

encouraging cooperative research with researchers of the private sector, with funding coming from industry, but also some from Monbusho.

The system provides industry with access to university research and with incentives as to the treatment of patents. In 1985, 216 projects were undertaken with 175 industrial firms in 45 universities and other institutions, involving 1.3 billion yen, for research into materials, instruments, biotechnology, computer software, and so on.

c. Contract research: The contract research system enables researchers in national universities to carry out research activities with funds from external bodies. In 1984, a total of 2.8 billion yen was received by national universities for conducting 1,300 research projects on a contract basis.

d. Contract researchers: The contract researcher system provides researchers and engineers in industry with the opportunity to conduct research in national universities at the graduate level. More than 800 contract researchers are implementing research projects at national universities under this system.

e. Donations: National universities are authorized to receive donations from outside organs, such as private companies, for the purpose of encouraging scientific research in the universities. These donations are utilized for research and educational activities which are in line with the objectives of the donators. In 1984, a total of 18 billion yen was received by national universities as donations.

Adding together above three schemes, national universities received a total of 22 billion yen from external sources in 1984, which accounted for 7% of the total direct research budget of national universities, excluding staff costs.

4) Usefulness of foundations

In order that university researchers may extend cooperation to scientific researches needed by the district where the university is located, the form of foundations is considered very useful. There are many cases where foundations have been set up by the funds contributed by local governments and industries are conducting university-industry cooperative research and developmental activities. There are also many examples of university researchers who participate in research meetings

for local industrial development set up at the initiative of local governors. Such cooperative activities with localities can be pointed out at many universities.

4. Industry-University Cooperative Research Committees

There are many barriers to university-industry research cooperation. First there is a lack of information in both universities ~~and universities~~ and industry. University professors do not know the real need of research and development in industry, and industry engineers do not know what kinds of research is going on in universities. In order to overcome this difficulty, the Japan Society for the Promotion of Science (JSPS) has been providing a forum for promoting cooperation between the universities and industry by creating Industry-University Cooperative Research Committees on specific themes where researchers from both industry and the universities meet and discuss recent research results. Since 1933, 151 such committees have been organized, 38 of which are still active. The other committees have been dissolved after fulfilling their assignments. These committees have been established at the initiative of scientists both in industry and the universities, and have been supported by industry funding.

5. Promotion of international cooperation

The promotion of international exchange and cooperation in science is especially important not only to raise the level of academic research in Japan but also to contribute toward the advancement of scientific research of the world. Among the programmes for this purpose for which Monbusho is responsible, project researches basing upon intergovernmental agreements are carried out by Monbusho itself, and programmes of general nature are carried out by JSPS in line with the science policy of Monbusho.

A few examples of international research projects are as follows:

In the field of high energy physics Japanese researchers are participating in joint experiments at American laboratories, as well as the LEP experiment at CERN with researchers from the United Kingdom. In Japan, too, American research groups are taking part in "TRISTAN"

programme at the National Laboratory for High Energy Physics (KEK).

In the area of nuclear fusion research, Japanese researchers cooperate in the international TEXTOR (Torus Experiment for Technology-Oriented Research) project at Julich, F.R.G.

In space science, Monbusho's Institute of Space and Astronautical Science, took part in the joint observation of Halley's Comet. In the ASTRO-C satellite, which will be launched in next February, observation machines developed by the United Kingdom and by the United States respectively will be loaded.

In the field of neutron scattering, Japanese researchers have started participating from 1986 in experiment programmes at Rutherford Appleton Laboratory, in addition to continuous collaboration with American researchers.

In the field of ocean science, Japan is participating together with U.K. and other countries in the ocean drilling project of the National Science Foundation (NSF).

As for the antarctic research, the National Institute of Polar Research acts as the central coordinating body for research under the direction of the Headquarters for Japanese Antarctic Research Expeditions established within Monbusho.

Between Japan and the United Kingdom various programmes for exchange and cooperation are being implemented under memoranda, one between JSPS and the Royal Society in natural sciences and the other between JSPS and the British Academy in humanities and social sciences. Monbusho is also conducting cooperative programmes with the Science and Engineering Research Council. I hope such cooperation will be further promoted for the future.

Scientific exchange programmes with developing countries are mainly those carried out by JSPS under its core university system and those included in the intergovernmental research programmes under the auspices of UNESCO.

The core university system is a cooperative network which is established in each priority field specified through negotiations between JSPS and its counterpart agency in each country. The role of the core university is to coordinate the activities of cooperating

universities and individual researchers, so that exchange of scientists and scientific seminars may be carried out on the systematic and continuing basis. At present various cooperative programmes are carried out in 13 priority fields with five countries in Southeast Asia.

As to international research cooperation under the auspices of UNESCO, Japan is participating in intergovernmental research programmes in oceanography (IOC), Man and the Biosphere (MAB), hydrology (IHP), etc. and to regional programmes such as the Southeast Asian Network in basic science.

Lastly, the United Nations University, which was established by the United Nations General Assembly and commenced operations in 1975, is an international community of scholars engaged in research and training on the pressing and global problems. The Government of Japan, supporting the ideology of the University, has contributed US\$100 million to the United Nations University's Endowment Fund, in addition to providing the University with a provisional Headquarters in Tokyo. Monbusho is now carrying on preparatory work for the construction of a permanent Headquarters in Tokyo.

IV Japan Society for the Promotion of Science (JSPS)

The Japan Society for the Promotion of Science (JSPS) operates various programs to promote scientific activities in Japan, including research fellowships and international exchanges. The annual budget of JSPS for 1986 is 4.7 billion yen, of which 3.8 billion yen is provided by Monbusho.

The domestic programs of JSPS include:

- (i) granting post-doctoral and doctoral fellowships under the special research^{dev.} program,
- (ii) promoting university-industry cooperation,
- (iii) managing government-owned patents, and
- (iv) providing publication and information services.

The international programs of JSPS include:

- (i) granting fellowships to foreign and Japanese scientists,
- (ii) providing travel grants for participation in international

joint research projects, and
(iii) managing bilateral exchange programs under agreements or memoranda of understanding with foreign academic institutions.

The last category of programs, consisting of exchange of scientists, joint research and seminars, currently includes cooperation with 40 foreign academic institutions in 28 countries, including those with ASEAN member countries under the scheme known as the "core university system".

Since 1933, JSPS has been providing a forum for promoting cooperation between universities and industry by organizing Industry-University Cooperative Research Committees on specific themes where researchers from both industry and universities discuss basic and technological problems. 151 such committees have been established. At present 38 of them are active.

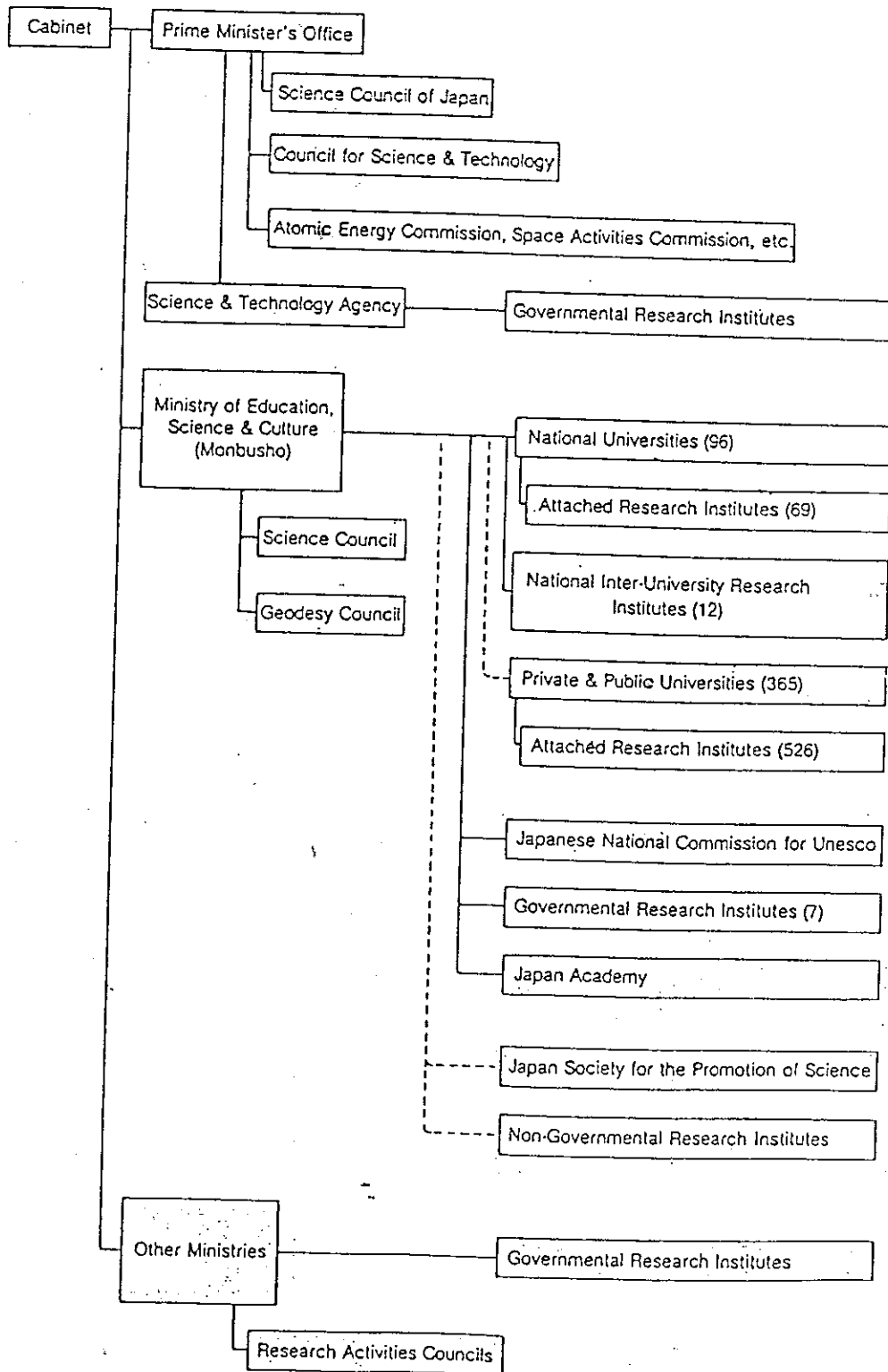
In order to further strengthen university-industry cooperation, an "Advisory Committee on University-Industry Research Activities" was set up in 1982 to study the problems of university-industry cooperation from a long-term, comprehensive point of view. Following the study by this advisory committee, two specialized Research and Development Committees have been established, one on molecular biology and the other on linguistic information processing, to promote joint research projects between universities and industry with funds from the government, industry and other sources. The former is to be replaced by a new committee on protein engineering in 1986.

In 1985, the Japanese people celebrated the sixty-years reign of His Majesty the Emperor of Japan. There arose voices proposing a programme to establish the International Prize for Biology, in the area which is related to the academic interest of the Emperor. The Prize was eventually established by the Committee on the International Prize for Biology, JSPS acting as its executive secretariat. I am very pleased to remind you that the 1985 Prize was awarded to Prof. Edred John Henry Corner, Emeritus Professor of the University of Cambridge, together with an imperial gift. Prof. Corner is not here today, but I have a message from him that he hopes sincerely that a U.K.-Japan Cooperative research programme will be realized in the field of tropical biology. Therefore,

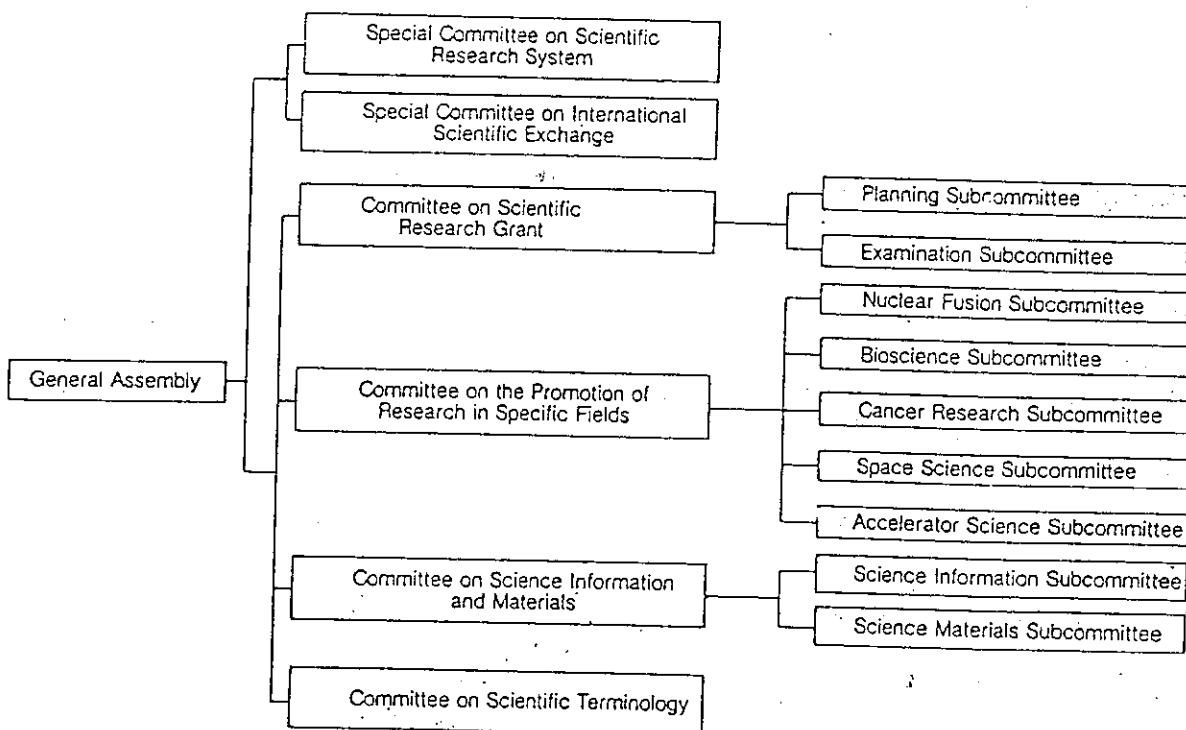
I would like to conclude my speech, conveying Prof. Corner's message to you all who are interested in the research cooperation between the United Kingdom and Japan.

Chart I-1

Organization of national research administration



Organization of the Science Council



Major recommendations and reports of the Science Council	
1973	basic policies for the promotion of science
1975	promotion of space science promotion of fusion research
1977	promotion of life sciences handing of patents for the inventions of university teachers promotion of scientific exchange with developing countries promotion of accelerator science
1978	promotion of environmental sciences promotion of ocean science research guidelines for recombinant DNA experiments
1980	a new plan for a science information system promotion of energy research long-term measures for the promotion of fusion research
1982	revision of guidelines for recombinant DNA experiments
1984	basic policy of and measures for the improvement of the scientific research system
1986	promotion of bioscience

Number of institutions of higher education

	National Public		Private	
Universities 461	96	34	331	
Junior colleges 543	37	51	455	
Technical colleges 62	54		4	4
Total: 1,066	(as of May 1985)			

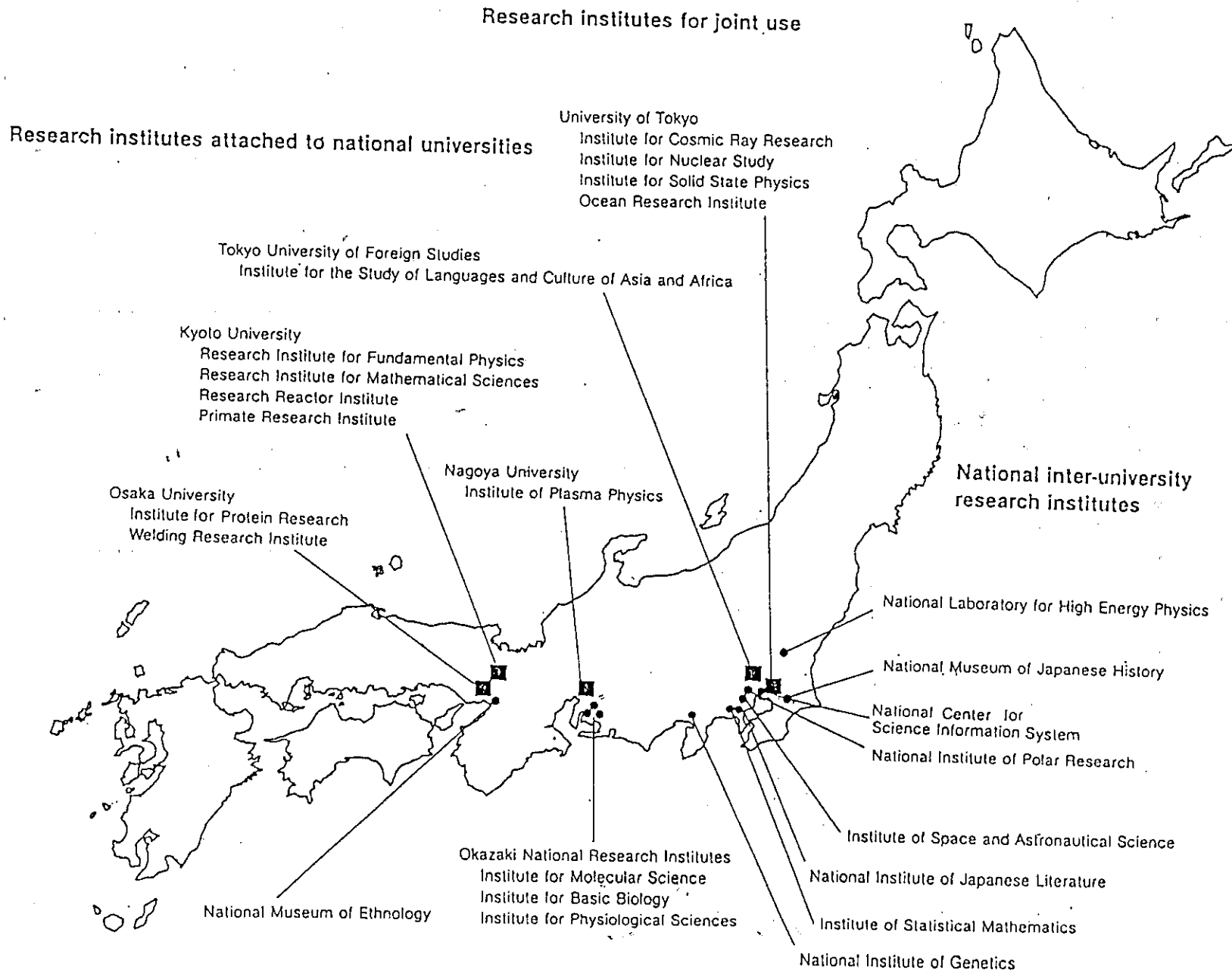


Chart I-4-1-1

Breakdown of researchers by sector and by field of science

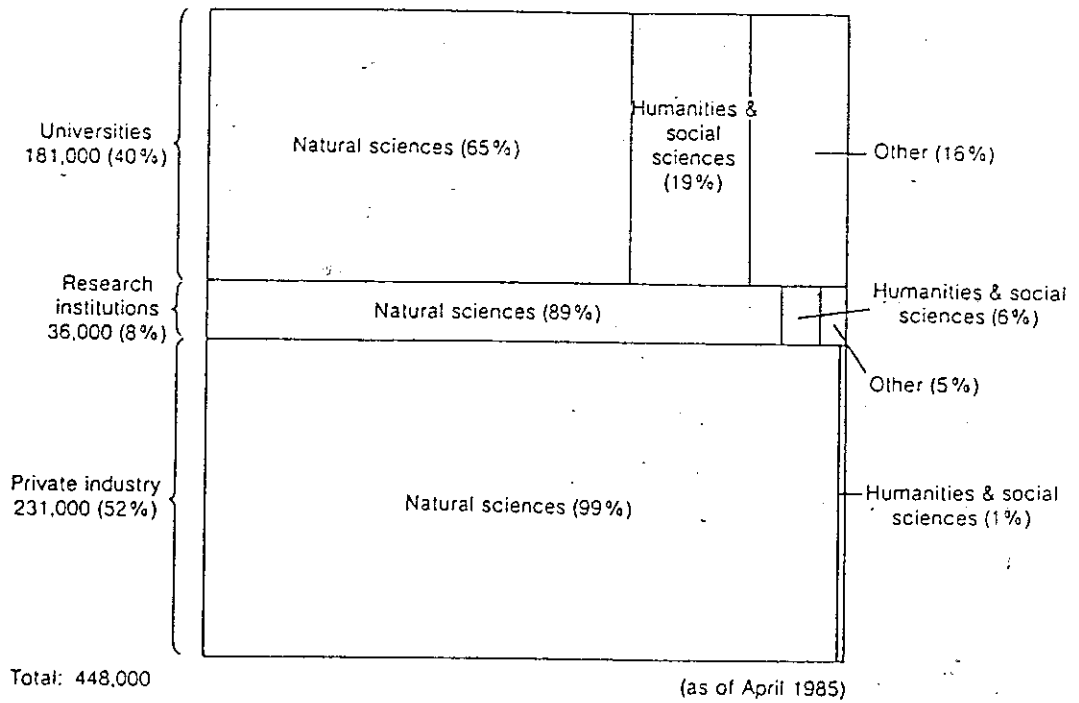
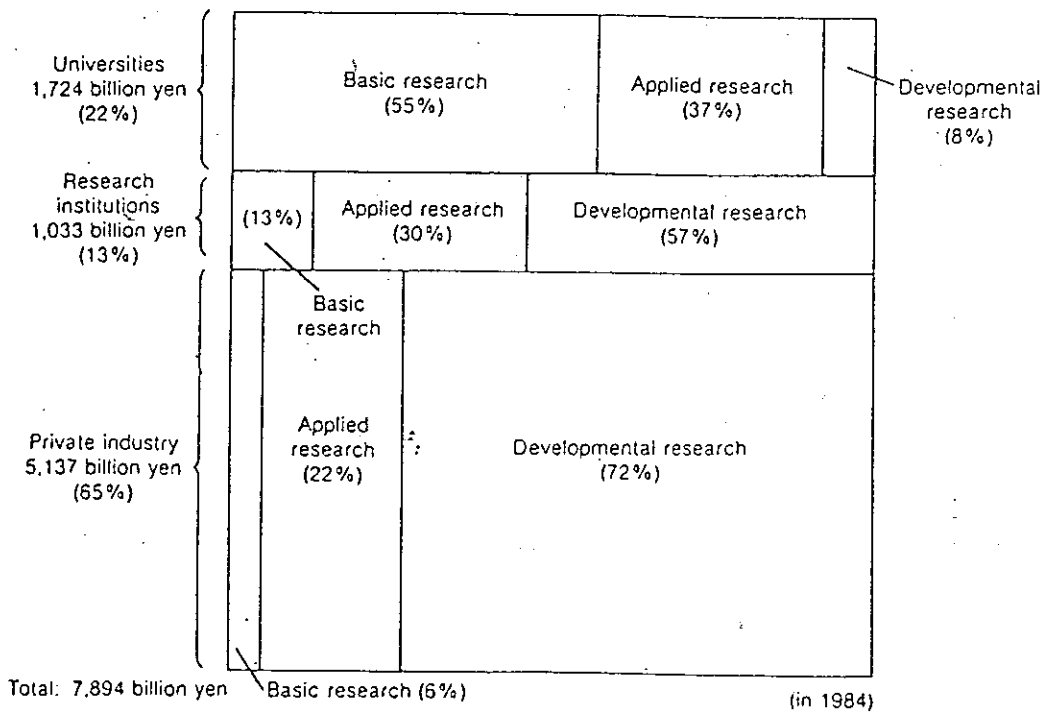


Chart I-4-1-2

Breakdown of research expenditure by sector and by type of research



Scientific Research Expenditures by Source of Funds and Sector

100 million yen

Source	Sector	Japan (1983)		U.S.A. (1983)		F.R.G. (1983)		France (1981)	
		amount	share	amount	share	amount	share	amount	share
Government	Industry	784	1.7	49,638	32.4	5,218	17.7	3,666	24.5
	Government	6,553	98.2	24,292	100.0	2,037	98.6	5,646	94.4
	Universities	<u>6,541</u>	63.6	<u>17,813</u>	73.0	<u>6,609</u>	98.4	<u>4,100</u>	98.5
		13,878		91,743		13,864		13,412	
Industry	Industry	44,735	98.1	103,788	67.6	23,822	80.9	10,186	68.2
	Government	116	1.7	0	0	9	0.5	106	1.8
	Universities	<u>177</u>	1.7	<u>891</u>	3.6	<u>107</u>	1.6	<u>56</u>	1.3
		45,028		104,679		23,938		10,348	

STA Report 1985

(share: The Share of funds in total expenditure for each sector)

Source: Japan; Statistics Bureau, Kagaku GijutsuChosa Hokoku

U.S.A.; NSF National Patterns of Science and Technology
Resources

F.R.G.; BMFT Bundesbericht Forschung 1984

France; OECD International Statistical Year