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## RESEARCH DEFENCE SOCIETY

*Interpres Interpretum.*

Founded in 1908, under the Presidency of Lord Cromer, to make generally known the value and the necessity of experiments on animals: the restrictions imposed on them by the Act of 1876; and the great saving of human and animal lives already obtained by means of such experiments.

(During 1913—1920, these Reports were sent only to Members and Associates. They now are sent to the chief Public Libraries; and may be obtained through any bookseller or newsagent. It is hoped that the Society will be able to publish them six times a year, instead of four).

Eighth Year of Issue.  
October, 1921.

11, Chandos Street, Cavendish Square,  
London, W. 1.

Price Sixpence.

# THE FIGHT AGAINST DISEASE.

“ I know that physiology cannot possibly progress except by experiments on living animals, and I feel the deepest conviction that he who retards the progress of physiology commits a crime against mankind.”

DARWIN, in 1881.

“ During the siege of Paris (1870-71), Nélaton, in despair at the sight of the death of almost every patient after operation, declared that he who should conquer purulent infection would deserve a statue made of gold.”

LIFE OF PASTEUR.

“ I can hardly do better than begin by saying that I have myself often performed experiments upon the lower animals, and that, if I have been privileged in my professional career to do anything for the good of my fellow men, more is to be attributed to these experiments than to any other work in which I have engaged.” LISTER, in 1875.

“ Tant de choses encore à travailler ! ” PASTEUR, in 1895, the year of his death.



## RESEARCH DEFENCE SOCIETY,

Tel. Langham 1043.

11, Chandos Street,  
London, W.1.

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In 1914, the Society had about 5000 Members and Associates : but, of course, its Membership went down during the years after 1914. It is not merely a scientific Society : it is a national Society of men and women united to promote national health and efficiency, to bring about a better understanding of the value of medical and surgical studies, and to expose the false statements which are made against them. It appeals to the general public. All of us enjoy the benefit of the results of these studies. All of us, therefore, ought to support a Society which defends them and explains them.

The annual subscription for Membership is ten shillings. Applications for Membership, or for the Society's publications, should be sent to the Secretary. Arrangements can always be made for addresses and lantern-lectures, and for supplying literature to clubs and institutes.



1914

# THE WORK OF THE NATIONAL INSTITUTE FOR MEDICAL RESEARCH.\*

By DR. H. H. DALE, F.R.S.,  
*Director of the Institute.*

I have been asked to speak upon the National Institute for Medical Research, which comprises the Central Research Laboratories under the Medical Research Council. I may remind you that the Medical Research Fund, which the Council administer, was originally established by the National Health Insurance Act, the sum of money annually available being assessed by the number of insured persons. It represented, indeed, a recognition of the fact, long familiar to anyone with knowledge of the position, that treatment directed to the cure or alleviation of existing disease touched only the fringe of the problem; that a relatively small sum spent on facilitating the discovery of causes, and therewith of methods of prevention or of radical treatment, would ultimately save more suffering, and do more for national health, than vast sums spent on the application of such remedies as woefully deficient knowledge had yet been able to indicate. The Committee appointed to administer the fund decided that, while the major part should be employed for supporting and promoting medical research in existing institutions—Hospital and University laboratories—a substantial sum should be devoted to the formation of a new central institute, staffed by workers who should be in the Committee's whole time service, and free to receive, from time to time, attached workers from other institutions whose research could be assisted by the facilities and the opportunities for help and collaboration which such a permanently organised institute could offer.

## THE HISTORY OF THE INSTITUTE.

The first members of the staff of the Institute were appointed in the middle of 1914, and the Committee had used a favourable opportunity to purchase a fine building and grounds at Hampstead, which, after many years' good service as the Mount Vernon Hospital for the treatment of consumption, had been abandoned in favour of more modern premises further from the centre of London.

\* An address read at the annual general meeting of the Research Defence Society, on June 29th.



Then came August, 1914, and the whole of the Committee's resources and staff were for 5 years diverted to dealing with the pressing problems created by the absorption of the whole energies of the nation in the successful prosecution of the war. The Hampstead building was immediately handed over to the War Office, and was used as a military hospital by different branches of the services down to the early months of 1919. When at length it was no longer needed in this direction, the task of preparing it for the accommodation of the research staff was taken up again, and by April, 1920, was so far advanced that the members of the staff could take up their work there, and bring into actual being that close co-operation between the different branches of medical research which the Committee had in view, in appointing the Staff and planning the Institute. Meanwhile, with the absorption of the Health Insurance Commissions into the Ministry of Health, the Medical Research Committee, as a Committee under the Insurance scheme, had passed out of existence; but the task which, during the war, they had discharged with such general approbation, was taken up by the newly constituted Medical Research Council, administering a Treasury grant, and responsible to a Committee of the Privy Council.

#### THE WORK IN PROGRESS.

It will be clear, from what I have said, that the National Institute for Medical Research at Mount Vernon has only been in existence as a working Research Institute for a little over a year. The building has been adapted with remarkable ease, and with very little real structural alteration, to provide spacious, airy and well-lit laboratories. At the same time, in the first year of working in such newly-adapted quarters, a good deal of time has necessarily been spent in plans and preparations. It can cause no surprise, therefore, if I speak more of our organisation, our plans, and our hopes, than of finished achievements. The staff, as originally appointed, and still constituted, is organised in 4 main departments, each with its independent Director—the departments of Bacteriology and Experimental Pathology, of Applied Physiology and Hygiene, of Biochemistry and Pharmacology, and of Medical Statistics.

#### BACTERIOLOGICAL MEDIA.

When the new Institute was ready to receive the workers in its constituent departments, many of them were still engaged in problems arising out of their



work during the war. This must be an experience common to many experimental laboratories. Under the stress of war conditions, detailed investigation along established lines was largely thrown aside. New methods and new aims were forced upon us. Peace brought the opportunity for more thorough exploration along routes which the hasty survey of war-time had indicated. Let me give you one or two examples. The shortage of the common constituents of bacteriological media led Captain S. R. Douglas, now directing the Bacteriological Department of the Institute, to devise, early in the war, a simple method of making such media from natural pancreatic digests of meat or other protein materials—a method which has safely established itself as a valuable aid to all kinds of bacteriological work. The necessity for making certain bacterial vaccines in large quantities led him to investigate the value for this purpose of bacteria killed, dehydrated, and freed of their oily constituents by extraction with pure acetone. Again he found a method of wide application, and usefulness. Possibly a combination of the two kinds of experience led him next to try the effect of the pancreatic ferments on the acetone-extracted bacteria. The result is already full of promise, as giving, perhaps, the long-sought method for extracting from many bacteria the poisonous substances which they liberate when they undergo digestion by the ferments of the blood and tissues, and which are responsible for the symptoms constituting what we call the “disease.” Hitherto the treatment of disease by antitoxic sera has had its most convincing success against infection by organisms, such as the diphtheria bacillus, which form their soluble poisons even when grown in an artificial broth. Large sums of money have been expended, and the lives of devoted investigators have been sacrificed, in unsuccessful attempts to extract from organisms like the typhoid bacillus the toxic substances which they liberate in the body, so as to prepare antitoxins which will neutralize them. In some cases, such as those of the dysentery bacillus and the meningococcus, a fair measure of success has been obtained by injecting suspensions of the organisms themselves into horses and allowing the animals’ own body juices to dissolve them and to excite the production of the appropriate antibodies. Captain Douglas’s work, growing under the conditions of peace out of his experience during the war, gives hope of a real step forward in the direction of obtaining sera of higher and of definitely measurable value for the treatment of such diseases.

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## RESEARCHES ON TETANUS AND SILICOSIS.

Let me quote another example. During the war Dr. W. E. Gye's duties brought him into contact with the danger of tetanus from heavily infected wounds. The organism of tetanus produces an extremely potent toxin in the laboratory, and the antitoxin produced by immunizing horses to this was used on a great scale, and undoubtedly saved many lives during the war. But no sufficient explanation was available of certain curious facts concerning the growth of the bacillus and the production of its toxin in the body. A suspension of washed tetanus bacilli or their spores can be injected without harm. If soil is introduced with them they will germinate, flourish, and produce the toxin which causes the disease. With Dr. W. Cramer, of the Imperial Cancer Research Fund, Dr. Gye investigated the soluble constituents of the soil, and found that two common constituents, calcium chloride and hydrated soluble silica, have the property that, when either of them is injected with tetanus spores under the skin of a mouse, it provides the necessary condition for the germination of the spores and the production of the disease. Now this knowledge, which the experimental use of animals alone could have produced, is bound to have a great influence on ideas as to the conditions under which the presence of tetanus organisms in a wound entails the development of tetanus. It is a new step in the direction of eliminating one peculiarly ghastly disease. But it goes much further than that. It directs attention anew to another condition with which the presence of silica has long been associated, though the nature of its action has been obscure. The fact that working in air impregnated with certain kinds of dust leads to injury to the lungs and predisposes to pulmonary consumption has been recognised for centuries. Though the special prevalence of this condition, in workers in materials creating a siliceous dust, has long been known, it is only since Haldane's work in 1902 that the singular position of silica, and the practical harmlessness, or even protective action of other dusts, have been made clear. But though it is now clear that the presence of silica in the lungs leads to fibrosis and predisposes to consumption, and though the vast importance of the matter for the hygiene of many kinds of workers is recognised, and though the possible means of its prevention are being vigorously investigated, such understanding of the condition as could lead to rational measures for its treatment has been wholly wanting. Now comes this evidence that hydrated silica, in colloidal solution, can lead to the germination of



tetanus spores in the tissues. Already Dr. Gye has applied this knowledge to a study of the mode of action of silicic acid on the tissues, and its influence on the growth of other organisms, and already with Dr. E. H. Kettle, of St. Mary's Hospital, he has been able to show that the tubercle bacillus, which normally in the tissues of the mouse causes at most a localised nodule of infection, when injected with silicic acid causes, in the same species, a spreading infection in the tissues which the silica has injured. Here then opens the possibility of a new light on the problem of the consumption which is a scourge of the tin-miners, of the gold miners, of the knife grinders, of the ganister-brick makers, of the whole army of workers in indispensable trades; a possibility of new light from an unexpected quarter, shed by knowledge which would be altogether beyond reach without experiments on animals. And surely even a small step towards the solution of a problem of such importance to humanity is worth the sacrifice of a few mice or rabbits.

#### DISSEMINATED SCLEROSIS.

Another example of work which, also in Dr. Gye's hands, is giving great promise, is the investigation of the disease of the central nervous system known as disseminated or multiple sclerosis. This is a condition regarded as so little susceptible to treatment that but few cases are to be seen in the voluntary hospitals, which must allot their beds to patients for whom there is some hope of remedy. It is to the poor-law infirmaries that you must go to realize how many are the victims smitten by this mysterious and distressing disease, dragging its course, with alternations of apparent arrest and inevitable progress, through years of misery, for which no fault of the patient or his parents is in any way responsible. The disease has long been recognised and studied by physicians and morbid anatomists, who have arrived at the conclusion that it was "a derangement of the central nervous system due to an inherent defect." Now comes Dr. Gye's evidence that it is due to a definite infection, since the affected nervous matter or the cerebro-spinal fluid from a human victim, when injected into rabbits, can transmit the disease, and evoke in them the characteristic lesions of the nervous system. At once we are lifted into an atmosphere of new possibilities. Nobody can investigate the means of preventing, or can suggest rational means of treating "an inherent nervous defect." But here is an infection, with an organism to be discovered, its channel of entry to be identified, its means of access to be removed, the methods



for its elimination to be explored. He would be a rash man who could prophecy with confidence, or awaken expectations of early results. But at least there is new hope; there is a line of investigation to pursue. Who, with any knowledge of the vast sum of misery due to this one disease, will dare to lift a finger or speak a word which can hinder?

#### OTHER BRANCHES OF WORK.

I should keep you much too long if I were to try to indicate to you merely the lines of work on which all the different workers in the Institute have embarked. Much of it, such as Dr. Leonard Hill's work on the conditions of ventilation and surface cooling needed for health and vigour, hardly needs at the moment experiments on animals of the kind which your Society is chiefly concerned to defend from ignorant attacks and misrepresentation. His usual experimental animals are himself, his colleagues, and volunteers from the Institute's personnel. Dr. John Brownlee, in his statistical department, takes his material chiefly from the large scale experiments which our ignorance allows Nature still to make on our fellow men. Mr. Barnard's investigation of the minute structure of micro-organisms, by means of his most recent developments of microscopic and photographic technique; Mr. Clifford Dobell's critical survey of the protozoological examinations made on the excreta of people in this country, showing the unexpected presence of the amoeba of tropical dysentery in a material percentage of us healthy Englishmen: these depend hardly at all on the use of animals for experiment at the moment. But the whole significance and value of all their work depend on the knowledge which we could not have obtained except by the directly experimental method.

There are many other items of our activity I could describe—Dr. Leonard Colebrook's work on actinomycosis, work by others of us on shock in wounded men, and on the significance of the capillary circulation in connexion therewith, work on anaphylaxis, on the reaction of blood in the body, and so forth. But there is only one other side of our work which I can mention with any detail. A very important task on which some members of our staff have been engaged has been the control of the activity and freedom from dangerous toxicity of some of the modern potent remedies, such as salvarsan and its analogues, which cannot by any known chemical test be guaranteed as invariably safe for use in human therapeutics. I need not say that such remedies were discovered by means of



experiment on animals; but I am not sure whether it is generally realized that there is a large and growing class of them which could not be used at all, with any confidence in their efficacy and in their safety for the patient, if their quality were not subjected, regularly and systematically, to the test of experiment on animals. I venture to say that it is hardly creditable to this country that we have hitherto had no publicly established organisation for the control of such remedies; but, to the limited extent to which the present state of our law and the willing co-operation of British manufacturers make it possible, such control is already being exercised by a department of the National Institute.

#### CONCLUSION.

I could spend much longer telling you of our plans, but I have said enough to enable you to realise how sincerely, with all workers in medical science, we must appreciate the efforts of this Society to help us, by developing a sane and informed public opinion. Genuine, well-informed criticism we shall always welcome; indeed, as an Institute supported out of public funds, it is peculiarly our duty to have regard to it. On the other hand, we should be false to our trust if we spent the time, which the Government pays us to give to research, in controversy with ignorance which no truth will convince. We realise the immense service to science which this Society is doing in making the real facts of the situation available to all who sincerely desire to know them.

#### THE GLASGOW OUTBREAK OF SMALLPOX.

The 1920 Report of the Scottish Board of Health gives a full account of this outbreak, down to the end of the year. "The sources of the outbreak appear to have included both India and Egypt. Epidemic smallpox in these parts of the world is normally a severe disease with a high case-mortality, and when that type of smallpox finds entrance to this country it exhibits characters remarkably different from the mild smallpox which is now commonly associated with the disease as introduced from America."

The outbreak began in February, 1920. "The housing of the population of Glasgow is exceptionally favourable to the spread of smallpox—indeed, probably, no other large centre of population in Great Britain is worse off in that respect. The great tenement buildings, four or five storeys in height, with multiple dwellings on each floor, and the whole connected by a common turnpike stair up and down



which all human traffic has to pass, and by means of which contaminated air finds its way from house to house—these conditions might almost be said to be devised for the propagation of disease.”

The total number of cases in Glasgow was 532. Outside Glasgow, and largely traced to infection from that centre, there were 126 cases in Burghs, and 66 in County areas.

“Of the total of 724 cases, 537, or 74 *per cent.* showed evidence of primary vaccination. Of these, however, only 31, or rather less than 6 *per cent.*, were under 15 years of age. None of the cases under 15 years of age died. There were 81 deaths among the vaccinated, all of them over 15 years of age; which is equivalent to a case-mortality rate of 15.1 *per cent.* Among the 162 un-vaccinated cases, there were 59 deaths, a case-mortality rate of 36.4 *per cent.* Of the 59 deaths among un-vaccinated, no less than 49, or 83 *per cent.*, occurred among children under 15 years of age.”

There were 25 doubtfully vaccinated cases, of whom 15 died. If we reckon them as un-vaccinated, it raises the case-mortality of the un-vaccinated to 39.6 *per cent.* If we reckon them as vaccinated, it raises the case-mortality of the vaccinated to 17.1 *per cent.*

Two lessons of this outbreak are plain enough. (1) The mortality among those patients who had not been vaccinated was more than twice the mortality among those patients who at some time had been vaccinated. (2) Among the vaccinated patients who were under 15 years of age, not one died. Among the un-vaccinated patients who were under 15 years of age, forty-nine died.

Overcrowding, bad sanitary arrangements, poverty, drink, neglect—these and the like miseries and disgraces of our national life spread smallpox; but they do not create it. There is a touch of folly in the incessant assertions of anti-vaccinationists that smallpox must be fought on lines of sanitation. Of course it must. Those great tenement buildings in Glasgow, those poorest back-streets in Nottingham—why do not the anti-vaccinationists pull them down? They talk: but what have they done? Why did they let these traps of infection stand till smallpox came?

It is something worse than a touch of folly, to talk as if our doctors, and our medical officers of health, were indifferent to the evils of overcrowding. For instance, the Rev. B. G. Bouchier, vicar of St. Jude's, Hampstead Garden Suburb, has lately published the notes of one of his sermons, with a passage as follows:—



Who are the true "reactionaries," those who strive for decent and adequate housing alike for the city and the rural population, for simple and healthful living with less abuse of the laws of Nature, for sound minds in sound bodies, and for minds, moreover, which will not knowingly permit that weaker things shall be made to suffer for any supposed good which may accrue, or those who accept as necessary evils the overcrowding in densely populated areas (such as four families living in a four-roomed house—referred to quite recently in the House of Commons), the still imperfect regulations in regard to sanitation in some quarters of our great cities, the ignorance prevailing in regard to hygiene, while recommending as a panacea for ills unavoidable under such conditions vaccination and inoculations, dosing with animal extracts and such alleged cures or preventatives against the flouting of natural laws of health?

We print this note in the rough, word for word, as it stands in Mr. Bouchier's parish-paper. What has Hampstead Garden Suburb ever done for Glasgow and Nottingham? What is it doing for them now? Is it not Dives, protesting that Lazarus ought, really ought, to be properly housed? Meanwhile, every medical officer in the land is working hard for the very reforms of which Hampstead Garden Suburb is only talking. We call attention to the end of the note. Beef-tea and calvesfoot jelly and codliver oil and oxtail soup are all of them animal extracts. What is a panacea for unavoidable ills? What is an alleged preventative against the flouting of natural laws? Why does Mr. Bouchier, in the pulpit, use this sort of language?

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#### NONSENSE-PRIZES FOR ANTI-VIVISECTIONISTS.

First Prize: to Dr. Hadwen, for his statement, "Vaccination would be likely to render a case of discrete smallpox fatal by weakening the constitution and lowering its vital resisting powers." (*Abolitionist*, Sept.)

Second Prize: to Mr. Allinson, for his statement, "Natural immunity could be restored to humanity by natural living and a period of reasonable control of motherhood and fatherhood." (*The Anti-vivisection Journal*, July.)

Third Prize: to Mr. Coleridge, for his statement, "We groan under the despotism of a bureaucracy, and liberty and personal freedom are now objects of derision with our rulers." (*Zoophilist*, Sept.)

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Sister and brother, admitted to Hospital with smallpox contracted from the same source. The sister, aged 11, had been vaccinated in infancy, and had 4 good scars. In her, the eruption consisted only of a few pimples which caused her no discomfort. The brother, aged 3½, and unvaccinated, had a confluent attack, from which he died. Photograph taken on 13th day of disease in the older child, and 10th in the younger.—“British Medical Journal,” June 3rd, 1893.



## THE ROCKEFELLER FOUNDATION.

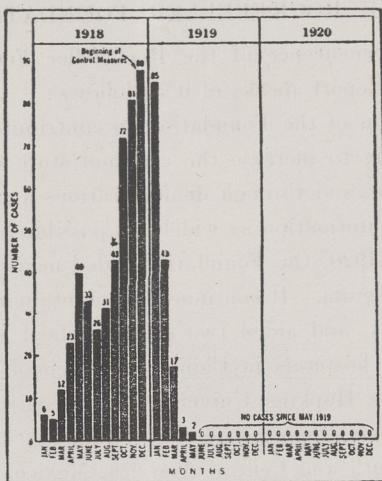
The world-wide beneficence of the Rockefeller Foundation is pleasant to think of. The latest Report speaks of it as follows:—

It is the aim of the Foundation to contribute to the progress of the world by helping to increase the common store of knowledge about the causes of disease, and through demonstrations and the services of experts to diffuse this information as widely as possible among all the peoples of the world. In 1920, the Foundation aided medical education in Canada, London, and Belgium. It continued to maintain a modern medical school in Peking, China, and aided two other medical schools, five pre-medical schools, and 31 hospitals in China. The School of Hygiene and Public Health at Johns Hopkins University, and courses in hygiene at Santo Paolo, Brazil, were supported; and the campaign against yellow fever was continued in South and Central America, Mexico, and West Africa. Aid was given to government agencies in the control of malaria in ten States in the South, and hookworm work was prosecuted in nine Southern States and in 18 foreign countries. The anti-tuberculosis work in France was brought to a point where it could soon be turned over to the French authorities; and the government of Czecho-Slovakia was aided in the reorganisation of its public health laboratory system. Participation in war-time emergency relief was brought to a close by giving a million dollars to the fund for European children. Emergency assistance in providing medical journals and apparatus was given to medical schools and libraries in five countries of Central Europe.

The Foundation has provided fellowships in public health and medical education for 90 individuals, who represented 13 different countries. Its gifts, paid or promised in 1920, include five million dollars to medical education in Canada; the like sum to University College and Hospital, London; a million francs to the Belgian *Fondation Reine Elisabeth*; and more than three million dollars to the Brussels Medical School.

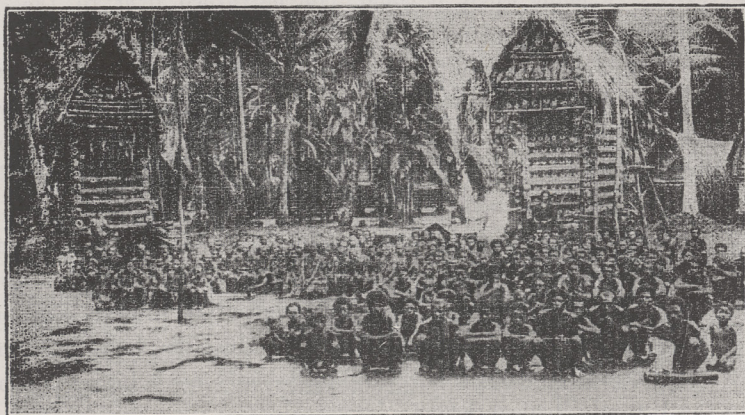
We reproduce here two of the many illustrations in this admirable Report: one from Ecuador, the other from Papua. They show that the Foundation is deserving of its proud motto, "The Well-being of Mankind throughout the World."





#### ERADICATION OF YELLOW FEVER IN GUAYAQUIL.

Chart showing sharp decline in the number of yellow fever cases in Guayaquil, Ecuador, since the beginning of control measures, November 25, 1918.



AUDIENCE AT HOOKWORM LECTURE, PAPUA.

Control or survey services have been rendered in 42 different governmental areas in 19 countries of the world. In each case government has invited aid, assumed responsibility, and looked forward to taking over the entire enterprise.



## NOTES.

The Government Report on experiments on animals during 1920 has now been published. It can be obtained through any bookseller, or from H.M. Stationery Office : price sixpence.

The Annual General Meeting of our Society was held on June 29, in the rooms of the Medical Society of London, and was very well attended. Lord Lamington presided. Messages of regret for non-attendance were received from Sir Clifford Allbutt, Lord Astor, Mr. A. J. Balfour, Sir Hugh Bell, Sir John Rose Bradford, Lord Hugh Cecil, Sir James Dewar, Lord Long, Sir Donald MacAlister, Lord Northcliffe, Mr. H. G. Wells, and others. The vote of thanks to Dr. Dale for his address was moved and seconded by Lord Knutsford, Sir Leonard Rogers, and Professor Bayliss. The Committee's Report, and the Hon. Treasurer's Report, were considered and adopted. Microscopes and micro-photographs by Mr. Barnard were on view. The Reports have been sent to all Members : and will be sent, with the Society's balance-sheet, on application to the Secretary.

Sir Walter Fletcher, Dr. D. T. Harris, and Miss Burgiss-Brown, have become members of the Committee. Mr. Paget has resigned the Hon. Secretaryship, and has been appointed Vice-Chairman. Lady Horsley acted as Hon. Secretary for some months ; and has been appointed joint Hon. Treasurer with Sir David Ferrier. In May, Dr. D. T. Harris was appointed Hon. Secretary.

Our Society has received a legacy of £10 under the will of Dr. T. W. Nassau Greene, of Dublin : and a contribution of £20 from the Birmingham Branch.

On June 10, Mrs Robertson, Hon Secretary of the Portsmouth Branch, gave a lantern-lecture, which was very well attended, in Southsea, on the Fight against Mosquitoes and other Disease Carriers. On June 27, the Anglo-French Society held a debate on experiments on animals, and decided by 43 votes to 9 that they are necessary in the interests of science. During July, Dr. Saleeby gave addresses to large audiences in Croydon, Portsmouth, and Battersea. During September, Dr. D. T. Harris and Dr. Clare Harris gave addresses to the Women's Co-operative Guild in North Finchley, Stoke Newington, Shoreditch, and Clapton ; and received a very good welcome.



"No man who knows anything of science has any doubt whatever that the right way to advance knowledge is by experiment. You can take the whole range of the sciences, and I would challenge an opponent to name one in which advance, if it has been rapid and striking, has not been through experiment. When we are reduced to observation, science crawls. Where and in proportion as you can use experiment, the science advances rapidly . . . . As soon as you can bring experiment to bear upon a subject, you are free; but as long as you can merely observe, your progress is very slow. The reason is, that experiment is like cross-examination. You can put the question you want, and Nature always answers it." LORD MOULTON, in 1907.