

UNITED NATIONS

**REPORT OF THE
UNITED NATIONS
SCIENTIFIC COMMITTEE
ON THE
EFFECTS OF ATOMIC RADIATION**



GENERAL ASSEMBLY
OFFICIAL RECORDS : THIRTEENTH SESSION
SUPPLEMENT No. 17 (A/3838)



NOTE

Throughout this report and its annexes cross-references are denoted by a letter followed by a number: the letter refers to the relevant technical annex (see Table of Contents) and the number is that of the relevant paragraph. Within each technical annex, references are made to its individual scientific bibliography by a number without any preceding letter.

Symbols of United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

Annex I
LIST OF REPORTS
SUBMITTED TO THE COMMITTEE

1. This annex lists reports received by the Committee from Governments, specialized agencies, the International Commission on Radiological Protection and the International Commission on Radiological Units and Measurements. Abstracts have been inserted where appropriate.

2. All those reports are included of which a sufficient number of copies for distribution in the A/AC.82/G/R. document series were received before 1 March 1958.

3. The list also includes reports received after 1 March 1958, preliminary copies of which were submitted to the Committee prior to that date.

Document Number	Country and Title	Approximate No. of pages
A/AC.82/G/R.		
1.	UNITED STATES OF AMERICA. <i>The biological effects of atomic radiation</i> Summarizes general survey in which committees of experts covered the following subjects: genetics; pathology; meteorology; oceanography and fisheries; agriculture and food supplies; disposal and disposers of radioactive wastes.	108
2.	UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND. <i>The hazards to man of nuclear and allied radiations</i> General report covers both somatic and genetic hazards associated with radiation, present and foreseeable levels of exposure, and an assessment of the hazards in terms of associated actual and permissible levels.	128
3.	BELGIUM. <i>Preliminary report on modern methods for the evaluation of the biological effects of small doses of external radiation or absorbed radioactive materials</i> Concludes that the most hopeful measurements are those of: 1. DNases and cathepsins in plasma and urine. 2. DNA synthesis in vitro by bone marrow or biopsy specimens. 3. Platelet counts. 4. Antibody synthesis. and that the Committee should re-emphasize the need of appropriate fundamental research in radiobiology.	25
4.	JAPAN. (Report consisting of eight parts, as follows:) (Part 1.) <i>Researches on the effects of the H-bomb explosion at Bikini Atoll 1954 on animal industry and sericulture in Japan</i> Gives negative results of analysis by absorption method of radioactivity in milk, eggs and agricultural products following the Bikini explosions of May 1954. Related experimental feedings of animals with radioactive ashes were analysed chemically. (Part 2.) <i>The radioactive contamination of agricultural crops in Japan</i> Gives results of soil and crop analyses for total radioactivity before and after May 1954 Bikini explosions, after subtraction of K ⁴⁰ content, and with some radiochemical analysis. Radioactivity after the explosion was detected in soil, crops and other vegetation which are distributed all over Japan. The possible route of contamination is discussed. (Part 3.) <i>A preliminary report of recommendations on the modern methods of estimating the biological activity of small radiation dose</i> Several current hematological findings in Japan are summarized and discussed. (Part 4.) <i>The airborne radioactivity in Japan</i> Analyses of airborne radioactivity by filter and by electrical precipitator are described and compared. Results of analyses 1954-1956 show poor correlation between peaks of contamination and trajectories of high-level air masses. (Part 5.) <i>Report on the systematic observations of the atmospheric radioactivity in Japan</i> Describes methods of collection and analysis of fall-out in dust, rain and snow, and of airborne radioactivity, as used in a wide survey at meteorological stations. Results from April 1954-March 1956 are summarized and discussed and the cumulative depositions of Sr ⁹⁰ is calculated. (Part 6.) <i>On the distribution of naturally radioactive nuclides in Japanese islands</i> Surveys of the distribution of naturally radioactive nuclides in Japanese waters and minerals are reviewed and summarized.	10 13 3 28 56 27

Document Number	Country and Title	Approximate No. of pages
A/AC.82/G/R.	JAPAN (continued)	
	(Part 7.) <i>Radiochemical analysis of radioactive fall-out observed in Japan</i>	24
	Present methods and results of radiochemical analyses of ash from the fishing boat No. 5 Fukuryu Maru and of rainwater and soil samples in Japan.	
	(Part 8.) <i>Fission products in water area and aquatic organisms</i>	24
	Describes fall-out distribution and uptake generally, with special reference to water and aquatic organisms and to the problem of Sr ⁹⁰ .	
5.	MEXICO. <i>First report on the studies of radioactive fall-out</i>	15
	Gives full description and comparisons of sticky paper and pot methods, preliminary results May-July 1956 for total beta activity and intended expansion of programme.	
6.	UNION OF SOUTH AFRICA. <i>Preliminary report on radioactive fall-out</i>	2
	The preliminary result of the measurement of total beta activity of fall-out by porcelain dish method is described and results are given for January-June 1956. Sr ⁹⁰ deposition was estimated by chemical analysis.	
7.	UNITED STATES. <i>Radioactive fall-out through September 1955</i>	13
	Summarizes analysis of daily samples obtained up to end of September 1955 from twenty-six stations in United States and sixty-two elsewhere by gummed film method calibrated against collection in high walled pots (see document A/AC.82/INF.1). Cumulative deposition of mixed fission products, integral gamma doses and Sr ⁹⁰ deposits are calculated and compared with other findings, including Sr ⁹⁰ content of soils and milk.	
8.	CHINA. <i>Reports by the Atomic Energy Council of the Executive Yuan of the Republic of China</i>	8
	Briefly notes the radium content of certain Chinese and other waters and the occurrence of radioactive sailfish and dolphin in seas off Taiwan, June 1954.	
9.	CANADA. <i>Report on waste disposal system at the Chalk River Plant of Atomic Energy of Canada Limited</i>	15
	Describes procedures and results of ground dispersal of radioactive wastes from a natural uranium heavy water-moderated reactor.	
10.	<i>The Canadian programme for the investigation of the genetic effects of ionizing radiation</i>	15
	Describes a proposal to modify the system of recording of the national vital statistics so as to render useful for genetic analysis the information contained in certificates of births, marriages and deaths (see also document A/AC.82/G/R. 58/Add. 1, annex 12).	
11.	UNITED STATES. <i>Pathologic effects of atomic radiation</i>	100
	Present knowledge of the pathological (non-hereditary) effects of radiation is surveyed extensively by a committee. Includes separate sections by sub-committees or individual members on: acute and long-term hematological effects; toxicity of internal emitters; acute and chronic effects of radioactive particles on the respiratory tract; delayed effects of ionizing radiations from external sources; effects of radiation on the embryo and foetus; radiation in a disturbed environment; effects of irradiation of the nervous system; radiation effects on endocrine organs.	
12.	CANADA. <i>Levels of strontium-90 in Canada</i>	7
	Gives figures for Sr ⁹⁰ and Sr ⁸⁹ in milk powder at seven stations, November 1955-May 1956. The Sr ⁹⁰ level averages 4.8 μc/gm Ca. Cumulative total beta activity and calculated Sr ⁹⁰ content of fall-out analysed by United States AEC from gummed papers, are summarized annually for 1953 to 1955. Independent Canadian measurements by methods which are not described differ from these by factors 2-5.	
13.	NEW ZEALAND. <i>Note by New Zealand</i>	12
	Gives brief notes in reply to the questions contained in individual paragraphs of annexes to letter PO 131/224 of 9 April 1956 (annexes derived from A/AC.82/R.10). Other sections describe: measurements of radioactivity (only radon found) collected from air at Wellington by filter and by electrostatic precipitator February 1953-May 1956, also by an impactor method in 1953 and in rainwater on certain dates November 1955-May 1956; results of measurements of total beta activities of fall-out by sticky paper method May-July 1956.	
14.	NORWAY. <i>Report of three parts</i>	9
	Suggests taurine biochemistry and lens opacities as biological indicators for low doses. Gives notes on disposal of small amounts of radioactive wastes. Describes and gives results of analyses by pot method in 1956 of total beta activity due to fall-out on ground, in air, in drinking water and accumulated in snow falls. Includes some analyses for Sr ⁹⁰ .	
14/Add.1	<i>Addendum to Part 1</i>	7

Document Number	Country and Title	Approximate No. of pages
A/AC.82/G/R.		
15.	SWEDEN. <i>Report of fifteen parts</i> The fifteen sections cover: consumption of the doses to the gonads of the population from various sources; thorough survey of natural radioactivity including estimates of weekly dose-rates; measurements of gamma radiation from the human body; measurements of fall-out (1953-1956) including total beta activity, gamma ray spectrum and migration of Sr ⁹⁰ into soils, plants and grazing animals, content of certain isotopes as well as research upon certain related physical quantities; considerations of occupational (medical) exposures. Methods used are extensively described throughout.	330
15/Corr.1	<i>Corrigendum to parts 1 and 9</i>	2
15/Corr.2	<i>Corrigendum to part 9</i>	1
16.	FRANCE. <i>Report of three parts</i> The report includes three main parts: 1. Methods of measuring: the radioactivity produced by nuclear explosions and nuclear industry; natural or artificial radioactivity in living beings; the atmospheric radon. 2. Reports on measurements relative to: natural radioactivity of rocks; radioactivity of soil and water; natural and artificial radioactivity of air, water and soil; occupational radiation exposure. 3. Studies on genetic effects of radiations and on the descendants of patients treated with pelvic radiotherapy.	106
16/Add.1	<i>Addendum to above report</i>	20
17.	CZECHOSLOVAKIA. <i>Natural radioactivity of water, air and soil in the Czechoslovak Republic</i> Briefly draws attention to deviations from reciprocity and to the partial reversibility of many radiation induced phenomena, to the possible use of organisms in a state of abiosis as integral dose-indicators, to certain specially radiosensitive organisms and responses, and to questions of threshold. An extensive survey reviews many studies of natural radioactivity.	37
18.	KOREA, REPUBLIC OF. <i>Report concerning the request for information on natural radiation background</i> Describes counters used for monitoring radiation background and gives results (cpm) from January 1955 to June 1956.	10
19.	AUSTRIA. <i>Information prepared by the Austrian Government relating to the effects of atomic radiation</i> Describes radioactive warm springs at Bad Gastein, giving activity levels in water and air. Outlines wide scope of biological and instrumental research at Gastein Institute.	2
20.	UNITED KINGDOM. <i>The radiological dose to persons in the United Kingdom due to debris from nuclear test explosions prior to January 1956</i> Summarizes measurements of total beta activity and Sr ⁹⁰ content of fall-out at ground stations, in rainwater and in the air over the United Kingdom during 1952-1955. Includes calculations of time-integrated gamma ray doses.	28
20/Corr.1	<i>Corrigendum to above report</i>	2
21.	UNITED STATES. <i>Project Sunshine Bulletin No. 12</i> Presents and discusses results of Sr ⁹⁰ analyses since 1 December 1955. Includes Sr ⁹⁰ concentration in human and animal bones, animal products, vegetation, soil, precipitation, other water, and air.	59
22.	<i>Summary of analytical results from the Hasl Strontium Program to June 1956</i> Summarizes the data of research on Sr ⁹⁰ conducted by Hasl since 1951. Includes the Sr ⁹⁰ content in fall-out, soil, vegetation, human and animal bones, human urine, milk, cheese, drinking water, and fish. Fall-out measurements and samples cover not only United States of America but also several other countries.	9
23.	ARGENTINA. <i>Preliminary report on possible methods of estimating the biological effects of small doses of radiation</i> Among biological effects of small doses of radiation, emphasizes especially: measurement of DNA synthesis using P ³² and C ¹⁴ radio-autography, histochemical and electron microscopic examination of changes in lymphocytes and other components of peripheral blood.	13
24.	UNITED STATES. <i>The effect of exposure to the atomic bombs on pregnancy termination in Hiroshima and Nagasaki</i> Gives full account of survey of pregnancies in Nagasaki and Hiroshima from 1948 to 1954: sex ratio, congenital malformations, still births, birthweights, neo-natal deaths, certain anthropometric measurements at nine months, and autopsies were compared with parental irradiation histories. No significant correlations were found.	380

<i>Document Number</i>	<i>Country and Title</i>	<i>Approximate No. of pages</i>
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25.	HUNGARY. <i>Unusual radioactivity observed in the atmospheric precipitation in Debrecen (Hungary) between 22 April-31 December 1952</i> Describes methods and discusses results of measurements of total beta activity of fall-out at Debrecen, April-December 1952.	13
26.	BELGIUM. <i>Report consisting of five parts</i> 1. Gives results of clinical observations of patients treated with X-rays, Ra or I ¹³¹ and of persons occupationally exposed. 2. Gives results of studies relating to: the medical and physical control of persons occupationally exposed; the absorbing materials; and the radioactive contamination of the atmosphere. 3. Considers preventive or curative methods of syndromes of acute irradiation. States results of doses received by the occupationally exposed personnel of the <i>Institut du cancer</i> of Louvain, Belgium, and of hematological examinations of them. 4. Describes methods for measuring the radioactivity in rain and surface waters. Gives results of measurements of radioactivity in rainwaters. 5. Describes method for measuring the radioactivity of atmospheric dust by continuous filtering of air.	50
27.	SWITZERLAND. <i>Letter from the "Service fédéral de l'hygiène publique", Bern</i> Gives brief description of studies on atomic radiations conducted in Switzerland.	6
28.	ARGENTINA. <i>Information summary on the preliminary work carried out in Argentina for the measurement and study of radioactive fall-out</i> Gives summary description of methods tried in Argentina for measurement of total fall-out radioactivity and airborne radioactivity.	2
29.	AUSTRALIA. <i>(Report consisting of six parts, as follows:)</i> <i>(Part I.) Human genetics</i> Report gives recommendation as to the kind of human mutations which could be scored: several dominant autosomal genes should be investigated (gives list of such genetical abnormalities). <i>(Part II.) Plant genetics</i> Gives plan of research to be organized. <i>(Part III.) Radio-biological unit in the University of Adelaide</i> To be established. <i>(Part IV.) Natural radiation background and environmental contamination</i> Describes future organization of investigations on natural radiation background and contamination; radioactivity of food will be determined. <i>(Part V.) Occupational exposure in Australia</i> Describes monitoring system in application since 1940 and summarizes observations done by the use of film badges (gives statement of per cent of personnel having received a specified per cent of the permissible dosage). <i>(Part VI.) Health and safety precautions in uranium mining and milling in Australia</i> Describes health and safety precautions in uranium mining and milling.	17
30.	UNITED KINGDOM. <i>Radio-strontium fall-out in biological materials in Britain</i> Describes methods for determination of Sr ⁹⁰ in soils and material of the biological cycle; gives results of measurement effected in England up to spring 1956.	46
31.	FEDERAL REPUBLIC OF GERMANY. <i>Replies to the questions put by the United Nations Scientific Committee on the Effects of Atomic Radiation</i> 1. Levels of natural radiation background. 2. Summarizes long-term research in biology and medicine under the direction of <i>Langendorff</i> (genetic effects, restorations, physicochemical effects); <i>Rajewski</i> (effects of natural radioactivity, accumulation of nuclides in tissues); <i>Marquardt</i> (research on natural mutation rates and their modification by irradiations); <i>Other institutes</i> (pathological and physicochemical effect). No details given—refers to scientific publications.	6
32.	INDIA. <i>Procedure used in India for collection of fall-out samples and some data on fall-out recorded in 1956</i> Describes methods for measurements of airborne activity by filtration, and of deposited fall-out with daily and monthly collection. The information includes tables giving results.	12
33.	<i>External radiation dose received by the inhabitants of monozite areas of Travancore-Cochin, India</i> Contains results of a survey to measure the radiation level of the Indian State of Travancore. The radiation level due to gamma-rays at about three feet above the ground level ranges from 6,000 to 100 mrad/year, approximately. The main contributors are thorium and its decay products.	9

Document Number	Country and Title	Approximate No. of pages
A/AC.82/G/R.		
34 and Add.1	BRAZIL. <i>On the intensity levels of natural radioactivity in certain selected areas of Brazil</i> States that Brazil has areas of intensive natural background where thorium sands are present. Gives description of a survey on four sample areas which were selected with regard to: (a) The geological structure and genesis of their active deposits; (b) The extension, configuration and intensity of their radiometric levels; (c) The extent and variety of possible biological observations and experiments.	46
34/Corr.1	<i>Corrigendum to above report.</i>	6
35.	WORLD METEOROLOGICAL ORGANIZATION. <i>Summary of comments of WMO on procedures for collection and analysis of atmospheric radioactivity data</i> Comments on measurements of fall-out and airborne activity; stresses the importance of co-operation between meteorologists in selecting sites wherefrom to obtain samples.	5
36.	BRAZIL. <i>Measurements of long-range fall-out in Rio de Janeiro</i> Gives information on measurements of airborne activity done in Rio de Janeiro, including tables showing decay curves of activity of samples and concentration of fission products in air during the period May-July 1956.	13
37.	UNION OF SOVIET SOCIALIST REPUBLICS. <i>On the methods of indicating the changes produced in the organism by small doses of ionizing radiation</i> Gives an enumeration of many methods which might be used as tests for small dosages; but these are based on certain symptoms which have not yet been worked out to give a quantitative response, i.e. vegetative-visceral symptoms, nervous symptoms (like the increase in threshold of gustatory and olfactory sensitivity, etc.), skin vascular reactions, electroencephalogram. Blood symptoms are also described (alterations of thrombocytes and lack of a leucocytosis response to the injection of Vit. B-12). Certain "immunological" symptoms are quoted, like the bactericidal properties of saliva and of skin.	13
38.	BRAZIL. <i>Absorption curve of fall-out products</i> Is connected with document A/AC.82/G/R.36; gives absorption curve for fission product of an airborne activity sample obtained by filtration.	5
39.	USSR. <i>Content of natural radioactive substances in the atmosphere and in water in the territory of the Union of Soviet Socialist Republics</i> Studies content of natural radioactive substances in the atmosphere and in waters; geochemical considerations on mechanism of contamination of waters and description of radio-hydrogeological methods. Gives methods of measurement of airborne activity and results, and includes tables giving content of natural radioactive products in air and waters.	23
40.	<i>Study of the atmospheric content of strontium-90 and other long-lived fissions products</i> Gives measurements of airborne fission products (Sr^{90} , Cs^{137} , Ce^{144} and Ru^{106}); methods for collection of samples and their radiochemical analysis; results and comments.	8
41.	<i>On the behaviour of radioactive fission products in soils, their absorption by plants and their accumulation in crops</i> Report of two parts: <i>Part I.</i> —Experiments of absorption and desorption by soil of fission products and especially of isotopes such as $\text{Sr}^{90} + \text{Y}^{90}$, Cs^{137} , $\text{Zr}^{95} + \text{Nb}^{95}$ and $\text{Ru}^{106} + \text{Rh}^{106}$ are described. Theoretical analysis is also described. It was observed that $\text{Sr}^{90} + \text{Y}^{90}$ is absorbed through ion exchange reaction, and is completely or almost completely displaced from the absorbed state under the action of a neutral salt such as CaCl_2 . Radioactive equilibrium between Sr^{90} and Y^{90} is destroyed during the interaction with soil. Displacement of absorbed radiocesium is greatly affected by the potassium ions, but not highly affected by NaNO_3 or CaCl_2 compared with $\text{Sr}^{90} + \text{Y}^{90}$. Zirconium and ruthenium absorbed by soil exhibit a much lower susceptibility to desorption into neutral salt solution, though their absorption is less complete. The disturbance of the equilibrium occurs also by absorption or desorption. <i>Part II.</i> —The results of experiments on uptake of fission products by several agricultural plants are described. In water culture, the bulk of radioactive isotopes of cesium and strontium is held in the above-ground organ of plant, while Zr, Rh and Ce are mainly retained in the root system. Sr and Cs are likely to accumulate in reproductive organs of plants in larger quantities than Zr, Ru and Ce. The plant uptake is affected by the concentration of hydrogen ions in the solution. Plants' uptake of fission products from soils is considerably smaller than from aqueous solution, and	176

Document Number	Country and Title	Approximate No. of pages
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	USSR (<i>continued</i>)	
	cesium was found to be less absorbable from soil, compared with other isotopes, while cesium is among the fission products most strongly absorbed by plants in water culture. These facts can be explained by the absorptive and desorptive capacity of the isotopes of the soil. The properties of soil as well as the application of lime, potassium or mineral fertilizers greatly affect the plant uptake. When a solution of fission products was applied to leaves of a plant, radio-isotopes were observed to pass to other organs. Radiocesium was the most transmovable among the isotopes tested.	
42.	MEXICO. <i>First studies on radioactive fall-out</i> Revised form of UN document A/AC.82/G/R.5.	15
43.	JAPAN. <i>The effect of momentary X-ray exposure in a small dose upon the peripheral blood picture</i> Decrease in lymphocyte number after single 60 mr exposure in humans. Decrease in lymphocyte count varies from 10 to 50 per cent—the maximum drop occurs thirty minutes after irradiation, and may be followed by an increase in lymphocyte count.	8
44.	<i>Hematological effects of single exposure to small doses of X-ray</i> Hematological effects during routine chest examinations. Dosages up to 3r. Most constantly observed are: increase in neutral red bodies and Demel's granules in lymphocytes and late decrease in mitochondrial index of lymphocytes during the four-hour period following the irradiation. The cytochemical identification of these various granules and their biological significance should be established unequivocally.	17
45.	<i>Morphological changes of platelets in chronic radiation injuries</i> Platelet morphology in chronic irradiation injury in rabbits (chronic 0.115 r/day or 0.231r/day), X-ray workers (dosage not evaluated) and persons exposed to atomic bomb within 4 km from epicentre (nine years after the exposure). Even if platelet count is normal, area index (proportional to average area) is increased markedly, and may remain so nine years after irradiation and is not necessarily related to low platelet count. Other morphological changes are also shown. This observation should be repeated by other groups.	19
46.	EGYPT. <i>Preliminary report on environmental iodine-131 measurement in sheep and cattle thyroids in Cairo, Egypt</i> Contains measurement of radioactivity of I ¹³¹ deposited in thyroids of sheep and cattle which were brought from all over Egypt, Sudan and north coast of Libya. Sampling was made during the period from May to October 1956.	11
47.	USSR. <i>Preliminary data on the effects of atomic bomb explosions on the concentration of artificial radioactivity in the lower levels of the atmosphere and in the soil</i> Contains description of methods of measurement of radioactive products in the air at ground level and high altitude and gives results of observations. Also contains the following conclusions: (1) The existing technique for detecting the presence of artificial radioactivity in the lower atmosphere and the technique for determining the integral activity of aerosols deposited on the earth's surface makes it possible to estimate the level of contamination of the soil by radiostrontium (strontium-90). (2) The accumulation of radiostrontium in the soil in various areas of USSR territory is attributable partly to the explosion of atomic bombs in USA and partly to explosions set off in USSR. The lower limit of activity of the strontium-90 which has accumulated in the past two years (1954-1955) is as high as about 30 millicuries per km ² in certain towns (cf., for example, Adler). (3) Since radiostrontium is readily caught up in the biological cycle, suitable projects must be put in hand to determine the permissible levels of contamination of the soil with radiostrontium (strontium-90) and other biologically dangerous isotopes.	21
48.	<i>Programme of scientific research on the effects of ionizing radiations on the health of present and future generations</i> Describes a programme of research intending to study the effects of radiation at dosages 1 or 2 orders of magnitude above background intensity, of contamination of the air and soil and life in areas of high natural radioactivity.	6
49.	<i>Summaries of papers presented at the Conference on the remote consequences of injuries caused by the action of ionizing radiation</i> Mostly concerned with effects of various radionuclides and external radiation on different mammalian populations (Hematology, carcinogenesis, fertility mostly studied). Twenty-two papers are summarized.	74
50.	<i>Contributions to the study of the metabolism of caesium, strontium and a mixture of beta-emitters in cows</i>	20

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USSR (continued)

The metabolism of Cs¹³⁷, Sr⁸⁹⁻⁹⁰ and a number of mixed beta-emitters has been studied in cows (milk, urine, faeces, tissues).

Strontium: about 10 per cent given is absorbed in intestine and 1.45 per cent is retained in bones, and twenty times less in the soft tissues. The rest is excreted by milk or urine.

Caesium: about 25 per cent given is absorbed in intestine—one fifth of this is retained in muscle and less than one tenth of this amount in other organs or skeleton; the rest is eliminated in the milk or urine.

51. UNITED KINGDOM. *The genetically significant radiation dose from the diagnosis use of X-rays in England and Wales—A preliminary survey* 11
Contains an analysis of number of X-ray diagnostic examinations performed per annum in England and Wales, and a subdivision obtained from five selected hospitals into types of examinations, and into age and sex of the patients examined. In addition, an assessment is made of the minimum dose received by the gonads in each type of examination, and the probability of reproduction as a function of age. The results show that it is unlikely that the genetically significant radiation dose received by the population of England and Wales from X-ray diagnosis amounts to less than 22 per cent of that received from natural sources and it may well be several times greater than this figure. Most of this radiation is received in a few types of examinations, undergone by relatively few patients, and by foetal gonads in examinations during pregnancy.
52. ROMANIA. *Organization and results in radiobiological research work in the Romanian People's Republic* 5
Describes the following:
(1) and (2) Protective effects of narcosis during irradiation only.
(3) After 325 r, up to eleven days narcosis increases biological effects (does not state what criteria of biological effect).
(4) Hibernation (25° C) protects. Hibernation between 18°-25° C enhances effect. Does not state if this is during or after irradiation.
(5) Hematological tests after 350 r.
(6) Caffeine or aktedron during irradiation enhance effect; caffeine or aktedron after irradiation diminish effect.
Suggests roentgenotherapy under conditions of protection (narcosis). Gives programme for radiobiology research in 1956-1957.
53. USSR. Report consisting of two articles: 10
Part 1. *The effects of ionizing radiations on the electrical activity of the brain*
(a) Grigorev's research work states: gamma-rays depress electrical action of human brain. Does not confirm Eldrid-Trowbridge, who do not find effect on monkey.
(b) Describes effects of beta-rays of P³² (0.05 mc/kg up to 1 mc/kg) on electroencephalogram of dogs. This was followed by radiation sickness (if dose > 0.5 mc/kg) and by hematological effects. A special implantation method of the electrodes is used. Injection of 0.09 mc/kg gives change in amplitude five minutes after the injection (reduction in amplitude). After 0.5 mc/kg lowering of electrical activity lasts for several days. For dosages above 0.1 mc, part of the repression of brain activity is probably a result of the radiation sickness induced by such high dosages.
Part 9. *On the beta-radiation activity of human blood*
Report on radioactivity of human blood: 100 cc of normal blood have a radioactivity of 1.7 to 3.64.10⁻¹⁰ curies (due to K⁴⁰). Permits the determination of K content of whole blood. Same values are found in different pathological conditions. No data on people working with radioactive material.
54. UNITED STATES. *Some effects of ionizing radiation on human beings* 106
A report on the Marshallese and Americans accidentally exposed to radiation from fall-out and a discussion of radiation injury in the human being. Gives general and clinical symptomatology in relation to the estimated dosage and to internally deposited radionuclides.
55. *Background radiation—A literature search* 43
The results of literature search about background radiations dosage to human beings are described and classified into three categories:
(1) Cosmic radiation; (2) terrestrial radiation sources; and (3) radiation from internal emitter. The cosmic radiation is important for the evaluation of natural background, since it is estimated very roughly to contribute about a quarter of total background dosage to the human population at sea level and high latitude. However, its intensity varies with various factors, such as altitude, geomagnetic latitude, barometric pressure,

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UNITED STATES (*continued*)

temperature etc. Facts directly related to biological effects of cosmic rays are also reviewed.

Radiations from naturally-occurring radioactive isotopes form another important part of the natural background. The contribution which comes from land is mainly due to K^{40} , Ra^{226} , Th^{232} and U^{238} and the decay products of the last three nuclides. The radium concentrations in surface water and public water supplies in various districts are tabulated. The atmospheric concentration of Rn and Tn is greatly dependent on the locality, atmospheric condition and degree of ventilation, if indoor.

The population dose due to the natural background radiation is difficult to evaluate in general, because of the statistical nature and varying conditions involved in nations.

56.

Operation Troll

37

Operation Troll was conducted to survey the radioactivity in sea water and marine life in the Pacific area during the period from February to May 1955. The general conclusions obtained are as follows:

1. Sea water and plankton samples show the existence of widespread low-level activity in the Pacific Ocean. Water activity ranged from 0-570 d/min/litre and plankton from 3-140 d/min/g wet weight.

2. There is some concentration of the activity in the main current streams, such as the North Equatorial Current. The highest activity was off the coast of Luzon, averaging 190 d/min/litre down to 600 m (1 April 1955).

3. Analyses of fish indicate no activity approaching the maximum permissible level for foods. The highest activity in tuna fish was 3.5 d/min/g ash, less than 1 per cent of the permissible level.

4. Measurements of plankton activity offer a sensitive indication of activity in the ocean.

5. Similar operations would be valuable in assessing the activity from future tests and in gathering valuable data for oceanographic studies.

57.

Gonadal dose in roentgen examinations—A literature search

6

Contains results of literature research which show the estimated contribution of gonadal dose by standard medical roentgenographic procedures. Contribution to the gonadal dose of certain examinations, such as examinations of teeth, skull, chest and extremities, is relatively insignificant, when compared to the case of pelvic and abdominal examinations. It should be noticed that the dose to the foetal gonad is important genetically.

58.

WORLD HEALTH ORGANIZATION. *Effect of radiation on human heredity—*

148

Report of a Study Group (Copenhagen, 7-11 August 1956).

1. Document A: Reply to a question raised by the United Nations Scientific Committee on the Effects of Atomic Radiation.

2. Report of the study group concerning general questions and recommendations for future progress and research.

3. Annexes 2-9 and 11-12 of the above report, being papers presented by various members of the group.

These annexes were:

Types of mutation at known gene loci and possibility of hitherto unrecognized mutations being induced. Irradiation of animal populations: results and work needed—T. C. Carter.

Some of the problems accompanying an increase of mutation rates in Mendelian populations—Bruce Wallace.

Exposure of man to ionizing radiations, with special reference to possible genetic hazards—R. M. Sievert.

Detection of induced mutations in offspring of irradiated parents—J. Lejeune.

Gonad doses from diagnostic and therapeutic radiology—W. M. Court Brown.

Mutation in man—L. S. Penrose.

Possible areas with sufficiently different background-radiation levels to permit detection of differences in mutation rates of "marker" genes—A. R. Gopal-Ayengar.

Comparisons of mutation rates at single loci in man—A. C. Stevenson.

Effect of inbreeding levels of populations on incidence of hereditary traits due to induced recessive mutations—N. Freire-Maia.

Detection of genetic trends in public health—Harold B. Newcombe.

58/Add.1

Annexes 1 and 10 of the above report of the WHO Study Group on the effect of radiation on human heredity.

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These annexes were:

Damage from point mutations in relation to radiation dose and biological conditions—H. J. Muller.

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WORLD HEALTH ORGANIZATION (<i>continued</i>)		
	Some problems in the estimation of spontaneous mutation rates in animals and man—James V. Neel.	
59.	NETHERLANDS. <i>Radioactive fall-out measurements in the Netherlands</i> Describes methods used for collecting samples of airborne radioactivity and of deposited fall-out, and methods of measurement. Includes tables of results for 1955 and 1956; calculation of gamma doses and quantity of strontium-90 computed from total activity.	6
60.	UNITED KINGDOM. <i>Genetic research in the United Kingdom</i> Relevant programmes of genetic research in the United Kingdom and their investigators concerned are listed under the headings: (i) Fundamental research upon mechanisms; (ii) Population structure; (iii) Quantitative data on human mutation.	6
60/Add.1	<i>Suggestions for research in radiation genetics</i> General considerations are reviewed and a list of suggested programmes of research in the fields (i) to (iii) is appended.	3
61.	JAPAN. <i>Current and proposed programmes of research and investigation related to radiation genetics in Japan</i> A brief survey of current and planned research in Japan relevant to radiation genetics, covering both human surveys and experimental work.	16
61/Add.1	<i>Table 1 (2) to above report:</i> <i>Experimental data with beta radiation</i>	
62.	<i>Radiochemical analysis of Sr⁹⁰ and Cs¹³⁷</i> Discusses methods of radiochemical analysis of Sr ⁹⁰ and Cs ¹³⁷ , including separation of strontium by precipitation and by ion exchange. Experiments for determining the best conditions for ion exchange separations are reported.	2 6
63.	<i>Review of the recent researches on the biological effects of ionizing radiation in Japan</i> Contains brief abstracts of fifty-five papers from the Japanese literature dealing with (1) research on biological indicators of the effects of ionizing radiation in small and large doses, and (2) research on counter measures to alleviate radiation injury. Classical and more modern morphological, histochemical and biochemical methods of observation were used for the assessment of radiation damage. Most studies were performed on mammals. It is emphasized that it is very difficult to obtain reliable biological indicators of damage by small doses and that haematological methods are still the most suitable in man.	14
64.	UNITED STATES. <i>Shortening of life in the offspring of male mice exposed to neutron radiation from an atomic bomb</i> Length of life in the offspring of male mice exposed to moderate doses of acute neutron radiation from a nuclear detonation is shortened by 0.61 days for each rep received by the father over the dose range tested. This figure excludes death before weaning age. The 95 per cent confidence limits are 0.14 and 1.07 days per rep. Extrapolating to a proportional shortening of life in man gives twenty days per rep received by the father as the point estimate and five and thirty-five days as the 95 per cent confidence limits. The offspring were obtained from matings made from nineteen to twenty-three days after irradiation and, therefore, represent the effect of irradiation on germ cells in a post-spermatogonial and sensitive stage of gametogenesis. It is probable that irradiation of spermatogonia (the stage that is important from the point of view of human hazards) would give a somewhat smaller effect. However, since the present data show an effect on the offspring which is as large as the shortening of life in the exposed individuals themselves, it seems likely that, even when allowance is made for the conditions of human radiation exposure, shortening of life in the immediate descendants will turn out to be of a magnitude that will warrant serious consideration as a genetic hazard in man.	12
65.	<i>Gamma-ray sensitivity of spermatogonia of the mouse</i> Relates the depletion of spermatogenic cells to killing of spermatogonia, the re-population being related to the maturation of surviving cells.	3
66.	<i>Some delayed effects of low doses of ionizing radiations in small laboratory animals</i> A quantitative study of the life span, the incidence of leukemia, tumours (lung, liver, ovary), and lens opacities as a response to low dosages (less than 100 rads).	7
67.	<i>Effects of low-level radiation (1 to 3 r) on mitotic rate of grasshopper neuroblasts</i> A study of the inhibitions of mitotic rate and of its possible relationship with the alteration of chromosome structure.	4

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UNITED STATES (continued)		
68.	<i>Effects of low doses of X-rays on embryonic development in the mouse</i> Effects of 25 r applied during different stages of embryonic development on skeletal malformations appearing in the young.	6
69.	SWEDEN. <i>Does there exist mutational adaptation to chronic irradiation?</i> An account of an experiment in which a population of <i>Drosophila</i> heavily irradiated for many generations was compared with a control unirradiated population in respect of radiation-induced mutability. No significant differences were found.	7
70.	JAPAN. <i>Radiological data in Japan</i> The report is a compilation of data on radiation exposures in Japan. Data are arranged as suggested by the Scientific Committee at its October 1956 meeting.	58
70/Corr.1	<i>Corrigendum to above document</i>	5
71.	UNITED STATES. <i>Occupational radiation exposures in Atomic Energy projects</i> A series of five tables concerning yearly exposures from 1947 to 1955 from external and internal radiation sources.	9
72.	<i>Worldwide effects of atomic weapons</i> (A comprehensive preliminary report on the Sr ⁹⁰ problem up to 1953). A preliminary report discussing the various aspects of long-range contamination due to the detonation of large numbers of nuclear devices. An improved methodology for assessing the human hazard is developed, and an extensive experimental programme is proposed.	96
73.	<i>Maximum permissible radiation exposures to man</i> A preliminary statement of the U.S. National Committee on Radiation Protection and Measurement. The recommendations given by the Committee in National Bureau of Standards Handbook 59 have been revised and the maximum permissible dose-levels have been lowered. The concept of "accumulated" dose for occupational conditions differs from the ICRP recommendations of 1956. For the whole population an annual additional exposure of 2.5 times the exposure from natural radiation sources is allowed.	6
74.	<i>Gonadal dose produced by the medical use of X-rays</i> A survey of diagnostic X-ray exposure with an attempt to estimate the genetically significant dose in the United States. The estimate has been made under the assumption that patients undergoing X-ray examinations have a normal child expectancy. The authors have assumed that the genetically significant dose can then be evaluated as approximately equal to the average gonad dose for patients below the age of 30. Using exposure data which are considered fairly representative of American practice they arrive at 130-140 mrem/year and 50 mrem/year as being the most probable and the minimum figure respectively.	105
75.	<i>Summary of current and proposed programmes of research in the U.S.A. related to radiation genetics</i> A survey by investigator and title of current and proposed programmes of research in the United States related to radiation genetics.	10
76.	FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. <i>Principal calcium contributors in national diets in relation to effects of atomic radiation from Sr⁹⁰</i> Gives a general idea of foods contributing to the calcium uptake of human beings in various parts of the world in relation to the different food habits of these people. Data still quite preliminary.	4
76/Rev.1	FAO. <i>Principal calcium contributors in national diets in relation to effects of atomic radiation from strontium-90</i> This paper replaces the preliminary note circulated as UN document A/AC.82/G/R.76.	8
77.	NORWAY AND SWEDEN. <i>Radioactive fall-out over the Scandinavian peninsula between July and December 1956</i> In this report, fall-out and rain precipitation figures over the Scandinavian peninsula are discussed. Accumulated monthly fall-out is reported for the period July-December 1956.	6
78.	BELGIUM. <i>Information in eight parts on human genetics submitted by Belgium</i> Contains the Belgian memorandum on human genetics prepared for the Geneva meeting in April 1957 and a preliminary report on radioactive regions of Katanga (Belgian Congo). Besides this several reprints of Belgian contributions to radiobiology are presented. The topics included are: (1) Steroid metabolism in irradiated rat. (2) Endocrine response of irradiated animals studied by intraocular grafting.	

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BELGIUM (<i>continued</i>)		
	(3) Doses and hazards due to medical radiology.	
	(4) Metabolism and toxicity of cystamine in the rat.	
	Part 1. Current uncertainties in the field of human genetics.	
	Part 2. A preliminary survey of vegetation and its radioactive content in the Katanga area.	1
	Part 3. Influence of irradiation on the blood level of 17-hydroxy-corticosteroids during the 24 hours following irradiation.	5
	Part 4. Skin and depth doses during diagnostic X-ray procedures.	14
	Part 5. General discussion of the need for methods of effective dose reduction in diagnostic X-ray procedures.	11
	Part 6. Chemical protection (a) metabolism of cystamine	
	Part 7. (b) the effectiveness and toxicity of cystamine.	11
	Part 8. Experiments on the ascorbic acid and cholesterol content of the supra-renal of the rat following irradiation of normal and hypophysectomised animals.	11
79.	SWEDEN. <i>A suggested procedure for the collection of radioactive fall-out</i> Proposes new method for evaluation of the external thirty-year dose due to the deposition of gamma-emitting isotopes, based upon a single beta measurement for each sample and one caesium ratio chemical determination in a pooled sample. A second part of the report describes a collecting procedure using ion exchange resins.	19
80.	ARGENTINA. <i>A geological, radiometric and botanic survey of the region "Los Chañores" in the province of Mendoza of Argentine Republic</i> Radiometric data on the above-mentioned region are shown on the attachment to the document.	4
81.	<i>Measurements of the cosmic ray intensity in three latitudes of Argentine Republic</i> Data on the intensity of the cosmic rays in three points of observation at different latitudes in Argentina.	5
81/Corr.1	<i>Corrigendum to above report</i>	2
82.	<i>On the absorption of the nucleonic component of the cosmic radiation at -15° geomagnetic latitude</i>	1
83.	<i>Mutations in barley seeds induced by acute treatments by gamma rays of cobalt-60</i> A report of experiments on the induction of mutations at a number of loci in barley by irradiation of seeds with gamma-rays of Co ⁶⁰ at 10 r/min.	2
83/Add.1	<i>Addendum to above report</i>	1
84.	<i>Mutations in barley induced by formaldehyde</i> A report of experiments on the induction of mutations at a number of loci in barley by formaldehyde.	1
85.	<i>Spontaneous mutations in barley</i> A report of experiments on spontaneous mutations at a number of loci in barley.	2
86.	<i>A study of radioactive fall-out in Argentine Republic</i> Describes the methods used in Argentina for fall-out collection and measurement. Value for strontium-90 and total beta activity are given for the first two months of 1957.	5
87.	<i>A research programme in Argentina on the genetic influence in the plants of the ionizing and ultra-violet radiation</i> A brief summary of projected research in Argentina on the genetic effects of ionizing and ultra-violet irradiations of plants, comprising both surveys of areas of high natural background and a broad range of laboratory experiments.	2
88.	<i>Programme of physical oceanography for the International Geophysical Year</i>	33
89.	<i>Information on the general programme to be developed in Argentina on items of interest to the Scientific Committee on the Effects of Atomic Radiation</i> A brief general survey of Argentina research activities related to the effects and levels of ionizing radiations.	2
90.	NETHERLANDS. <i>Chemical steps involved in the production of mutations and chromosome aberration by X-radiation and certain chemicals in Drosophila</i> A survey of comparative studies of X-ray and chemical mutagenesis in <i>Drosophila</i> , made in an attempt to throw light on possible intermediate chemical steps in the induction of chromosome breaks or mutations by ionizing radiation.	6
91.	UNITED STATES. <i>Strontium-90 in man</i> Radiochemical analyses of strontium-90 in human bone have been reported. The	7

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	UNITED STATES (<i>continued</i>)	
	values are in accord with the predicted levels based on fall-out measurements and fractionation through the food-chains.	
92.	NORWAY. <i>Radioactive fall-out in Norway</i> Contains information on methods and results of measurements of fall-out in Norway.	19
93.	<i>Summary of analytical results from the HASL Strontium Program July through December 1956</i> Summarizes data on samples collected by the U.S.A. fall-out network since September 1955 up to September 1956. In addition, it summarizes the data of the samples collected for the strontium programme during the period July-December 1956.	43
94.	<i>Environmental radon concentrations—An interim report</i> Preliminary data showing ambient concentrations of radon in the metropolitan New York area are presented. An attempt has been made to define the variability of concentration of radon in the general atmosphere with location, time, and weather conditions. Samples have been analysed from the outdoor air, inside of buildings, and above and below the surface of the ground. Comparisons with the data obtained by other investigators are also shown.	8
95.	<i>The radium content of soil, water, food and humans—Reported values</i>	6
96.	<i>Marine biology—Effects of radiation—A selected bibliography</i> Twenty-four references concerning investigation on the distribution and metabolism of fission products in marine organisms.	2
97.	<i>Sea disposal operation</i> Some atomic energy activities in the United States have been disposing of radioactive wastes at selected ocean disposal sites since as early as 1946. It is the purpose of this report to describe the extent of these disposal operations including a summary of types of packaging used and of places where the wastes are dumped. The status of related oceanographic research (1956) is briefly touched upon.	14
97/Corr.1	<i>Corrigendum to the above report</i>	1
98.	CANADA. <i>Radiochemical procedures for strontium and yttrium</i> A detailed ion exchange procedure is given for the determination of radiostrontium in different samples. Methods are described for the treatment of various organic materials.	25
99.	<i>Levels of strontium-90 in Canada up to December 1956</i> Reports the results of radiochemical analysis for strontium-90 activity in milk and milk products and human bone. Natural strontium content determinations in milk and bone are also reported.	15
100.	UNITED KINGDOM. <i>The determination of long-lived fall-out in rainwater</i> Describes radiochemical procedures for the determination of Sr ⁸⁹ , Sr ⁹⁰ , Cs ¹³⁷ and Ce ¹⁴⁴ activities in the rainwater.	
101.	DENMARK. <i>Measurement of activity of airborne dust. Measurements of fall-out deposited on the ground</i> Results of daily measured radioactivity in air (electrostatic filter method) and in precipitations (collection of rainwater) in Copenhagen for the period 1956.	3
102.	AUSTRIA. <i>Radiological data. Demographic data.</i> Contains data on RBE dose rate in the gonad due to both natural and artificial sources. Demographic data on the whole population and of special groups are given.	6
103.	UNITED KINGDOM. <i>Modification of immunological phenomena and pathogenic action of infectious agents after irradiation of the host</i> Evidence is given that whole body irradiation before the repeated injection of antigen both diminishes the peak-concentration of antibody and delays in time the appearance of the peak. The lowest efficient dose was 25r. The tolerance of heterogenous skin grafts or bone marrow cells has been also shown after irradiation; the duration of inhibition of immune response is proportional to dose received.	2
104.	<i>Some data, estimates and reflections on congenital and hereditary anomalies in the population of Northern Ireland</i> Presents an extremely detailed and thorough medico-genetic survey of the population of Northern Ireland using data accumulated over a number of years, together with very pertinent analyses of the data, the problem of genetic disability and its relation to radiation effects.	42
105.	<i>Leukemia and aplastic anaemia in patients irradiated for ankylosing spondylitis</i> The incidence of leukemia and of aplastic anaemia was investigated in patients	135

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	UNITED KINGDOM (<i>continued</i>)	
	treated in Britain for ankylosing spondylitis by means of ionizing radiations during the years 1935-1954.	
	Relationship between radiation dose and incidence of leukemia was evaluated. The answers suggest the adoption of working hypothesis that for low doses the incidence of leukemia bears a simple proportional relationship to the dose of radiation, and that there is no threshold dose for the induction of the disease. The dose to the whole bone marrow which would have doubled the expected incidence of leukemia may lie within 30 to 50 r for irradiation with X-rays.	
106.	NORWAY. <i>Information on radiological data</i> Summary tables on radiological data in Norway with an extensive set of data on X-ray and natural radiation exposures.	44
106/Add.1	<i>Addendum to above report</i>	2
107.	NEW ZEALAND. <i>New Zealand report to U.N. Scientific Committee on Atomic Radiation: Effects of atomic radiation measured in New Zealand to 31 July 1957</i> A set of notes on the current status of various programmes in New Zealand within the field of interest on the Scientific Committee on the Effects of Atomic Radiation, including preliminary measurement of radioactive fall-out, C ¹⁴ airborne activity, natural and artificial radioactivity, and occupational gonad exposures.	6
108.	UNITED STATES. <i>Current research findings on radioactive fall-out</i> General survey of the fall-out problem, especially Sr ⁹⁰ distribution and uptake in the human body.	18
109.	<i>Dosages from natural radioactivity and cosmic rays</i>	2
110.	NETHERLANDS. <i>Four reports on quantitative determination of radioactivity</i> A group of tables containing figures for the radiation doses from natural and man-made sources in the Netherlands.	48
111.	NORWAY. <i>On the deposition of nuclear bomb debris in relation to air concentration</i> Studies the relation between the deposition of fall-out and the airborne activity. It appears that in 1956-1957 the fall-out in the Oslo area was roughly proportional to the product of precipitation and airborne activity at ground level.	16
112.	<i>Radioactive fall-out in Norway up to August 1957</i> Gives the results of measurement of fall-out materials in air, precipitation, water and other samples. Measurement of airborne activity at high altitudes are included. Sr ⁹⁰ values are computed from total beta activity, a small number of samples having been checked by chemical analysis. Samples of water, milk and urine have been analysed for iodine-131.	22
113.	<i>Radiochemical analysis of fall-out in Norway</i> Describes the methods used in Norway for determination of Sr ⁹⁰ , Cs ¹³⁷ and I ¹³¹ and contains data of Sr ⁹⁰ and Cs ¹³⁷ activities in water and milk and of I ¹³¹ in milk, in the period February-June 1957.	10
114.	UNITED KINGDOM. <i>The relative hazards of Sr⁹⁰ and Ra²²⁶</i> Methods for calculations of the doses received by soft tissue cavities in bone containing Sr ⁹⁰ and Ra ²²⁶ are presented. Non-uniformity factors are given for the dose from Sr ⁹⁰ . Calculation of the maximum permissible body burden for radium on the basis of a given maximum permissible dose-rate to bone gives a wide range of values, depending on the assumptions made. In the case of radio-strontium, the range of possible values is less. It is suggested that radium be no longer taken as the basis for the calculation of maximum permissible body burden of Sr ⁹⁰ .	26
115.	<i>Shortening of life by chronic irradiation: the experimental facts</i> A survey of all published experimental results relating to shortening of life-span of mice due to chronic irradiation. The comparison of effects between gamma-rays of cobalt-60 and fast neutrons is made; the R.B.E. factor used for fast neutrons was 13. A good agreement of experimental results has been found indicating that chronic irradiation both with gamma-rays and neutrons shortens the life of mice in a reproducible manner. No statistically significant data were found below the weekly dose of 10r. The possibility of extrapolation and the possible dose-effect relationship is discussed.	7
116.	BELGIUM. <i>Report on health protection in uranium mining operations in Katanga</i>	7

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A/AC.82/G/R.		
117.	INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION AND INTERNATIONAL COMMISSION ON RADIOLOGICAL UNITS AND MEASUREMENTS. <i>Exposure of man to ionizing radiation arising from medical procedures</i> Gives a survey of the present exposure of the gonads due to X-ray diagnostic procedures. Some 85 per cent of the diagnostic dose arises from six to seven types of examinations, which are discussed separately. Estimates of the genetically significant dose are given for some countries. It is recommended that the basic studies be extended and that more detailed analysis be obtained through sampling procedures rather than through the systematic recording of the radiation received by every member of the population. Methods for dose reduction are discussed.	60
118.	POLAND. <i>Report on measurements of fall-out in Poland</i> Continuous measurements of global beta activity of fall-out are reported for four stations in Poland.	4
119.	BELGIUM. <i>Effect of a lethal dose of radiation on the amount of reducing steroids in the blood of the rat</i> Indicates that lethal irradiation shows, in the blood, an increase of reducing steroids. This reaction presents a maximum which is not necessarily linked to the variations of the ascorbic acid and of the cholesterol in the suprarenals.	4
120.	<i>Action of hydrogen peroxide on the growth of young barley plants</i> The growth of coleoptiles of young barley plants treated with hydrogen peroxide is affected in the same way as when the plants are irradiated with X-rays.	3
121.	<i>Action of cystamine and glutathione on X-ray irradiated barley seed</i> The cystamine and glutathione diminish the effects of X-rays on barley grains; mitosis are still possible after doses which would inhibit them in the absence of these agents.	3
122.	<i>Action of X-rays on the growth of internodal cells of the alga Chara Vulgaris L.</i> Irradiation of internodal cells of <i>alga Chara Vulgaris L.</i> increases the elongation of these cells for doses up to 150 kr; above this dosage elongation is inhibited (c.f. document A/AC.82/G/R.156).	4
123.	UNITED STATES. <i>Radioactivity of people and foods</i> Potassium and caesium activities measured with whole body counters are reported. The amount of caesium-137 now present in the population of the United States shows no marked dependence on geographical location.	32
124.	<i>Atmospheric radioactivity along the 80th meridian, 1956</i> Radioactivity levels at the various sites during 1956 are reported for three different collecting systems: air filters, cloth screens and gummed films. Extremely wide variations in the gross radioactivity of fission products in the air have been noted, with the highest levels occurring in the Northern hemisphere. Preliminary results of radiochemical analyses of a few filter collections are included.	13
125.	<i>Radioactive contamination of certain areas in the Pacific Ocean from nuclear tests</i> Contains a summary of the data on contamination levels in some areas of the Pacific Ocean and results from medical surveys of Marshall Islands inhabitants. Data on gross beta activity, individual isotope contamination and external gamma-exposure are included.	51
126.	UNITED KINGDOM. <i>Radiostrontium in soil, grass, milk and bone in the United Kingdom: 1956 results</i> Results of strontium-90 analysis of soil, grass and animal bone for twelve stations in the United Kingdom are given. Human bone specimens obtained in 1956 have also been measured.	28
127.	ARGENTINA. <i>Calcium and potassium content of foodstuffs in the Argentine Republic</i> Describes the methods and results of K and Ca analysis of food in Argentina. It shows that 80 per cent of the dietary Ca is provided by milk.	17
128.	UNITED KINGDOM. <i>Ionizing radiation and the socially handicapped</i> Collects available data and calculations concerning the numbers in various classes of handicapped individuals in the United Kingdom and the relationships of these numbers to genetic factors, mutation rates and radiation levels.	9
129.	CANADA. <i>Dose from unsealed radio-nuclides</i> Calculations based upon information on shipments of radioisotopes show that the gonad dose to age 30 from unsealed radio-nuclides during 1956 in Canada is about 0.5 per cent of the dose from the natural radiation sources. The main dose arises from iodine-131.	11

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130.	UNITED STATES. <i>The nature of radioactive fall-out and its effects on man</i> An extremely diverse and extensive collection of information and expert opinion given as public testimony before a governmental committee, and presented without further evaluation.	2,000
130/Add.1	<i>Index to above report.</i>	51
131.	<i>Radioactive strontium fall-out</i> General survey of the fall-out problem, especially strontium-90 distribution and uptake in the human body.	26
132.	UNITED KINGDOM. <i>The determination of long-lived fall-out in rainwater</i> A method is described for the determination of long-lived isotopes in samples of rain water. Some attention is paid to the development of the method, including details of the checks to ensure radiochemical purity of the final sources used for counting.	21
133.	WORLD METEOROLOGICAL ORGANIZATION. <i>Excerpt from a letter dated 6 November 1957 received from the Secretary-General of the WMO—Interim international reference precipitation gauge</i> Brief report of the discussion held by the Executive Committee Panel on Atomic Energy and by the Commission for Instruments and Methods of Observations of the WMO on subjects related to the effects of atomic radiation.	7
134.	ITALY. <i>Report on genetics 1950-57—A brief report on the research work done in the field of genetics in Italy</i> Extensive notes reporting relevant research work in the field of genetics carried out in Italy during the period 1950-1957.	47
135.	JAPAN. <i>Analysis of Sr⁹⁰, Cs¹³⁷ and Pu²³⁹ in fall-out and contaminated materials</i> The report gives radiochemical procedures for Sr ⁹⁰ , Cs ¹³⁷ and Pu ²³⁹ from air filter ash. The counting equipment is described briefly.	7
136.	<i>Primary estimate of the dose given to the lungs by the airborne radioactivity originated by the nuclear bomb tests</i> The report gives method and results of measurement of airborne radioactivity for Tokyo from 1955 to 1957. Values are obtained for gross alpha and beta activity and radiochemically determined concentrations of strontium-90 and plutonium-239. A method for computation of the dose to the lungs is described. The mean dose during 1955-1957 was of the order of magnitude of 10 ⁻² rem/year.	7
136/Corr.1	<i>Corrigendum to above report</i>	1
137.	<i>A measure of future strontium-90 level from earth surface to human bone</i> Calculation of the future strontium-90 level is made on the basis of present data on cumulative ground deposit and food contamination. The cumulative ground deposit (mc/km ²) is calculated assuming that: 1. The total amount of fission products from future tests is known. 2. 20 per cent of airborne strontium-90 falls to the earth's surface every year. 3. The distribution of fall-out is homogeneous. The metabolism of strontium-90 through the food channel and food habit factor related to calcium and strontium source are taken into consideration. The future human skeletal dose and maximum permissible level of ground deposit are then calculated.	14
138.	<i>Supplemental review of the recent researches on the alleviation of radiation hazards</i> This is an addition to G/R 63 and gives abstracts of new developments of radiobiology in Japan. Work on protection by amino acids, cysteamine and some new derivatives of this last compound is reported. Work on the therapeutic effect of a protein diet and of adrenochrome preparation is also reported.	3
138/Corr.1	<i>Corrigendum to above report</i>	1
139.	<i>Experimental studies on the development of leukemia in mice with frequent administrations of small doses of some radioactive isotopes (P³², Sr⁸⁹, Ce¹⁴⁴)</i> The development of leukemia is described in three strains of mice in which the disease has not been observed under control conditions. Nine cases of leukemia have been observed among forty-six animals surviving twenty-one weeks and longer following the first of repeated administrations of P ³² at three dose levels (0.1, 0.3, and 0.5 µc/gm). Latent periods varied with total dose administered. Larger doses were more effective than small doses. The leukemia was primarily of the myeloid type. Radiostrontium (Sr ⁹⁰) and radio-cerium (Ce ¹⁴⁴) were much less and practically ineffective in producing this disease in these animals. Sarcoma of bone was found in strontium-treated animals. It is concluded that leukemia is the result of severe damage	9

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	to the haematopoietic tissues in the bone marrow and lymph nodes. There are many tables and figures, including results of radiochemical analyses of various bones at various intervals following injection.	
139/Corr.1	<i>Corrigendum to above report</i>	1
140.	<i>Experimental studies on radiation injury by colloidal radioisotope-liver injury by colloidal radioactive chromic phosphate CrP³²⁰O₄</i>	6
	Describes morphological observations on the liver of rats which were injected intravenously with various concentrations of colloidal suspensions (particle size 0.1-1.0 micron) of radioactive chromium phosphate (CrP ³²⁰ O ₄). Even with high doses (7.5 µc/gm) liver injury did not become manifest until twenty days after injection and correspondingly later with lower doses. Changes in the liver are described but not illustrated. They are greater in the liver than in other organs containing reticulo-endothelial cells. The lesions are said to resemble those of virus hepatitis. Large doses of chromium phosphate also produce lesions in the bone marrow with concomitant changes in the peripheral blood.	
140/Corr.1	<i>Corrigendum to above report</i>	1
141.	<i>Radiological data in Japan II—Concentrations of Sr⁹⁰, Cs¹³⁷, Pu²³⁹ and others in various materials on earth's surface</i>	17
	Contains data on concentration of Sr ⁹⁰ in rainwater, soil, foodstuffs and human bone in Japan obtained by radiochemical analysis in some cases and by computation from the total beta activity in other cases. Besides Sr ⁹⁰ , data on Cs ¹³⁷ , Pu ²³⁹ , Zn ⁶⁵ , Fe ⁵⁵ and Cd ¹¹³ are also included.	
141/Corr.1	<i>Corrigendum to above report</i>	2
141/Add.1	<i>Addendum to above report</i>	3
142.	UNITED STATES. <i>Radioactive fall-out</i>	18
	General survey of the fall-out problem, especially Sr ⁹⁰ distribution and uptake in the human body.	
143.	UNITED KINGDOM. <i>The world-wide deposition of long-lived fission products from nuclear test explosions</i>	28
	A network of six stations in the United Kingdom and thirteen in other parts of the world has been set up for rainwater collection. Samples are analysed for Sr ⁸⁹ , Sr ⁹⁰ , Ce ¹³⁷ and Ce ¹⁴⁴ . This report contains an account of the results obtained so far, and some discussion of the present and future levels of Sr ⁹⁰ in United Kingdom soil.	
144.	NORWAY. <i>Radioactive fall-out up to November 1957</i>	24
	A review is given of the monitoring in Norway of airborne activity and fall-out of radioactive dust; also radioactive contamination in drinking water is reported.	
145.	SWEDEN. <i>Uptake of strontium and caesium by plants grown in soils of different texture and different calcium and potassium content</i>	5
146.	<i>The radioactive fall-out in Sweden up to 1.7.1957</i>	12
	Additional data to the report G/R.15 for the period up to June 1957 are given. The total beta activity, accumulated Sr ⁹⁰ and Cs ¹³⁷ amount and Sr ⁹⁰ content in soil are measured.	
147.	<i>Gamma radiation from some Swedish foodstuffs</i>	9
	Significant increase of gamma radiation from milk, beef, cattle-bone and vegetables was found during the period 1952-1956. No increase of gamma radiation from children in the corresponding period could be observed.	
148.	<i>Progress report on the metabolism of fission products in ruminants</i>	3
	The excretion of radioactive fission products (Sr ⁹⁰ and I ¹³¹) in milk after per oral administration is measured.	
149.	<i>A method for monthly collection of radioactive fall-out</i>	7
	Describes a collecting procedure using anion and cation exchange resins.	
150.	<i>The computation of infinite plane 30-year doses from radioactive fall-out</i>	12
	Proposes new method for evaluation of the external 30-year dose due to the deposition of gamma emitting isotopes, based upon a single beta measurement for each sample and one Cs ¹³⁷ ratio chemical determination in a pooled sample.	
151.	<i>The control of irradiation of populations from natural and artificial sources</i>	3
	Describes an automatic system for continuous indication and recording of very low radiation level. Suggests the use of such instrument for public control purposes.	

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152.	UNITED KINGDOM. <i>The analysis of low level gamma-ray activity by scintillation spectrometry</i> The application of gamma-ray spectrometry enables measurement of the gamma-activity of 10 ⁻¹¹ curies or less.	9
153.	UNITED STATES. <i>The Chicago Sunshine method: Absolute assay of strontium-90 in biological materials, soils, waters and air filters</i> Contains a survey of Chicago sunshine research programme on the distribution of strontium-90 in the biosphere. Methods of sample treatment, counting and evaluation of data are reported. Detailed description of analytical chemical procedures is added.	59
154.	ARGENTINA. <i>Normal calcium content of San Juan wines</i>	8
155.	BELGIUM. <i>Recent research on the chemical protectors and particularly on cysteamine-cystamine. (Document in English)</i> Discusses the possible mechanisms of action of chemical radioprotectors particularly of those above-mentioned.	9
156.	<i>Effect of X-rays on the growth of internodal cells of the alga Chara vulgaris L</i> A complicated dose-effect relationship is shown when non-dividing internodal cells are irradiated and their growth tested (cf. document A/AC.82/G/R.122).	4
157.	ARGENTINA. <i>Radioactive fall-out from the atmosphere in the Argentine Republic during 1957</i> Includes tables of results for first three-quarters of 1957. Total activity and strontium-90 content is measured.	18
158.	BELGIUM. <i>The action of various drugs on the suprarenal response of the rat to total body X-irradiation. (Document in English)</i> Describes strict difference in action of radioprotectors (cysteamine) or narcotic drugs (morphine and barbiturate) in preventing adrenal changes of irradiated animals.	8
159.	<i>Nervous control of the reaction of anterior hypophysis to X-irradiation as studied in grafted and newborn rats. (Document in English.)</i> Indicates that the changes of suprarenals after irradiation are consequence of a neuro-humoral chain reaction. The reaction of adrenals seems to have negligible importance in the pathogenesis of radiation disease.	13
160.	USSR. <i>Draft of Chapter F prepared by the delegation of the USSR to the Scientific Committee on the Effects of Atomic Radiation</i>	18
161.	JAPAN. <i>A sensitive method for detecting the effect of radiation upon the human body</i> Discovers a new extremely sensitive biological indicator of the effect of ionizing radiation. The acute dose of 50 mr and even less results in significant changes of the phosphene threshold of the eye. Approximately linear relationship between the effect and the logarithm of the dose from 1 mr to 50 mr is derived. Summation of the effect of repeated exposure is found.	16
162.	UNESCO/FAO/WHO. <i>UNESCO/FAO/WHO report on sea and ocean disposal of radioactive wastes, including appendices A, B and C</i> Summarizes contributions made by different authorities. <i>Appendix A:</i> R. Revelle and M. B. Schaefer. General considerations concerning the ocean as a receptacle for artificially radioactive materials. Contains general account of the processes in the oceans and indicates the necessity of research on certain basic problems which would enable the prediction of the consequences of the disposal of large quantity of radioactive material to the sea. Recommends measures of an international character in order to assure safe liquidation of atomic wastes. <i>Appendix B:</i> Report prepared by FAO and WHO. Discusses the following questions: 1. The geochemical cycle of various elements between the water and the sediments. 2. The affinities of the various species of organisms in the oceans for different elements which have radioactive isotopes. 3. The possible rate and distance of vertical and horizontal transport of radioactive isotopes by marine organisms. 4. The distribution, abundance and rate of growth of the populations in the oceans. <i>Appendix C:</i> Abstracts of eight other contributions to the report on sea and ocean disposal of radioactive wastes.	118
163.	USSR. <i>Data on the radioactive strontium fall-out on the territory of the USSR as to the end of 1955</i>	1

Document Number	Country and Title	Approximate No. of pages
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164.	MEXICO. <i>Third report on the studies on radioactive fall-out</i> Presents fall-out data for thirteen stations in Mexico covering the period from March to October 1957. Computes approximate figures for infinite gamma dose and Sr ⁹⁰ precipitation. Gives preliminary results of Sr ⁹⁰ and Cs ¹³⁷ content in milk.	25
165.	FAO. <i>General considerations regarding calcium availability in the broad soil groups of the world in relation to the uptake of radiostrontium</i> Classifies soil groups with low calcium level. Recommends the investigations of the factors influencing Sr ⁹⁰ uptake by plants growing on such soils.	6
166.	INDIA. <i>Measurements on the radiation fields in the Monazite areas of Kerala in India</i> Presents results of measurements in the monazite area with high thorium content. As this area is one of the most densely populated areas in the world, the study of the relation between high level radiation background and eventual biological effect would be of great value. The average dose is 1500 mrad per year, exceeding three times the maximum permissible dose recommended by NCRP (USA).	6
167.	UNITED KINGDOM. <i>Measurements of Cs¹³⁷ in human beings in the United Kingdom 1956/1957</i> Describes the method of determining the Cs ¹³⁷ content in the human body using gamma-ray spectrometry. The average present value is $34.0 \pm 7.6 \mu\mu\text{c}$ per g potassium.	5
168.	JAPAN. <i>An enumeration of future Sr⁹⁰ concentration in foods and bone</i> Gives amendments and corrections to the report A/AC.82/G/R.137 based upon new available data.	6
169.	BRAZIL. <i>On the nature of long-range fall-out. (Document in English.)</i> Describes one surprisingly high value of daily collected fall-out activity due to a single big and highly active particle.	4
169/Corr.1	<i>Corrigendum to above report</i>	1
170.	UNITED KINGDOM. <i>The disposal of radioactive waste to the sea during 1956 by the United Kingdom Atomic Energy Authority</i> Summarizes the discharges of liquid radioactive wastes to the coastal sea from Windscale Works during 1956. The results of monitoring indicate that the average activity of the samples remains well below the permissible level.	3
171.	<i>A summary of the biological investigations of the discharges of aqueous radioactive waste to the sea from Windscale Works, Sellafield, Cumberland</i> Summarizes the results of preliminary hydrographic and biological studies and of regular monitoring of the marine environment in the period 1952-1956. About 2,500 curies of radioactive wastes monthly has been discharged during this period. Due to the favourable local conditions, the upper limit for safe liquidation is determined to be more than 45,000 curies per month.	12
172.	JAPAN. <i>The estimation of the amount of Sr⁹⁰ deposition and the external infinite gamma dose in Japan due to man-made radioactivity</i>	10
173.	SWEDEN. <i>Transfer of strontium-90 from mother to foetus at various stages of gestation in mice</i> Shows that no significant fixation of Sr ⁹⁰ by the foetus can be detected before the fifteenth day of gestation. The increase of radioactivity corresponds to the intensity of ossification processes.	2
174.	<i>The recovery phenomenon after irradiation in Drosophila melanogaster</i> 1. <i>Recovery or differential sensitivity to X-rays</i> Experimental results—lower rate of chromosome aberrations induced by X-ray if irradiated in anoxia in comparison with irradiation in air—support the hypothesis of recovery.	29
174/Add.1	<i>The recovery phenomenon after irradiation in Drosophila melanogaster</i> Indicates that both the spontaneous recovery and the differential sensitivity in spermatogenesis in Drosophila are responsible for the changes in the rate of chromosome breaks under different conditions of irradiation.	8
174/Add.2	<i>The recovery phenomenon after irradiation in Drosophila melanogaster</i> Chromosomes breakage <i>per se</i> or their rejoining by recovery seems to have no genetic consequences.	5

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SWEDEN (continued)		
175.	<i>Reports on scientific observations and experiments relevant to the effects of ionizing radiation upon man and his environment already under way in Sweden</i>	4
175/Add.1	<i>Report on experiments on the influence of selection pressure on irradiated populations of <i>Drosophila melanogaster</i></i> Attempts to determine the influence of high selection pressure in a population on the spread of radiation-induced genetic changes. No results are as yet available.	3
175/Add.2	<i>Studies on the mutagenic effect of X-rays</i> Summarizes the results of the work on radiation-induced chromosome breakage under various conditions (K. G. Luning).	3
175/Add.3	<i>Does there exist mutational adaptation to chronic irradiation?</i> The results do not confirm the assumption that under the increased radiation-background mutational adaptation occurs due to incorporation in the population of mutational isoalleles with lower mutability.	8
175/Add.4	<i>Some results and previews of research in Sweden relevant to human radiation genetics</i> Summarizes the present state of knowledge and recommends: 1. Large-scale international investigation of genetic consequences in females who have been controlled by means of X-rays due to congenital dislocation of the hip. 2. The study of genetic effects of radiation on human cell cultures.	10
175/Add.5	<i>Summary of papers of Lars Ehrenberg and co-workers with regards to the questions of the U.N. Radiation Committee</i> Summary of papers of L. Ehrenberg and co-workers on genetic effects of radiation.	7
175/Add.6	<i>Studies on the effects of irradiation on plant material carried out during recent years at the Institute for Physiologic Botany of Uppsala University</i>	2
175/Add.7	<i>Swedish mutation research in plants</i>	1
175/Add.8	<i>Dr. Gunnar Östergren and co-workers</i> Study on experimentally induced chromosome fragmentation (G. Östergren).	1
175/Add.9	<i>Investigations carried out by Dr. C. A. Larson (human genetics)</i>	1
176.	<i>Some notes on skin doses and bone marrow doses in mass miniature radiography</i>	2
177.	<i>Investigations into the health and blood picture of Swedish women living in houses representing different levels of ionizing radiation</i> No difference was found either in general health-state or in blood picture among the various groups of individuals (over 2,000 women) living in different types of dwelling.	37
178.	<i>Other haemopoetic functions: Read-off methods in radio-haematological control</i> Proposes a statistical method of evaluating total white-cells count as a control test of radiation damage:	11
179.	FRANCE. Atomic Energy Commission. Centre of Nuclear Studies at Saclay, Gif-sur-Yvette (Seine et Oise), France. <i>Measurement of environmental activity: Methods and results</i> Gives results of measurements of both natural and artificial radioactivity in the environment.	7
179/Corr.1	<i>Corrigendum to above report</i>	1
180.	<i>Biological methods available for use in the quantitative detection of ionizing radiations</i> Surveys and evaluates the biological methods usable for the quantitative estimation of absorbed dose.	43
181.	SWEDEN. <i>Bone and radiostrontium</i> The local radiation dose to the bone tissue and to the bone marrow after administration of bone-seeking isotopes is discussed. The figures are compared with the maximum permissible body burden.	4
182.	<i>Radiation doses to the gonads of patients in Swedish roentgen diagnostics. Summary of studies on magnitude and variation of the gonad doses together with dose reducing measures.</i>	3
183.	THE NETHERLANDS. <i>Report of the Committee of the Royal Netherlands Academy of Sciences concerning the dangers which may arise from the dissemination of radioactive products through nuclear test explosions</i> Report on the amount of radioactivity, its world-wide spreading and its biological risk as a consequence of test explosions.	48
184.	<i>Radioactive fall-out measurements in the Netherlands until December 31, 1957</i>	8
184/Corr.1	<i>Corrigendum to above report</i>	1

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185.	NEW ZEALAND. <i>Report on some aspects of radiation protection work in New Zealand</i> Contains: 1. Description of radiation protection measures in New Zealand. 2. Results of routine monitoring of radiation workers. 3. Preliminary results of statistical study on genetically significant gonad dose from X-ray diagnosis.	21
186.	FRANCE. <i>Doses received by the genital organs of children during X-ray examinations</i> Suggests the improvement of the radiological techniques and certain protective measures for decreasing the gonad dose from radiography.	15
187.	MEXICO. <i>Summary of radioactive fall-out data recorded in Mexico</i>	1
188.	BRAZIL. <i>Summary—strontium-90 analysis in dry milk and human urine</i>	2
189.	<i>On the composition of long-range fall-out particles</i> A single fall-out particle of large dimensions and relatively high activity was found by daily monitoring of fall-out. A detailed investigation of the nature and activity of this particle is presented.	7
190.	<i>On the uptake of MsThI in naturally contaminated areas</i> Gives preliminary results of an investigation on the uptake of natural radioisotopes by plants and animals in thorium-bearing area.	3
191.	UNITED ARAB REPUBLIC. <i>Radioactive fall-out in Egypt: December 1956-February 1957</i>	5
192.	<i>Radioactive fall-out in Egypt: March-December 1957</i>	7
193.	<i>Some somatic changes observed in Culex Molestus Forskal 1775</i> Shows differences in the uptake of P ³² in dependence upon the development stage and sex. The explanation of sex-difference is discussed.	6
194.	FRANCE. <i>Gonad doses in radiodiagnosis</i> Summarizes the systematic study on the gonad dose due to diagnostic examination by means of X-rays.	64
195.	ITALY. <i>Data on radioactive fall-out collected in Italy (1956, 1957, 1958)</i>	6
196.	USSR. <i>Draft chapter on "Genetic Effects of Radiation" for the report to be transmitted by the Scientific Committee on the Effects of Atomic Radiation to the General Assembly in 1958</i>	14
197.	<i>Draft chapter on "Conclusions and Recommendations" for the report to be transmitted by the Scientific Committee on the Effects of Atomic Radiation to the General Assembly in 1958</i>	17
198.	<i>Contamination of the biosphere in the vicinity of Leningrad by the products of nuclear explosions</i> Contains the description of methods used for monitoring the fall-out deposition. Results for the period 1953-1957 are given. Data on specific activity of water from the river Neva, the sea and the water supply system are also included. Accumulated radioactivity on the ground and external dose from radioactive deposit are then computed. Special attention is given to the contamination of the biosphere by Sr ⁹⁰ . Data are based on Hunter and Ballou's calculation.	28
199.	<i>Study of the strontium-90 content of the atmosphere, soil, foodstuffs and human bones in the USSR</i> The strontium-90 content of the air, soil, milk and cereals in various districts of the USSR was determined by radiochemical analysis. Preliminary results on the Sr ⁹⁰ content in bones from children in the Moscow district give the average value of 2.3 S.U. in the second half of 1957. A few data on Cs ¹³⁷ concentration in the air are attached.	24
200.	<i>Uptake of radioactive strontium by plants and its accumulation in various agricultural crops</i> Detailed analysis of Sr ⁹⁰ uptake by plants in relation to their biological characteristic (plant species, vegetative period) and the properties of the soil. Both factors can influence to a large extent the incorporation of Sr ⁹⁰ during the biological cycle.	27
201.	<i>Some results of a study of the bone system after injury by radioactive strontium</i> Reviews the experimental results obtained in the studies on the effect of bone-seeking radioisotopes. The progressive pathological changes leading to the development of bone tumours are described. The disturbances in the osteogenetic processes during	14

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USSR (<i>continued</i>)		
	the initial stages after contamination are marked pretumorous changes; their histological characteristic and their pathogenetic significance are discussed.	
202.	<i>Blastomogenic effects of strontium-90</i> Summarizes and evaluates the results so far published on the cancerogenic effect of strontium-90 in bone. In particular, the minimum and optimum tumour-producing doses, the latent period and the distribution of strontium-90 are discussed. The connexion between the blastomogenic effect and the development of leukemia is briefly mentioned.	10
203.	<i>The radiation hazards of explosions of pure hydrogen and ordinary atomic bombs</i> Compares the hazards of the long-lived radioactive substances dispersed throughout the world after the explosion of a fission and a pure fusion bomb. Radiation doses to the gonads and bones are calculated and the number of persons affected (hereditary diseases and leukemia) then computed. The conclusion is drawn that a pure fusion bomb cannot be regarded as less dangerous to mankind than a fission bomb.	27
204.	<i>Towards an assessment of the hazard from radioactive fall-out</i> An attempt to assess the various forms of hazard involved in the contamination of the earth's surface with long-lived radioactive fission products. The particular importance of strontium-90 is stressed. Effects of small doses of radiation and the concept of maximum permissible dose are discussed.	32
205.	<i>Nature of the initial effect of radiation on the hereditary structures</i> A survey of the present knowledge of the nature of the primary mechanisms through which ionizing radiation damages the hereditary structures.	40
206.	<i>Radiation and human heredity</i> Emphasizes the importance of the basic scientific principles of radiation genetics for the assessment of radiation-induced changes in human heredity. The natural mutation rate for various hereditary abnormalities is compared with the observations so far available on irradiated human population. The comparison of natural and induced mutagenesis both in experimental organisms and in men is the basis on which the doubling dose for man was estimated as approximately 10 r. The lack of exact knowledge and the urgent need for it is stressed.	22
207.	<i>The effect of radiation on the histological structure of monkey testes</i> Presents the results of histological analysis of monkey testes two years after exposure to a dose of 150-450r. While the recovery process proceeds rapidly and is apparently complete in animals irradiated after the attainment of sexual maturity, harmful disturbances have been found in young animals even two years after exposure.	25
208.	<i>The cytogenetic effects of radiation exposure on spermatogenesis in monkeys</i> Presents the results of cytological analysis of monkey testes two years after exposure to a dose of 150-450r. Extensive damage to the spermatogenesis was found. The frequency of chromosome re-arrangements in mammals considerably exceeds that in <i>Drosophila</i> after exposure to the same dose, being 65 per cent and 1.6 per cent after 500 r respectively.	18
209.	BELGIUM. <i>Radioactive fall-out measured at the CEN during 1955-1956 and 1957</i> Describes methods and results of fall-out measurements in the period 1955-1957.	9
210.	<i>Average dose received by the personnel of CEN, MOL, from 1954 to 1957</i> Summarizes the results of monitoring the professional exposure in nuclear energy education centre in Belgium. Film strip enables the differentiation of the proportion of the exposure between beta, gamma and neutron radiation. Only average doses of the personnel are given.	3
211.	FRANCE. <i>Study of the gonad dose during systematic X-ray examinations (Preliminary note dealing only with the irradiation of male gonads)</i> Measurement of the gonad dose resulting in males from systematic standardized X-ray examination of the chest indicate that the exposure is very low. An average of 9 mrem for a period of 30 years is computed. The dose to the lungs is discussed with relation to the increase in frequency of lung cancer.	6
212.	<i>Determination of the absorbed dose/exposure dose ratio in bone and muscle by the equivalent-gases method. Principle of the method and preliminary results</i> Describes the method for determination of the dose absorbed in various tissues using ionization chambers filled with gas mixtures of equivalent density.	22

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FRANCE (*continued*)

213. *Recovery following the action of ionizing radiation* 26

The authors first discuss the problem of recovery which they consider hypothetically. They attempt to show that it is a phenomenon which, although appearing very complex at first glance, can be simplified by relating the recovery to a definite effect.

They contribute a series of experiments showing that recovery is a very general phenomenon, common to all living things, and related to the metabolic activity of living matter.

They report a new method of experimental analysis which greatly facilitates interpretation of the results. They believe that the study of recovery should be developed on a much larger scale.

Appendix

LIST OF SCIENTIFIC EXPERTS

The scientific experts who have taken part in the preparation of the report while attending Committee sessions as members of national delegations are listed below. The Committee must also express its appreciation to the many individual scientists not directly connected with national delegations whose voluntary co-operation and good will contributed in no small measure to the preparation of the report.

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Mr. D. J. Stevens (*Representative*)
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BELGIUM :

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