

◆ Report of the 3rd RIKEN Advisory Council to the
President, the Vice-President, and the Executive Directors
of the Institute of Physical and Chemical Research. ◆

Foreword

Science represents a curiosity about the world that is uniquely human. The research that results from this curiosity and the quest for action have served humanity well, spectacularly well in the past century, and are likely to do so in the next. Yet the mechanism whereby the scientific process can be optimally stimulated and supported within a particular society is complex and delicate. The RIKEN system shows recognition of some of the key universal elements:

- the need to identify the potential for excellence in individual researchers,
- the need to allow these researchers sufficient independence in the choice of problems to pursue, and
- the need for a framework for providing the resources for this pursuit.

Acknowledgements

The members of the RIKEN Advisory Council are most grateful to all those members of the RIKEN staff who prepared material and took part in presentations for the meeting in June 1998. We appreciate the tremendous amount of work that went into the preparations, and the kindness and hospitality with which we were received. We wish you all well.

July 1998

Introduction

The first two meetings of the RIKEN Advisory Council (RAC) were held in 1993 and 1995. It was decided at the second meeting that the third should be held in 1998. The members of the 1998 Council are shown in Appendix 1 .

During the evening of Sunday 31 May, Council Members met for an introductory meeting in Tokyo. On 1 June they assembled in Wako with the former President, Professor Arima, and a number of his colleagues for a series of meetings lasting 3 days. They then transferred to Himeji and the Harima campus for 4-5 June. The timetable and agenda for the meetings are set out in Appendix 2. For some of the meetings and visits the members divided into sub-groups: Physics, Chemistry, Engineering, Biological Sciences, and Medical Sciences. Separate reports were prepared by the sub-groups for submission in confidence to the President for his consideration. The sub-group reports do not appear in this RAC Report, but reference is made to some of the important points of general interest.

The Council met at a critical time for RIKEN. Externally, major changes are under way in the management of science and technology by Government (see

Appendices 2, 3 and 4 in White Paper Volume D). Internally, the Institute has unexpectedly lost President Arima, a towering figure in RIKEN and in intellectual affairs generally - we regret his departure from RIKEN, but we wish him all success in his important new national role; and the Institute is conducting a review of its own structure for the start of the next century; finally, the Institute is in the throes of major capital expenditure and increasing recurrent expenditure, largely in connection with new developments. Members were most impressed by the progress made during the three years since the last meeting.

A history and description of RIKEN were sent in advance to members of Council in the White Paper on RIKEN, 1998, Vol. I General Introduction. It provided excellent background reading for members; its substance will not be repeated here, but this report should be read alongside Vol. I.

This report is set out in sections: Politics and Policy; Structure and Management; The Science; and Recommendations.

Politics and Policy

Great importance is attached to the uniqueness of RIKEN, not least in its autonomy and independence. If there is any fear that this independence is put at risk by the changes in the Government agencies responsible for science and technology, it must be defended; and can be stoutly defended in our view. RIKEN'S budget is a modest fraction of Government expenditure on science and technology - approximately 1.5% of the total and 7% of the STA budget. RIKEN is a singular treasure in the whole system of laboratories, and its independence is a major factor in its standing and success. Any change which would diminish that independence would surely jeopardise its performance. We recommend to Government (through the Executive) that the independence of RIKEN is maintained in the forthcoming changes in the administration of science and technology.

Turning to intellectual property, venture, and commercial exploitation, we believe that the importance of this and the associated activities should not be allowed to become a dominant consideration in long-term, speculative research; fundamental work must not be sacrificed in favour of applied. We would advocate taking the emphasis off the exploitation of intellectual property rights (IPR) by scientists (who have not been outstandingly successful in the recent past) and putting the responsibility in the hands of a small, professional group. Of course valuable IPR will emerge from research at RIKEN and we therefore recommend that exploitation be promoted by a small professional group within RIKEN, dedicated to the task of securing patents and managing their exploitation.

Structure and Management

The structure of the Institute strikes us as complex, unnecessarily so, and this is

aggravated by dispersal across many sites. We believe that the Institute Laboratories and the Frontier Programmes, for example, with their differing missions and conditions of employment, could be accommodated within a unified structure, with a small number of senior post-holders in charge of thematic departments in major groupings. These senior post-holders could hold office for limited periods of, say, three to five years. They would have the power to steer major programmes under the general guidance of the President and Senior Executive and with internal and external consultation. They would also have the responsibility of maintaining collaboration and interaction among scientists in the remote locations. Such a structure would facilitate reviews by external groups. Members of RAC have knowledge and experience of universities with as wide a range of styles of academic activity as RIKEN, operating within a unified structure, with many income streams and a variety of missions.

In the Introduction we mentioned the review by the Executive of the structure of RIKEN which is currently under consideration. We were briefly shown the proposal, an essentially equipment-based structure. We urge the Executive to take no radical action on this review before determining a strategy for the Institute as a whole. The recent rapid growth in activity has precipitated the need to create a strategic plan for the Institute, not inflexible, but a vision for the future. Of course unexpected opportunities must be grasped, and a strategy must have the flexibility to allow that to happen, sometimes with urgency.

We recommend that the Executive and the Chief Scientists' Assembly stand back from the current situation, take a strategic overview of RIKEN as a whole, and its major groupings, and plan a flexible but identifiable research strategy for the next five to ten years, and then consider the future structure. Disciplines develop and change, and with them the boundaries between; boundaries rarely remain appropriate for very long, but they are needed to make an institution manageable. The vital characteristic of discipline boundaries is that they must be permeable, enabling free exchange of expertise and cooperation between scientists across them.

Our impression is that administration at high level is generously covered, but at the lower levels it is not. Our attention was drawn to a paucity of junior administrative support staff and technical staff in several quarters. It is a false economy to leave simple administration and technical work to young scientists, even if they are willing to do it - we detected the spirit "we can do everything ourselves". However, we feel that many of the more straightforward tasks could be undertaken by secretaries and technicians, releasing the time and talents of the scientists for more profitable use.

The Science

The first of the Findings set out in the report of the 2nd RAC of 1995 (p81 of 1998 White Paper Vol.I) can certainly be reiterated in 1998: "RIKEN continues to

produce excellent research results which are widely disseminated in refereed journals and international meetings".

The reports of the Sub-Groups praise the quality of the work of RIKEN, very highly in some cases, and there are some specific and general reservations.

"The physics research at RIKEN is of high quality and it has developed successfully since the previous RAC meeting. Most of the ongoing programmes can be labelled as very good or excellent on an international scale. "However, the present activities tend to be highly equipment-oriented, which is natural considering the superb facilities available at RIKEN. We believe that a stronger theoretical support than that presently available would be most valuable for the continued development of the physics research at RIKEN".

"There is excellent work being carried out in the (chemistry) Laboratories, with particularly impressive work in some fields". However in the Institute there is no overall strategy for chemistry.

----- "Chemistry is the basis of much of biology and materials science. We are all in favour of interdisciplinarity, but it is vital not to ignore the core science. It is quite clear that RIKEN is not paying sufficient attention to this, particularly in theory and synthesis".

"The research activities in the 8 (engineering) Laboratories, the Coherent Science Research Group, and the Frontier Materials Research Group, all on the Wako campus, are generally of a high scientific and technical standard, with original contributions in basic and applied areas. Much appreciated is the trend to problem oriented activities away from instrument and method oriented ones; the problem determines the method, not vice versa. We noticed with satisfaction that former core activities in applied laser chemistry, optical engineering, and materials fabrication were transferred to industry and new, adventurous projects are taking their place".

"Overall, the laboratories in the biological sciences carry out science that is very good. There are pockets of excellence. "The biological sciences at RIKEN do not have sufficient critical mass in the areas of biology that are represented among their laboratories. The lack of critical mass will make establishing a strong international reputation in biology difficult" .

"Altogether we found that research in medical sciences conducted in RIKEN is of a very high standard with centres of excellence. All groups publish routinely in internationally recognised peer review journals". We had a concern that some laboratories appeared to be tackling too many problems in highly competitive areas. "----- there is at Riken the emergence of an entirely new initiative that is visionary in its scale and bold in its scientific reach. ----- It is our view that the (Brain Science) Institute over time should become an international brain research centre of great renown".

It is clear that the science is, in general, very highly regarded by the Council. But there is also a feeling amongst us that in some areas the science is too thinly

spread; many of the groups are small, some are short of support, and some appear not to be outward-looking. It was put to us that some laboratories and projects are isolated by "impermeable membranes". There is a willingness in the Institute, and among individuals, to "take on anything"; this is admirable in spirit and enthusiasm, but it can lead to too many projects running simultaneously. The cardinal aim must be quality; diversity should not be allowed to put quality at risk.

We recommend that the Executive and the Chief Scientists' Assembly consider some concentration, at the expense of diversity.

There are a number of major developments which command special mention. Of two major and internationally unique facilities, SPring-8 is operating splendidly and the RIBF should be operating in a few years. These facilities represent opportunities for major contributions to human knowledge. To take advantage of these opportunities, for example in condensed matter science at SPring-8 and in nuclear physics at RIBF, a commitment to the provision of adequate resources is required. RIKEN is in an ideal position to play a leading role in helping to reap the benefits of these world-class facilities, although we were worried lest Spring-8 would dominate the direction of science, rather than being science driven.

Other major developments include genomics and structural biology, and the Brain Science Institute. These represent major investments of financial and intellectual capital, and are high-profile activities. The Brain Science Institute is a bold venture with enormous scientific and social potential. It is expanding rapidly and it must recruit and retain scientists of the highest international standard, or potential, if it is to succeed; the penalty for failure would be damaging. We would encourage the Director to employ expert groups of advisors, under the aegis of the Advisory Council, to support him in recruiting the best and brightest candidates, and to ensure that the quality of the research reaches the very highest standards.

The Council did not have the opportunity to study the processes of External Assessment in any detail, but we did have an outline in the White Paper, p 51-52, augmented by a proforma provided by Dr Kira. The Chairman also had encouraging discussions and correspondence with the Co-Chairman, Professor Kuchitsu, who has taken part in a number of assessments. The only recommendations we make at this stage are: 1. the interval between Institute Laboratory (IL) reviews, currently eight years according to p 51, should be reduced, probably to four years; 2. the Executive should consider conducting reviews across whole disciplines, or in groups where three or four Chief Scientists are working in related areas; these could be conducted either instead of or in addition to IL reviews.

Among other points which came up during discussions were three of the Issues of Concern recorded in the 2nd RAC Report: numbers 3,5 & 6, which are still of

concern to some of the staff we met. A final point arose during an interesting meeting of three members of Council with a group of about twenty young members of the Institute; it came across clearly that they very much enjoy what they do, and seem to be very hard working, and would much appreciate being kept informed of plans and aspirations for the future. It seemed to us that occasional regular meetings between management and junior scientists would engender a feeling of having a stake in the Institute, rather than simply in their own projects.

For the plenary session on the last day Professor Arima kindly attended the meeting at the invitation of the Chairman. Among other topics the Terms and Duration of Appointment of RAC Members were discussed. It was agreed that, in appointing RAC members, RIKEN would take the following factors into account:

1. balance between scientific disciplines,
2. age balance,
3. geographical and cultural balance, and
4. continuity in knowledge of RIKEN and RAC.

To realise 4, it was felt that each Sub-Group should, if possible, have at least one member who had served previously; and an individual member should not serve at more than two, or at most three, consecutive meetings. These last two requirements may not always be compatible, and it should be left to RIKEN's judgment to determine the composition of the Council.

There was a lengthy discussion on the interval between meetings of the Council. It was of course recommended by the 2nd RAC that the interval should be extended from two years to three, and that was accepted. However, a number of members expressed the view that the next meeting should be held after two years, because recent and forthcoming developments were happening so quickly. The proposal received much, but not universal, support. One objection was that the preparation of the White Paper was a mammoth task and would have to start almost immediately for a meeting in two years' time. This was countered by the suggestion that the next meeting might focus on major developing projects; if that were to be so, Vol I of the White Paper could be much shorter, and Vol II could be either much reduced or dispensed with altogether. Furthermore, it might be possible to reduce the length of the meeting. Again, the decision must be left to RIKEN, and will take account of the views of the incoming President.

Recommendations

1. We recommend to Government (through the Executive) that the independence of RIKEN is maintained in the forthcoming changes in the administration of science and technology. (p 3)
2. We recommend that the commercial exploitation of intellectual property rights generated within RIKEN be promoted by a small professional group in RIKEN, dedicated to the task. (p 3)
3. We recommend that the Executive and the Chief Scientists take a strategic

overview of RIKEN as a whole, and plan a research strategy for the next five to ten years on which a new appropriate structure can be developed. (p3 & 4)

4. We recommend that the Executive and the Chief Scientists consider some concentration, at the expense of diversity. (p 6)

5. We recommend that the interval between Institute Laboratory reviews should be reduced, probably to four years. Further, we recommend that the Executive consider conducting reviews across whole disciplines, either instead of or in addition to Institute Laboratory reviews. (p 7)

Appendix 1

◆ Members of the RIKEN Advisory Council 1998. ◆

PHYSICS

Prof. Indrek Martinson

Dept. of Physics, University of Lund, Sweden

*Prof. Toyochi Tanaka

Dept. of Physics, MIT, U.S.A.

*Prof. John P. Schiffer

Physics Division, Argonne National Laboratory, U.S.A.

CHEMISTRY

Prof. Kozo Kuchitsu < Co-Chairman >

Dept. of Chemistry, Josai University

Professor Emeritus, University of Tokyo, Japan

Prof. Heinz A. Staab

Director, Organic Chemistry Dept., MPI for Medical Research, Germany

*Prof. James J. Turner FRS

Department of Chemistry, University of Nottingham, U.K.

ENGINEERING

Sir Gordon Higginson <>

Former Vice Chancellor, University of Southampton, U.K.

Dr. Heinrich Rohrer

IBM Fellow, Ruschlikon, Switzerland Prof. Morio Onoe

Professor Emeritus, University of Tokyo

Executive Adviser, Ricoh Co.,Ltd., Japan

BIOLOGICAL SCIENCES

Prof. M. Ugo Palma

Professor of Physics, Palermo University, Italy

tProf. Setsuro Ebashi

Former President, Okazaki National Research Institute, Japan

*Prof. Russell L. Jones

Dept. of Plant and Microbial Biology, University of California, Berkeley, U.S.A.

MEDICAL SCIENCE

*Prof. Henry G. Friesen

President, Medical Research Council of Canada, Canada

*Prof. Hiroo Imura+

Former President, Kyoto University, Japan

*Prof. Moshe Yaniv

Dept. of Biotechnology, Institut Pasteur, France

* : Newly Appointed 7 members

t : Transferred from Medical Sciences group to Biological Sciences

+ : Absent from this meeting due to unforeseen circumstances

Appendix 2

◆ Agenda for the Third RAC Meeting (May 31 - June 5, 1998) ◆

May 31, 1998 (Sun)

Imperial Hotel, Tokyo

18.30-20.30 Working Buffet Supper

Welcome address (By Mr. Sakauchi)

Introduction to proposed changes in Japanese
Government policy for science and technology.

June 1, 1998 (Mon)

RIKEN Wako Campus

9.30-12.30 PLENARY SESSION

Welcome address by former RIKEN President

Presentations by RIKEN Management:

- Introduction to RIKEN
- RIKEN's response to the recommendations from the second RAC meeting in 1995.
- RIKEN's future plans

12.30-14.30 Buffet Lunch - Hirosawa Club.

14.30-16.30 Closed Session: RAC members: discussion of initial findings.
Discuss Agenda for meeting.

16.30 Conclude meeting.

19.00-21.00 Formal Reception/Dinner hosted by the Vice President of RIKEN.

June 2, 1998 (Tues) RIKEN Wako Campus

9.30-17.00 Individual Sub-Group meetings
Presentations by RIKEN Chief Scientists and Group Directors.
(12.30-13.30 Sub-Group working lunch)

17.00 Depart Wako Campus

19.00-22.30 Discussion: RAC Members only (at the Hotel).

June 3, 1998 (Wed) RIKEN Wako Campus

9.30-12.00 Sub-Group meetings, continued.

12.00-12.30 Joint Sub-Group meeting (hearing from the Chair of CSA).

12.30-14.00 Lunch Reception - Hirosawa Club.
Members, Chief Scientists, Group Directors and RIKEN Management.

14.00-17.00 Visits to laboratories which are not covered by Sub-Group Meeting Program.
(Wako Campus or Tsukuba Campus)

17.00 Return to Hotel.

19.00-22.30 Discussion: RAC Members only..

June 4, 1998 (Thurs) RIKEN Harima Campus

7.45 Leave Hotel for Harima RIKEN site.

14.15-16.15 Harima RIKEN and SPring-8: Visit and presentations.

16.15 Return to Hotel Sun-Garden, Himeji.

19.30-22.00 RAC Plenary Session: RAC members only:
Presentation of Sub-Group findings.
Discussion of contents of full RAC report.

June 5, 1998 (Fri) Hotel Sun-Garden, Himeji

9.00-12.00 RAC Plenary Session: RAC Members only
Discussion of contents of full RAC report (cont.).
Drafting of preliminary recommendations to be presented in the afternoon session.
Discussion of RAC membership and the composition of Sub-Groups for next meeting.

12.00 Lunch hosted by Vice-President of RIKEN.

13.30-16:00 FINAL PLENARY SESSION: RAC and RIKEN
Presentations on preliminary recommendations by RAC.

16.00

Plans for producing the Final Report.
Close meeting.