship between philosophical theories of mind and agency, on the one hand, and scientific approaches to the mind on the other.

In that context, our project functioned as an umbrella for a number of specific individual research projects, all in the general field of philosophy of mind and related areas. The synergy effects provided by informal cooperation on the hospitable CAS premises were significant. However, the group also had regularly scheduled meetings throughout the year. These meetings had the form of colloquia where we discussed work in progress by members of the group. Many such sessions were attended by graduate students in philosophy from the UiO.

During their stay at the CAS, the four members of the group from foreign universities all presented papers to the Philosophy Department at the UiO, as well as to other Scandinavian universities. In March the group (all but Williamson and Perry) went to Røros for an intensive three-day workshop on the central themes of our work. From June 23rd to 25th we held a concluding conference at the Norwegian Academy of Science and Letters under the title, *Truth, Norms and Agency*. In addition to the members of the group, the following scholars attended the conference by invitation; Brian Loar (Rutgers), Helen Steward (Balliol College, University of Oxford), Tim Crane (University College, London), Hartry Field (New York University) John Dupré (University of Exeter). The

conference was open to anyone interested, and about 25 people pre-registered. An open lunch was served at the Academy each of the three conference days, giving members of the audience an opportunity (seized by many!) to meet more informally with the presenters.

All members of the group have worked throughout the year on philosophical research intended for publication. While there will be no joint publication of the works of the group, the time at the CAS has provided a tremendous stimulus to the work of all of us who have had the privilege of spending research time there. The detailed results are accounted for in the form of appendices, itemizing, for each member, the work pertaining to the project at the CAS.

As a group we found the facilities – not to mention the human support provided – for serious research at the CAS to be exceptional. A stay at the Centre, accordingly, represents a rare opportunity to focus and qualitatively advance research projects requiring both a sustained effort and a cooperative intellectual environment. Certainly, from the point of view of the philosophy group, the interdisciplinary interaction with the other groups (biology and psychology) was a rare and welcome element. The inter-group dynamic, clearly a priority of the management at the CAS, is an important aspect of the open and extraordinarily stimulating intellectual atmosphere that has been fostered at the CAS.

We end the year regretting that it is over, but with renewed vigour and a firm resolve to make the most of the advantage that the stay at the CAS has provided.

## **2. Participants, research activities and publications**

The Norwegian component of our group consisted of Jan Harald Alnes (UiT), Magne Dybvik (NTNU), Dagfinn Føllesdal (UiO (emeritus) and Stanford), Carsten Hansen (UiO), and Jonathan Knowles (NTNU), as well as the group leaders, Olav Gjelsvik (UiO) and Bjørn Ramberg (UiO). We were all able to work at the CAS continuously from August/September 03 until June 04.

During the fall semester (03), the group was augmented by John Perry (Henry Waldgrave Stuart Professor of Philosophy, Stanford University, and Director, Center for the Study of Language and Information (CSLI)), and Jennifer Hornsby (Birkbeck College, University of London). During the spring, Pascal Engel (University of Paris-IV-Sorbonne) joined the group from February onward, and Tim Williamson (New College, University of Oxford) for the final six weeks.

## 2.1 Jan Harald Alnes (UiT)

I have focused mainly on Wittgenstein in order to prepare my first publications on his work. This has resulted in two articles in progress, one of them (“Wittgenstein: Reason...”) was presented at the end-of-year conference, *Truth, Norms and Agency*.

In a wider context, this study is part of my general investigations into the history of analytic philosophy. With respect to this topic, I have sketched three papers.

- i. “Wittgenstein: Reason, Cause, and the Bounds of Sense.” Draft #2.
- ii. “Wittgenstein: On the Significance of Family Resemblance.” Working title for paper in progress.
- iii. “Frege: Varieties of Self-evidence?” Working title for paper in progress.
- iv. “An Elucidation of Elucidations.” Working title for note/paper in progress on the various ways of reading Frege’s and Wittgenstein’s use of elucidations.
- v. “Quine og Davidson: Hvor er de uenige?” (“Quine and Davidson: Where Do They Disagree?”). Working title for paper in progress.

## 2.2 Magne Dybvik (NTNU)

While at the CAS, I wrote drafts of all projected chapters of a planned book (provisional title: *Narrowing the gap: The structure and limits of materialistic monism*) on mind-body metaphysics. A main purpose of the book is to provide an analytic overview of possible philosophical positions on the mind-body relationship, emphasizing the dialectical issues that separate them.

I argue that materialistic monism may be broken into different (interrelated) parts, each part representing a certain kind of “monism” which may be contrasted with a corresponding “dualism”. I distinguish between and discuss the following components: Substance monism, event monism, causal monism and property monism. My conclusion is that a kind of non-reductive materialism, where the first three “monisms” are accepted and the last one rejected, is the most plausible position. In an additional chapter, “The mental as internal”, I discuss the structure of mental properties given that property monism is false, i.e. given that some sort of property dualism is true.

### 2.3 *Pascal Engel (Sorbonne)*

#### 1) Books

A. During my stay at the Centre, I completed about two thirds of a book-length manuscript on belief in French, to be published by Editions Gallimard, which will eventually, I hope, have an English version. The plan of the book, provisionally entitled *Doxa*, is as follows:

- Chapter 1 presents a number of truisms and paradoxes about the ordinary notion of belief.
- Chapter 2, historical, presents the antecedents in the history of philosophy of the debate over the voluntariness and involuntariness of belief, from the Stoics to contemporary pragmatism.
- Chapter 3 presents the core or minimal notion of belief, as a disposition to act and think.
- Chapter 4 deals with the distinction between degree of belief (subjective probability) and full belief, and argues that neither can be dispensed with at the expense of the other.
- Chapter 5 introduces the debate about whether belief can be in some sense controlled, and argues against a strong version of direct voluntarism.
- Chapter 6 defends a modest form of voluntarism about belief, arguing that doxastic states such as acceptances imply an active form of belief formation through inquiry.
- Chapter 7, The dynamics of belief, deals with a diachronic version of Moore’s paradox, due to Van Fraassen.

- Chapter 8 deals with the problem of the ethics of belief, and more generally with the issue of how to distinguish epistemic norms and practical norms.
- Chapter 9 traces the consequences of the pluralistic account of belief for the problem of epistemic justification, and argues for an externalist version of virtue epistemology.
- Chapter 10 deals with the consequences of the account of pathological belief formation.
- Chapter 10 deals with the consequences of the account of collective beliefs.
- Chapter 11, on faith and knowledge, deals with the consequences of the account of religious belief.

B. During my stay at the Centre, I started work on another manuscript on *Norms and the Mental*, in English. It will deal with the issue of the so-called “normative” character of mental content, and will develop an answer to this vexed question which will be neither naturalistic in the sense of a reduction of norms to physical or biological facts, nor normativist in the sense of a complete assimilation of mental contents and states to normative facts about the individual or a community. This work will incorporate in part publication (ii), (vii) and (viii).

## 2) Articles written during my stay at the Centre

- i. “Must we believe what we are told?” (in French) an essay on testimony for a special issue of the French journal, *Philosophie*, on this topic, to appear in 2005.
- ii. “Truth and the aim of belief”, rewriting of a paper read at a conference in London in 2003 and at a seminar at the CAS in February 2004, to appear in D. Gillies, ed. *Laws and Models in Science*, London: King’s College Publications.
- iii. “Levels of Belief”, paper read at a discussion group at the CAS, in progress.
- iv. “Questions à Jon Elster” (in French), forum discussion on Jon Elster’s work, to appear in *Archives de Sociologie*.
- v. “Tacit Belief”, paper read a luncheon seminar at the CAS, in W. Østreng, ed. *Synergies: Interdisciplinary Communications 2003/2004*, pp. 98–101.



- vi. “Dummett, Achilles and the Tortoise”, paper read at Stockholm University April 2004, and in a different form at a Seminar on Ethics organised by Panos Dimas and Jakob Elster at the University of Oslo, and to appear in *the Philosophy of Michael Dummett*, R. Auxier & L. Hahn, eds., The Library of Living Philosophers, Open court, La Salle, Ill.
- vii. “La bête humaine”, a popular piece on animal altruism, in French, in *Sciences et avenir Hors Série*, N° 139, juin-juillet 2004, pp.12–13.
- viii. “The Norms of reason: immaculate conception, low origins or genealogy?”, rewriting of a paper read in 2003 in a conference on Rationality in Padova, to appear in *Mind and Society*.
- ix. “Mental Norms and Epistemic Norms”, paper read at the June 2004 Workshop of the program *Towards a New Understanding of the Mental*; “Norms, Truth and Agency”, Norwegian Academy of Science and Letters, to appear.

#### 2.4 Olav Gjelsvik (UiO)

My main project has been the writing of a book entitled “Knowledge, Freedom and Addiction”. This is a long-term project that progressed a lot during the year. There are seven separate chapters, connected through various applications of the concept of knowledge. The books starts with some arguments in support of a conception of the mental at its most general, but its heart is in action theory and the application of philosophy to questions of social science. The chapters are as follows:

- Introduction
- Ch. 1 Knowledge in understanding others
- Ch. 2 Explanation and knowing why
- Ch. 3 Agency and knowledge in action
- Ch. 4 Freedom of the will and normative knowledge
- Ch. 5 Weakness of the will
- Ch. 6 Motivation through time and the objectivity of reason
- Ch. 7 Understanding addiction

I have also completed the following papers:

- i. “Radikal tolkning. En refleksjon over Davidson og en skisse av et alternativ”, *Norsk Filosofisk Tidsskrift*, no 1-2, 2004.

- ii. “Causal Explanation Provides Knowledge Why”, forthcoming in an international volume entitled *Rethinking Explanation*, edited by Petri Ylikoski and Johannes Persson, most likely to appear in the series Boston Studies in the Philosophy of Science.
- iii. “Facing Facts and Facing Motivations”, to appear in the journal *Protosoziologie*.
- iv. I also gave the scientific paper “Fri vilje og avhengighet” at the Norwegian Academy of Science and Letters in their meeting in December 2003, and this talk will appear in the proceedings of the Academy.

## 2.5 Carsten Hansen (UiO)

During my year at the CAS, I completed penultimate drafts of the following four papers. After a final revision of each of them, I shall be submitting them for publication in international, peer-review journals:

- i. “Truth and the Point of ‘True’”, 38 p.
- ii. “Pure Disquotationalism and Conscious Episodes”, 33 p.
- iii. “The Exclusion Problems of Physicalism: the Supervenience Argument and Generalization Argument revisited”, 34p.
- iv. “Clinical Psychiatry and the Philosophy of Mind – wherein lies the significance of the latter for the former?” 25 p.

## 2.6 Jennifer Hornsby (University of London)

Publications: (i) – (v) are forthcoming, (vi) is in preparation.

- i. “Physicalism, Conceptual Analysis, and Acts of Faith”, in *Minds, Worlds & Conditionals: Essays in Honor of Frank Jackson*, ed. I. Ravenscroft (Oxford University Press 2005?).
- ii. “Truth and Ontology”, in *Truthmakers*, eds. Helen Beebe and Julian Dodd (Oxford University Press, 2005?).
- iii. “Dealing with Facts”, in *Philosophy and Phenomenological Research* (2005?)
- iv. “Semantic Knowledge and Practical Knowledge”, *Proceedings of the Aristotelian Society, Supplementary Volume* (2005).
- v. *Reading Philosophy of Language: Selected Texts with Interactive Commentary* (Blackwell Publishers, 2005).

- vi. *Speech and Power: Communicative Speech Acts* (Oxford University Press).

Having the benefit of a year's study leave, I have been able to engage in four projects of my own relating to *Towards a New Understanding of the Mental*;

- a) Ontology:

In the publication cited at (i) I argue that recent defences of physicalism (as a doctrine about the mental) surreptitiously import a questionable – and, in my own view, false – assumption in ontology.

- b) Facts:

I think that a proper understanding of the place of mind in the world requires us to have a viable conception of facts according to which facts are discriminated as finely as pieces of possible knowledge. I have defended this conception in the two papers listed as (ii) and (iii).

- c) Language (1):

This has been my main project – to prepare to write a book contracted with Oxford University Press. The aim of the book is to make room for a self-standing philosophical conception of human beings as language using beings – self-standing and philosophical inasmuch as it need not draw on scientific work in linguistics or psychology. It starts by painting a picture of language in the quotidian causal world in which the notion of something's being a reason has a place; it moves on to questions about the nature of speech acts and of linguistic knowledge; and it finishes with questions about linguistic theorizing. The talks I gave come out of this work. The only publication under this head already definitely forthcoming is listed at (iv).

- d) Language (2):

With Guy Longworth (a colleague at my home institution, Birkbeck College), I prepared a book to appear in a Blackwell series of which I am a general editor. It contains 18 reprinted articles in six Chapters, with introductions by the authors to the whole, to each Chapter, and to each article, and also our commentaries on each article. We hope that it will provide students with a novel, and fertile, route into the philosophy of language. (See (v).)

## 2.7 Jonathan Knowles (NTNU)

The year started in August with couple of week's final preparation of a book manuscript that was published in December 2003 as *Norms, Naturalism and Epistemology: The Case for Science without Norms* (Palgrave Macmillan). Having completed that, whose theme was a critique of the idea that we need specifiable norms within a naturalised epistemology or theory of science, I was led to consider the wider issue of the compatibility of naturalism with epistemic normativity itself. Work on this, focussing initially on something of a hotchpotch of issues from Quine's naturalism to doxastic voluntarism, eventuated in the first instance in a talk at Lund University entitled 'Naturalism and epistemic normativity', whose ideas we subsequently discussed at a seminar at the CAS. While in Lund I also gave a shorter talk, 'Varieties of naturalism', based on ideas from my project proposal for the sabbatical year, a paper which in turn formed the basis of my presentation in the CAS lunch seminar series, in November.

From this time to about the beginning of February, I worked on trying to regiment my ideas on epistemic normativity into one or two papers, eventually producing a rather over-sized document that was discussed at another seminar. In a quandary as to what to do with the upshot of this, I turned to the 'Varieties of naturalism' material, linking previous work I had about a certain conception of common sense psychology associated with thinkers like Hornsby, Davidson and McDowell to what seemed like rather similar views on epistemology expressed by people like Susan Haack and Richard Feldman. This led, via another seminar, to a paper which in its current form is entitled 'Non-scientific naturalism?' which seeks to cast doubt on the idea of a naturalism that does not see scientific understanding as prior to any other (presented in Helsinki in May, see below).

From April to the present I have again rewritten the paper on epistemic normativity for presentation at our final Workshop, dropping the original relativisation of the question to any substantive assumption of naturalism. It is this paper that I see as closest to publishable standard (in a journal such as *Philosophy and Phenomenological Research*), though probably after the extraction of the section on the psychological conception of epistemic norms (which I am aiming to combine with earlier work

and publish as 'Reasoning competence' in e.g. *Mind and Language* or *Philosophical Psychology*). The paper on naturalism is also one I will seek to work up to submittable standard in the next few months (e.g. to *Metaphilosophy*).

#### Publications:

Knowles, J. (2003): *Norms, Naturalism and Epistemology: The Case for Science without Norms*. Palgrave Macmillan, 182 pp., ISBN: 1-4039-0287-9.

In preparation for publication: "Epistemic normativity", "Non-scientific naturalism?", "Reasoning competence".

### 2.8 John Perry (Stanford)

My research for 2003–2004 focused on three projects:

- a) Continued work on my book *Meaning and the Self*. This book gives an account of self-knowledge in the context of a more comprehensive theory of knowledge and other "propositional attitudes." I claim to explain the peculiar characteristics of self-knowledge without appealing to any special metaphysical characteristics of "selves"; that is, without appealing to any characteristics of selves that prevent us from regarding selves as merely people, and people as naturally occurring organisms. I made considerable progress on this project during my Fall Quarter at the CAS and some progress during the rest of the year. I expect to finish it by fall, 2004; it will be published by MIT Press, or Oxford University Press, or Johns Hopkins University Press.
- b) A paper co-authored with Thomas Hofweber on time. We consider a set of issues that have emerged from McTaggart's argument that time is unreal. In the 80 years since this argument was promulgated, a sort of consensus has been reached that the choices are to be a "B-theorist" or an "A-theorist". B-theorists hold that being present, past, and future are not metaphysical properties of events, but relations events have to utterances or episodes of thought, relative to which they are past, present, or future. This seems to have the consequence that the future is, objectively, as real as the past. A-theorists hold that past, present and future are real, thought-independent properties of events. This seems to require that in addition to the properties that order events (before, simultaneous with, after) events have another set of temporal properties. Many think

this view to be incoherent. Hofweber and I argue that this is a false dilemma, which emerges from a flawed analysis of McTaggart's original argument. We argue that if one adopts the view that the future is not real, one should deny an important premise of McTaggart's, that the ordering relations among events do not change with time. This paper is in its fourth or fifth draft. Considerable progress was made, and a talk based on it was presented to the philosophy group at the CAS.

- c) A book has been put together with a dozen articles from various philosophers about my work on a number of issues. I spent a considerable amount of time in the fall reading these papers and preparing responses. The book, *Situation Semantics: Essays on the Work of John Perry*, edited by Michael O'Rourke and Corey Washington, will be published by MIT in 2005.

## 2.9 Bjørn Ramberg (UiO)

My time at the centre gave me a unique opportunity to consolidate my research interest in subjectivity at the interface between philosophy and science. I expect publications in the coming years will rely substantially on the groundwork done during this period.

### Publications:

Donald Davidson (06.03.1917–31.08.2003)." *Norsk filosofisk tidsskrift*, no. 1-2, 2004, vol. 39, 7–8.

Davidson og sjelsvitenskapene." *Norsk filosofisk tidsskrift*, no. 1-2, 2004, vol. 39, 90–104.

"Smerte, lidelse og medlidenhet: Om etiske og biologiske forskjeller mellom dyr og mennesker." *Norsk veterinærtidsskrift*, no. 6/2004, vol.116, 468–9, 472.

"Sneversynt akademisk fagfilosof? Hvem – jeg?" *Rett Kopi. Filosofisk tidsskrift*, nr 1 2004, vol. 1, 30–39.

"Naturalizing Idealizations: Pragmatism and the Interpretivist Strategy." Forthcoming in *Contemporary Pragmatism*, no 2, vol. I.

*Hermeneutics* with Kristin Gjesdal. Forthcoming in Stanford Encyclopedia of Philosophy. URL: <http://plato.stanford.edu/>

2.10 Timothy Williamson (New College, Oxford)

I spent May and June 2004 in Oslo as a Fellow of the Centre for Advanced Study in connection with the project *Towards a New Understanding of the Mental*, organized by Professors Olav Gjelsvik and Bjorn Ramberg. During my stay I began and completed two main full-length papers relevant to the project: “Armchair Philosophy, Metaphysical Modality and Counterfactual Thinking”, which will appear as the Presidential Address in the *Proceedings of the Aristotelian Society* for 2005, and “Probabilistic Anti-Luminosity”, which will appear in Q. Smith (ed.), *Epistemology: New Philosophical Essays*, to be published by Oxford University Press. I also wrote almost all of my contributions to two symposia on my book *Knowledge and its Limits* (OUP 2000) to appear in the journals *Philosophy* and *Phenomenological Research* and *Philosophical Books*, consisting of summaries of the book and extended replies to four and three commentators respectively; this work was relevant to the project because the book develops an account of the relation between knowledge and mind that is closely related to Professor Gjelsvik’s ideas on the explanation of action – issues on which we had fruitful discussions. The papers mentioned earlier are on similar themes. At the end of June I presented a version of “Armchair Philosophy, Metaphysical Modality and Counterfactual Thinking” to the workshop on *Truth, Norms and Agency* in which the research project culminated at the Norwegian Academy of Science and Letters. I presented another version, adapted to an interdisciplinary audience, as a lunchtime talk at the Centre for Advanced Study, published by the CAS (*Synergies: Interdisciplinary Communications 2003/2004*). While in Oslo I also gave the annual Skolem Lecture at the University of Oslo, in which I discussed logical issues concerning unrestricted generality, and was inducted as a foreign member of the Norwegian Academy. I wrote more than I had planned during the period, which I attribute to the generosity of the CAS and the pleasant efficiency of its staff, which together allowed me to work without distraction. I also greatly enjoyed philosophical discussion within the research group. All in all, I found it an extremely positive intellectual experience and would like to thank the organizers for making it possible.

### 3. Workshops and seminars

#### 3.1 Workshop at Røros

In March, 2004 the group (all but Williamson and Perry) went to Røros for an intensive three-day workshop on the central themes of our work.

#### 3.2 "Truth, Norms and Agency"

Oslo Workshop, June 23rd–25th 2004, The Norwegian Academy of Science and Letters:

- John Perry: "Unburdening the Self"
- Pascal Engel: "Mental Norms and Epistemic Norms"
- Jonathan Knowles: "Epistemic Norms and Naturalism"
- Brian Loar: "Perceptual Concepts"
- Helen Steward: "Doing Things"
- Olav Gjelsvik: "Agency"
- Tim Crane: "Perceptual Relations, Perceptual Intentionality and Qualia"
- Magne Dybvig: "Mental Particulars"
- Jan Harald Alnes: "Wittgenstein: Reason, Cause and The Bounds of Sense"
- Timothy Williamson: "Philosophical "Intuitions" and A Priori Thinking"
- Carsten Hansen: "Truth and Conscious Episodes"
- Hartry Field: "Epistemic Rules and Their Revision"

#### 3.3 CAS' Luncheon Seminars

- November 19th: Professor John Perry: "Self Knowledge"
- November 26th: Associate Professor Jonathan Knowles: "Varieties of Naturalism"
- January 21st: Professor Olav Gjelsvik: "Agency"
- February 18th: Professor Magne Dybvig: "Modern Theories of Consciousness: some alternatives"
- March 17th: Professor Bjørn Ramberg: "Subjectivity as Scientific Object"
- May 5th: Professor Pascal Engel: "Tacit Belief"



- May 12th: Professor Dagfinn Føllesdal: “Indexicals and the Mind”
- May 19th: Associate Professor Jan Harald Alnes: “Philosophy and Science”
- June 9th: Professor Timothy Williamson: “Armchair Philosophy and Counterfactual Thinking”
- June 16th: Associate Professor Carsten Hansen: “Truth and the Point of “true””

### 3.4 *Other talks and presentations by group members*

Hansen, C.: “Clinical Psychiatry and the Philosophy of Mind – wherein lies the significance of the latter for the former?” Conference on *Mind and Brain*, Norwegian Academy of Science and Letters, 19th–20th February 2004.

Hansen, C.: “Mental Causation, Mind-Body Supervenience and the Exclusion Problems of Physicalism.” Namicon Conference on *Mental and Special Science Causation*, Århus University, Denmark, May 1st–3rd, 2004.

Hornsby, J.: “Language and Epistemic Interdependence.” Conference in *Philosophy of Language*, Yale University, Nov. 2003.

Hornsby, J.: “Hearing Words.” University of Oslo, Philosophy Colloquium, Mar. 2004.

Hornsby, J.: “Linguistic Action and Knowledge of Speakers.” University of Stockholm, Philosophy Colloquium, Apr. 2004.

Knowles, J.: “Naturalism and epistemic normativity.” Lund University, October 2003.

Knowles, J.: “Varieties of naturalism.” Lund University, October 2003.

Knowles, J.: “Non-scientific naturalism?” presented at XV Inter-Nordic Philosophical Symposium, *Is Science a Challenge to Philosophy?* Helsinki, May 2004.

Perry, J.: Keynote Address, “Body, Mind, and Soul” at the *Geist-Leib-Seele* Conference, Hanover, Germany, 6 September 2003. (To be published by MIT Press in a book based on the conference edited by Ian Kaplow of the Forschungsinstitut für Philosophie.)

Perry, J.: “Return of the Zombies.” Philosophy Department, University of Oslo, 3 October 2003.

Perry, J.: “Epistemic Possibility.” Logic and Language Seminar, Stockholm University, 24 October 2003.

Perry, J.: "Unarticulated Constituents" at Philosophy of Language Group, Gothenburg University, 29 October 2003.

Perry, J.: "Epistemic Possibility." Philosophy Department, Gothenburg University, 30 October 2003.

Perry, J.: "Unarticulated Constituents" at a conference on *The Explicit/Implicit Distinction and the Semantics-Pragmatics Interface*, organized by The Department of Language and Communication Studies and The Department of Philosophy in the Norwegian University of Science and Technology, Trondheim, 31 October 2003.

Perry, J.: "Unarticulated Constituents" at Second International Workshop on *Semantics, Pragmatics and Rhetoric*, University of the Basque Country, San Sebastian-Donostia, 7 November, 2003.

Perry, J.: "Return of the Zombies" at the Philosophy Department of the University of Stockholm, 20 November 2003.

Perry, J.: "Return of the Zombies" at the Philosophy Department, California State University at Los Angeles, 15 April 2004.

Perry, J.: "The Elusive Self." Centre for Advanced Study, 23 June, 2004.

Ramberg, B.: "Interpretation and the knowledge of emotion" at: *Objectivity and Meaning: Themes from Davidson*, International Research Seminar, Oslo, April 16th 2004.

Ramberg, B.: "Interpretation and the Knowledge of Emotion" at: *The Prague seminar on Interpretation*, Prague, April 28th, 2004.

Ramberg, B.: "Who we are and what we are: Emotion at the interface of subjectivity and science" (plenary paper) at: *XV Internordic Philosophical Symposium: SCIENCE – A CHALLENGE TO PHILOSOPHY?* Helsinki, May 13th, 2004. Ramberg, B.: "Subjectivity as scientific object: a pragmatist approach to the sciences of emotion" at: *The LOGOS Group*, Department of Logic, History and Philosophy of Science, University of Barcelona, May 21st, 2004.

Ramberg, B.: An interview with *Verdibørsen* (NRK radio) was broadcast on November 29th, 2003.



## Appendix 1:

### Survey of the joint seminars between the research groups 2004

- 14.01.04: Professors Cesare Cornoldi and Rossana De Beni: "Imagery in the Blind".
- 21.01.04: Professor Olav Gjelsvik: "Agency".
- 28.01.04: Professor Dag Hessen: "Genetic Determinism".
- 04.02.04: Professor Tore Helstrup: "Cognitive Control: By what or whom?".
- 12.02.04: Dr. Robert Ptacnik: "Omnivory – The Strategy of Eating your Competitor".
- 18.02.04: Professor Magne Dybvig: "Modern Theories of Consciousness: some alternatives".
- 25.02.04: Professor Lars-Göran Nilsson: "Genes and Memory".
- 03.03.04: Professor Svein Magnussen: "What people believe about memory".
- 10.03.04: Dr. Annika Melinder: "Witness Psychology".
- 17.03.04: Professor Bjørn Ramberg: "Subjectivity as Scientific Object".
- 14.04.04: Dr. Maria Larsson: "Odor Memory".
- 21.04.04: Professor Asher Koriat: "Knowing and the Feeling of Knowing".
- 05.05.04: Professor Pascal Engel: "Tacit Belief".
- 12.05.04: Professor Dagfinn Føllesdal: "Indexicals and the Mind".
- 19.05.04: Dr. Jan Harald Alnes: "Philosophy and Science".
- 26.05.04: Dr. Tor Endestad: "Metaphors and Memory".
- 09.06.04: Professor Timothy Williamson: "Armchair Philosophy and Counterfactual Thinking".
- 16.06.04: Dr. Carsten Hansen: "Truth and the Point of 'true'".
- 23.06.04: Dr. Tom Andersen: "Biodiversity and Nature's services".
- 22.09.04: Professor Peter Killeen: "Greek mind/Geek mind: Complementarity, Chaos, Consciousness".
- 06.10.04: Professor Henning Andersen: "On the Plasticity of Universal Grammar".
- 13.10.04: Professor Andrzej Wernik: "What is the Space Weather?".

- 20.10.04: Professor Jeff Wickers: "Neural assemblies, corticostriatal interactions, and the serial organization of behaviour: steps towards a formal theory".
- 27.10.04: Professor Hans Pécseli: "Turbulence in nature: Why should I care?".
- 03.11.04: Professor Jan Terje Faarlund: "Language Acquisition as the Locus of Change".
- 10.11.04: Professor Rosemary Tannock: "Language and ADHD: The Application of Linguistic Method".
- 17.11.04: Dr. Tolli Eythorsson: "Looking at the Overlooked".
- 24.11.04: Professor Gail Tripp: "ADHD beyond the child".
- 01.12.04: Professors David Berger and John P. Lombardo: "Exposure to Polychlorinated Biphenyls (PCBs) Produces Hyperactivity Differentially in Male and Female Rats".
- 08.12.04: Professor Elly van Gelderen: "Economy and Prescriptivism: Internal and External Causes of Language Change".

## Appendix 2:

The Scientific Director's external academic contributions, attendance at conferences and meetings in 2004

### *Publications:*

Willy Østreng: "The Changing Mood of Arctic Politics. From Confrontation to Cooperation" in Lou Hagbarth (ed): *Innovative City and Business Regions. Structural Change in Europe 3*, Hagbarth Publications, January 2004, pp. 69–80.

Willy Østreng: "The International Northern Sea Route Programme: Lessons Learned" forthcoming article in *Polar Record*, University of Cambridge, 2005, 20 pages.

Willy Østreng & Helge Ole Bergesen: *Internasjonal Politikk*, Aschehoug Forlag, revision for publication in 9th edition, 2005, 200 pages.

Willy Østreng (ed): *Synergies. Interdisciplinary Communications 2003/2004*, Centre for Advanced Study, Oslo, 2005, 112 pages.

Willy Østreng: "The Gribbin Syndrome and the Entities of Knowledge Integration" in Willy Østreng (ed): *Synergies. Interdisciplinary Communications 2003/2004*, pp. 9–13.

### *Lectures, meetings and attendance at conferences:*

*NetIAS Founders' Meeting* in Wassenaar, Nederland, 7–8 April 2004.

RCN conference: *Science in a New Situation – the Role of Basic Research*, 15–16 June 2004

*Arctic Marine Transport Workshop*, Scott Polar Research Institute, Cambridge University 28–30 September 2004. Lecture on: "INSROP – A learning Experience in forging an Arctic Marine Strategic Plan."

*Russia seminar*, Norwegian-Russian Chamber of Trade, Fornebu 4 October 2004: Lecture: "Hvorfor nordområdene er interessante for norsk næringsliv?" [why the northern areas are interesting for Norwegian business and industry]



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