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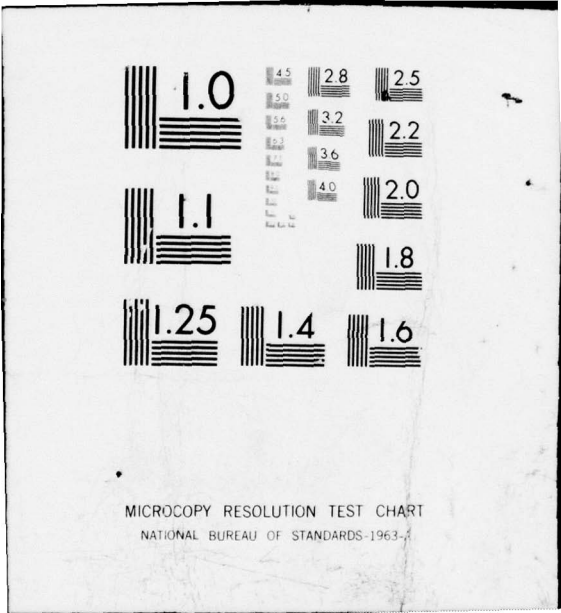
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Vol. 5, No. 7

	<u>Page</u>
<u>PHYSICS</u>	
Neutron, Proton, Meson Reaction in Photographic Emulsions	76
<u>CHEMISTRY</u>	
Physical Chemistry Research at the University of Leeds	77
The Decomposition of Hydrogen Peroxide by Catalase and by Peroxidase	78
Evaporation Characteristics and Molecular Configurations of Large Hydrocarbons and Fluorocarbons	79
The Chemical Nature of Knock in Internal Combustion Engines	80
Viscosity of Liquids at Constant Volume	81
<u>MATHEMATICS</u>	
Disturbances and General Circulation of the Atmosphere	82
<u>BIOSCIENCES</u>	
Some Epidemiologic Aspects of Influenza Epidemic in England, 1951	83
Sickness Benefits	83
Spread and Date of Occurrence	83
Mortality Studies	84
Climatic Observations	84
Psychologic Effect	84
Clinical Patterns	85
In Situ Measurement of Radium Radiation in the Pelvis	85
Intraduodenal Technique for Investigation of "Flat" Glucose Curve	86
Laminarin as a Talcum Substitute for Surgical Powders	86

<u>MISCELLANEOUS</u>	<u>Page</u>
Forthcoming Books on Cosmic Rays87
Ergonomics Research Society88
Health Congress, Southport, England89
1950 Stalin Prizes89
<u>PERSONAL NEWS ITEMS</u>91
<u>FORTHCOMING EVENTS</u>92

AMERICAN EMBASSY

LONDON, ENGLAND

1 April 1951

Vol. 5, No. 7

NEUTRON, PROTON, MESON REACTION IN PHOTOGRAPHIC
EMULSIONS

S. J. Goldsack and N. Page, University of Manchester, have recently found the event shown in Fig. 1 in a 400 micron thick G-5 emulsion, exposed vertically for 21 days at an altitude of 2860 meters in a magnetic field of 34,000 gauss.

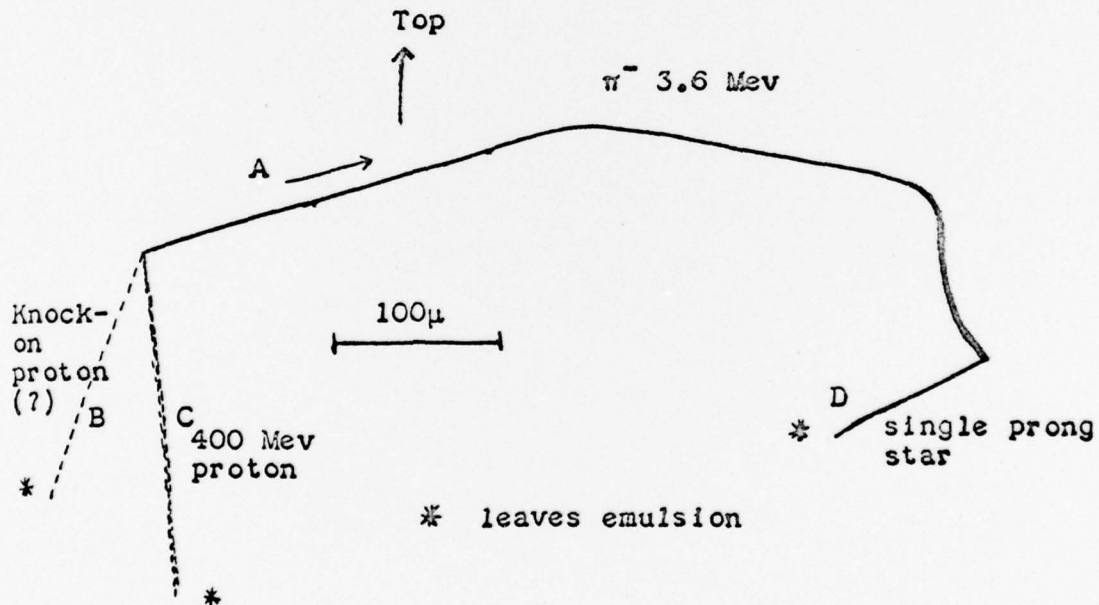
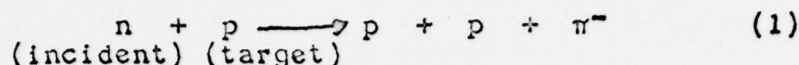


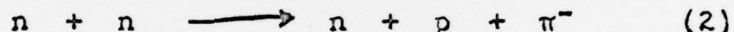
Fig. 1

The event is interpreted as the production of a π^- meson (track A) in the collision of a high energy cosmic ray neutron with a proton in the emulsion, according to the following scheme:



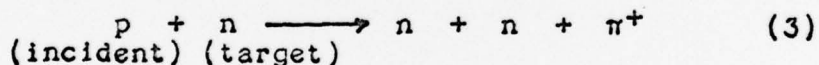
The grain density and scattering of track A is consistent with its having been produced by a slow meson (presumably π^-) which produces a single prong star (D) at the end of its range. Track C is identified as a proton from grain density and scattering measurements and is also found to be positively deflected in the magnetic field. Track B is thought to be a knock-on proton initially at rest in the emulsion. Its energy must be at least 650 Mev.

In reviewing the types of simple stars involving the production of one meson in a nucleon-nucleon collision, they conclude that all of the six such reactions which are possible might be observed in a G-5 emulsion. The reaction



is of particular interest. Armenteros et al have pointed out that this process might account for the event described by Hopper and Bizwas (Phys. Rev. 80, 1099, 1950) and interpreted by them as an example of a V^0 decay.

Goldsack and Page conclude that it appears impossible at present to distinguish in the emulsion between the decay of V particles and high energy events of type (2) and of the type



PHYSICAL CHEMISTRY RESEARCH AT THE UNIVERSITY OF LEEDS

Since the last report on physical chemistry research at Leeds University (ESN 4, 150 (1950)), F. S. Dainton has been appointed to the second chair to succeed M. G. Evans. Professor Emeritus R. Whytlaw-Gray has retired completely during the past year and his highly refined measurements on vapor compressibilities have been discontinued

Professor Dainton has a large, varied program of researches underway. These deal with (1) radiation chemistry, i.e., the study of chemical reactions induced by ionizing radiations. Present investigations include the reactions of ferrous salts, water soluble polymerisable substances and biological substances, (2) the production and detection of H and OH radicals in aqueous solution, and (3) polymerization studies. Some of this work is discussed in the following paragraphs.

R. S. Bradley, Senior Lecturer, is continuing his studies on the sizes and shapes of high molecular weight compounds and has initiated a research program on the kinetics of phase change.

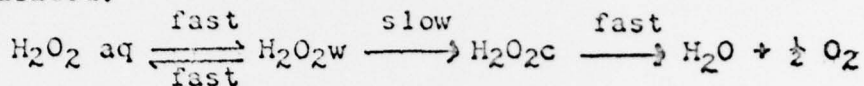
Further details about the work of this department can be found in Technical Reports ONRL-57-50 and ONRL-28-51, obtainable from the Technical Information Division, Code 250, Office of Naval Research, Washington 25, D. C.

The Decomposition of Hydrogen Peroxide by Catalase and by Peroxidase

Professor Dainton and P. Smith have obtained convincing evidence that the enzymatic decomposition of aqueous hydrogen peroxide solutions by catalase or by peroxidase does not proceed through a free radical mechanism. All experimental observations can be satisfactorily explained in terms of a surface reaction mechanism involving two different types of active sites on the protein surface.

A free radical mechanism, involving the intermediate formation of HO and HO₂ radicals, was first proposed for this decomposition in 1931 by Haber and Wills-tätter. Dainton and Smith have applied the techniques developed for the detailed study of free radical reactions in aqueous solutions to this system. Several monomers which are known to polymerize very rapidly in the presence of these free radicals were found not to do so in this system. The rate of decomposition of the hydrogen peroxide solutions catalyzed by these enzymes has been found to be unchanged in the presence of methylacrylate and methylmethacrylate, and the total amount of oxygen gas evolved was unchanged in the presence of these monomers.

These observations and the results obtained by Chance and others on the rates of these decomposition reactions can be consistently explained in terms of a surface reaction mechanism. The enzyme surface is now assumed to have two different types of sites available either for chemisorption or for van der Waals physical adsorption. The following reaction mechanism has been postulated:



where $\text{H}_2\text{O}_2\text{w}$ represents a physically adsorbed molecule, and $\text{H}_2\text{O}_2\text{c}$ is the chemisorbed unit. This scheme readily explains the fact that the rate of decomposition is first order with respect to peroxide concentration and also the saturation effects observed by Chance.

It is planned to publish this work in detail in the Biochemical Journal.

Evaporation Characteristics and Molecular Configurations of Large Hydrocarbons and Fluorocarbons

The evaporation characteristics of several branched chain hydrocarbons and a straight chain fluorocarbon have been determined by Bradley and G.C.S. Waghorn, and these can be compared with the results previously obtained for long chain paraffins (cf. ESN 4, 153 (1950)). Triheptylmethane, tridecylmethane and perfluoro-n-hexadecane were investigated recently. The results indicate that in agreement with previous conclusions the straight chain hydrocarbons are coiled in the vapor phase essentially corresponding to free rotation. The observed collision radius of the fluorocarbon is only slightly larger than would be expected on the basis of the increased molecular volume.

In the course of these studies useful data were obtained on the physical properties of these molecules, viz., on their vapor pressures and heats of sublimation. These results can be briefly summarized as follows:

Triheptylmethane

$$\log_{10} P_{\text{cm}} = -5626/T + 12.772$$

$$\Delta H_{\text{vap.}} = 25,750 \text{ cal./mole}$$

$$\text{Collision radius } 4.85 \pm 0.03 \text{ \AA} \text{ at } 25\text{-}35^\circ\text{C}$$

$$\log_{10} P_{cm} = -7981/T + 18.63$$

$$\Delta H_{vap.} = 36,530 \text{ cal./mole}$$

$$\text{Collision radius } 6.06 \pm 0.03 \text{ \AA}$$

The collision radii are considerably less than those predicted by previous workers. The value observed for triheptylmethane is not far from that found for the straight chain isomer n-hexadecane, supporting the previously reached conclusion of extreme coiling in the straight chain molecule.

Perfluorohexadecane melts at 115°C and was investigated in the solid state only. The following physical properties were observed:

$$\text{Density at } 20^{\circ}\text{C } 1.856 \text{ (molecular volume } 453.0 \text{ cc)}$$

$$\log_{10} P_{cm} = -5464/T + 13.61$$

$$\Delta H \text{ sublimation} = 25.01 \text{ Kcal./mole}$$

$$\text{Collision radius } 5.6 \text{ \AA at } 20^{\circ}\text{C}$$

The collision radius can be estimated from that observed for the analogous hydrocarbon by taking the cube root of the ratio of their molecule volumes under comparable conditions (i.e., in the solid state at 20°C) and this yields the value of 5.43 Å. The similarity of these values suggests that the potential forces hindering internal rotation in hydrocarbons and in fluorocarbons are of a similar order and magnitude, in good agreement with available thermodynamic and spectroscopic evidence.

The Chemical Nature of Knock in Internal Combustion Engines

The investigations of Dr. W. A. Walsh on the problem of knock are essentially complete now. The results show quite conclusively that the knock inhibiting activity of lead tetraethyl is due to the formation of a lead salt and that the chemical reactions leading to knock are of the "low temperature" nature.

The formation of a lead oxide fog at a temperature of 180°C was proved by means of the Tyndall effect. It was also shown that by adding a few grains of lead salt and heating to 200°C, a film is formed on the walls

of the vessel which is just as effective as lead tetraethyl and which cannot be pumped out by a high vacuum. This film exhibits an inhibiting effect of apparently infinite lifetime. By using inert gases as diluents, it was shown that a reaction chain is being broken on these surfaces and subsequent detailed experiments led to the conclusion that this chain breaking mechanism consists of the removal of hydrogen atoms. In agreement with this conclusion, it was shown that the reaction between hydrogen and oxygen is also inhibited by lead tetraethyl.

VISCOSITY OF LIQUIDS AT CONSTANT VOLUME

The viscosity of liquids at constant volume has been investigated at pressures up to 3,000 atms. in the Department of Physical Chemistry, Imperial College of Science and Technology, London. Dr. A.S.C. Lawrence and A. Jobling have recently reported this work to the Royal Society. The results yield a value for the activation energy of viscous flow at constant volume which is considered to be of more fundamental significance than the conventionally measured activation energy at constant pressure. Further details of this work may be found in Technical Report ONRL-29-51, available from the Technical Information Division, Code 250, Office of Naval Research, Washington 25, D. C.

In this work a falling cylinder viscometer was used and the measurements were carried out at temperatures between 20 and 70°C. The falling cylinder consisted of a closed steel tube containing a small permanent magnet. The rate of fall, which is the measure of the viscosity, was observed by means of the electric current induced by the permanent magnet when it passes electric wires wound on the outside of the tube at appropriate positions. The electrical leads were brought out from the bomb through special glass seals designed and constructed by I.C.I. Plastics Division. The induced currents were amplified and photographed simultaneously with a time scale. The precision of the measurement was about 0.5 percent and results obtained on benzene and on carbon tetrachloride when comparable with other investigations were in good agreement with those.

The data yield, by interpolation, a straight line relationship between $\log \eta$ and $1/T$ at constant volume. From this the activation energy of viscous flow at constant volume, E_V , can be calculated. As already foreseen by Andrade, E_V is a function of the volume. Available experimental data of this and other investigations lead to the general equation: $E_V = C (V-b)^{-2}$. In this equation C is a constant, V is the molecular volume and b is the van der Waals correction. At high pressures E_V will approach infinity asymptotically. This equation holds, however, to pressures up to 12,000 ats. and the authors conclude from this observation that molecular deformation effects are not significant up to these pressures.

These investigations are currently being extended to associated liquids and preliminary results indicate that while these are also amenable to treatment by this general formula, the values of E_V observed are very much larger here than in the case of simple liquids.

DISTURBANCES AND GENERAL CIRCULATION OF THE ATMOSPHERE

Professor E. Palmén of the University of Helsinki and the University of Chicago, gave the 1951 Symons Memorial Lecture of the Royal Meteorological Society. His subject was "The Role of Atmospheric Disturbances in the General Atmospheric Circulation".

A detailed analysis of the transport of angular momentum and mass across latitude circles has been carried out by Professor Palmén both for average weather situations and for specific storms in Europe and North America. As a result of this study it is now clear that there is a greater exchange of air between high and low latitudes than had previously been supposed. Professor Palmén concludes that about five percent of the earth's atmospheric mass crosses the 45° parallel every day.

Moreover, the motion is seldom quasi-horizontal during a cold air outbreak. The shallow cold domes, when injected into lower latitudes, subside rapidly and in doing so spread out and lose their identity. In a typical situation, a particle initially at 500 millibars near the southern edge of the polar front will descend to the surface, during the course of about three days, following a long, sweeping anticyclonic trajectory.

SOME EPIDEMIOLOGIC ASPECTS OF INFLUENZA EPIDEMIC IN ENGLAND, 1951

At a recent meeting of the epidemiology section of the Royal Society of Medicine, London, some epidemiologic aspects of the recent influenza epidemic were presented by physicians from the large towns in the United Kingdom.

Sickness Benefits

The chief health officer in the Ministry of National Insurance pointed out that his Ministry may in the future be able to assist in predicting roughly the "relative local geographic movements" of epidemic diseases by plotting the number and location of daily benefit claims presented to the 1,000 local offices scattered throughout England, Scotland and Wales. Illnesses in the two insurable groups, the employed and self-employed, may reflect to a limited degree the pattern appearing in a general population. Some 22,700,000 people are included in these two categories.

During the first eight weeks of the influenza epidemic, 2,561,000 applications were presented. During a normal winter season approximately 146,000 claims are presented each week. At the peak of the influenza epidemic, 440,000 benefit requests were filed during the week of 23 January 1951. Death claims followed one week or 10 days after sickness benefits were submitted.

Spread and Date of Occurrence

From previous statistics on influenza epidemics for the past 20 years and the extremely low mortality rates reported for 1948, no warning could be given of the present epidemic.

In the present outbreak, influenza appeared fully one month earlier than normally and the early rise gave indications that a full-blown epidemic could be expected. However, there did appear to be some indication of a pattern in the occurrence of specific strains of influenza virus involved in the various epidemics for the past several years.

By the middle of December, an increase in the number of sickness benefit claims was reported simultaneously from Newcastle and Aberdeen. Claims in the Liverpool area started about 27 December 1950. There was a faint resemblance of separate spreads from these areas down the east and west coasts of England and Scotland.

The puzzling feature was the fulminating course of influenza within the city of Liverpool. It seemed as though the entire city became involved in one complete sweep of the disease through the population.

Mortality Studies

It was emphasized that the current outbreak was average as far as deaths were concerned but the seriousness of the disease should not be underestimated. During two months of the epidemic, 50,000 people died of illnesses either directly or indirectly attributable to influenza. There were 1269 deaths in one week of the epidemic. Liverpool had the highest death rate for any one period exclusive of bombings and the cholera epidemic in the middle of the 19th century.

The older age groups throughout the United Kingdom were more affected. This is in marked contrast to the experience in the first and second waves of the 1917-1918 epidemic when young people readily succumbed to pneumonia in 24-48 hours. Women in the older age groups (over 75) were highly susceptible and it appeared that those confined to old homes died rapidly without any serious symptoms of influenza. Very young children under five were rarely affected.

Climatic Observations

The epidemic in the Liverpool area started during the coldest weather reported for 30 years. In London, by coincidence, the peak occurred during the time of lowest temperature, largest number of foggy days expressed in hours, and the highest rainfall.

Psychologic Effect

During the period of the epidemic, several physicians emphasized the general public fear of contracting the disease. The main topic of conversation

during the entire period was the daily trend and severity of the disease. It presented an impressive psychologic impact on a city which was totally unprepared from a mental as well as a medical service standpoint.

Clinical Patterns

The course of influenza seen in the United Kingdom was entirely unpredictable and the sinister aspect of the disease was its ability to mask some other chronic or intercurrent disease. The mild and moderate cases were not infrequently confused with other maladies.

IN SITU MEASUREMENT OF RADIUM RADIATION IN THE PELVIS

Doctor H. L. Kottmeier, head of the Gynecological Department of Radiumhemmet, Stockholm, is approaching the problem of determining the range of radiation by radium used in treatment of carcinoma of the cervix by taking intrapelvic measurements while the radium pack is in place. The standard Stockholm radium pack technic is followed. The pelvis is exposed through low lateral abdominal incisions for bilateral extraperitoneal iliac lymphodectomy. The nodes are examined microscopically for tumor tissue and, as would be expected, a wide variation in the incidence of involvement is encountered dependent upon the stage of disease and the histologic grade of malignancy.

Following extirpation of the nodes, measurements of radiation are taken by placing the ionometer chamber at multiple fixed points throughout the pelvis with, at first, the complete radium pack in place, then a second set of readings is taken following removal of the vaginal part of the pack. Thus, the radiation of both the vaginal and the intraluminal parts of the pack are determined. The operator wears no protective mechanism on his hands.

Thirty-five cases have been examined to date. As more cases will follow, the data are being compiled but have not yet been analyzed. However, Doctor Kottmeier is impressed by the uniformity of his measurements, and he is of the opinion that the accuracy obtained will result in findings more true and accurate than those obtained by phantoms and by interpolation, and, in addition, will provide a series of cases for evaluation of iliac lymphodectomy combined with radiation.

INTRADUODENAL TECHNIQUE FOR INVESTIGATION OF "FLAT"
GLUCOSE CURVE

Dr. J. M. French of the Department of Pharmacology, Medical School, Birmingham, England, has been using an intraduodenal technique to observe the "flat" glucose curve seen in patients with the sprue syndrome.

Glucose is introduced by tube into the second part of the duodenum at the rate of 0.5 g. per minute, and at the end of one hour the tube is withdrawn to the stomach which is aspirated for residual glucose. The tube is then withdrawn completely.

Blood samples are taken every five minutes and glucose is determined by the method of Hagedorn and Jensen. In sprue cases the glucose curve shows a marked delay in absorption for about 20 minutes, which is followed by a moderate rise to subnormal levels and then a delayed fall.

In the simultaneous administration of urea and glucose a similar pattern occurred indicating that the phenomenon cannot be attributed solely to a delay in gastric emptying.

Dr. French believes the delay in absorption of glucose seen in sprue cases might be accounted for by:

- (1) A defect in the enzyme system necessary for the absorption of glucose
- (2) A defect of a more mechanical nature such as diminished motility of the small intestine
- (3) Excessive secretion of mucus.

Further details may be found in Technical Report ONRL-24-51, obtainable from the Technical Information Division, Code 250, Office of Naval Research, Washington 25, D. C.

LAMINARIN AS A TALCUM SUBSTITUTE FOR SURGICAL POWDERS

Dr. George Blaine of the Royal Veterinary College, London, has demonstrated that laminarin, a reserve carbohydrate abundant in some species of sublittoral brown

algae, may be used as a satisfactory talcum substitute for surgical powders.

Laminarin is obtained from Laminaria cloustoni or L. digitata as an early extraction product from these species of seaweed. This carbohydrate appears to be a chain of approximately 20 beta d-glucopyranose units linked through positions 1 and 3. The powder withstands dry heat sterilization at 150°C for one hour, at which temperature it remains smooth and free flowing.

Soluble and insoluble varieties have been obtained. The soluble form was shown to be non-toxic when introduced into the abdomen or injected as a 10 percent solution into mice, guinea pigs or rabbits. There were no adhesions in the abdomen and no indication of liver damage or blockage of kidney tubules in animals autopsied for periods varying from three days to two months after initial inoculations.

Further details may be found in Technical Report ONRL-26-51, obtainable from the Technical Information Division, Code 250, Office of Naval Research, Washington 25, D. C.

FORTHCOMING BOOKS ON COSMIC RAYS

A volume entitled "Progress of Cosmic Ray Physics, 1951" will be published late this year by the North Holland Publishing Company, Oz Zoorburgwal 66-68, Amsterdam C. The editor is Dr. J. G. Wilson, University of Manchester.

Titles of invited articles and authors are given below:

- (1) The Analysis in Photographic Emulsions of Energetic Nuclear Encounters (Camerini, Lock and Perkins, University of Bristol)
- (2) The Rare Phenomena of Nuclear Encounters (Dr. C. C. Butler, University of Manchester)
- (3) Coupling Properties of Nucleons, Mesons and Leptons (M. Louis Michel, Institute of Theoretical Physics, Copenhagen)
- (4) Heavy Primary Particles of Cosmic Rays (Dr. B. Peters, University of Rochester)
- (5) Recent Data on the Geomagnetic Effects (Prof. H. V. Neher, California Institute of Technology)

- (6) The Equilibrium of the Cosmic Ray Beam in the Atmosphere (Dr. G. Puppi and Prof. A. Dallaporta, Universita di Padova, Italy)
- (7) Observations Underground and their Interpretation, (Dr. E. P. George, Birkbeck College, London)
- (8) Time Variations of Cosmic Ray Intensity (Dr. H. Elliot, University of Manchester)

A volume of about 120 cloud chamber pictures and textual descriptions illustrating various cosmic events will be published by Butterworth and Springer, London, sometime in 1952. The pictures are being selected by G. D. Rochester and J. G. Wilson, University of Manchester, who will also edit the text.

A companion volume on nuclear physics is being assembled under the editorship of Professor Bothe, Heidelberg.

ERGONOMICS RESEARCH SOCIETY

A symposium on Human Factors in Equipment Design is to be held at Birmingham University, Birmingham, England, between 18-21 April 1951.

The several sessions will include subjects on (1) practical anthropometry and problems of seating and posture, (2) visual and auditory displays, (3) muscular force and work, and (4) speed of performance.

Sir Frederic Bartlett, Professor of Experimental Psychology of the University of Cambridge, will give the concluding address.

Three representatives from the United States will present papers. Dr. Paul Fitts is representing the Psychophysiology Branch of the Office of Naval Research, Dr. Arnold Small, Head of the Human Factors Division, will represent the Bureau of Ships, and Dr. Lloyd Searle will represent the Naval Research Laboratory.

Abstracts of papers presented may be obtained, at a cost of 12 shillings, by writing the Secretary, Ergonomics Research Society, 219 Cromwell Road, London, S.W.5.

HEALTH CONGRESS, SOUTHPORT, ENGLAND

The Health Congress of the Royal Sanitary Institute is being held at Southport, England, from 23-27 April 1951.

Eight sections including (1) preventive medicine, (2) engineering and architecture, (3) maternal and child health, (4) veterinary hygiene, (5) food and nutrition, (6) housing and town planning, (7) tropical hygiene, and (8) hygiene in industry are to be held. Four conferences on (1) medical officers of health, (2) engineers and surveyors, (3) sanitary inspectors and (4) health visitors are included.

The president of the Royal Sanitary Institute is Major-General the Right Hon. The Earl of Athlone. Abstracts of papers presented will be available at a cost of five shillings per set. Copies of the presidential address will be available at a cost of one shilling. Application should be made to the Secretary, Royal Sanitary Institute, 90 Buckingham Palace Road, London, S.W.1.

1950 STALIN PRIZES

The Council of Ministers of the U.S.S.R. have awarded the Stalin Prizes for 1950 for outstanding works in science, invention, literature and art. Eighty-two prizes for science have been awarded, which include 11 First Prizes of 100,000-200,000 roubles each, 37 Second Prizes of 50,000-100,000 roubles each, and 34 Third Prizes of 25,000-50,000 roubles each. The Russian rouble is currently quoted at 25 cents.

Among the First and Second Prizes awarded were the following:

Leonid Brekhovskikh	for investigations in acoustics
Dmitri Skobeltsyn Nikolai Dobrotin Georgi Zatsepin	for discovery and study of electronic-nuclear showers and the nuclear-cascade process in cosmic rays
Alexander Vinogradov	for his scientific study "The Geo-Chemistry of Rare and Dis- persed Chemical Elements in the Soil"

Peter Sergeev Boris Kruzhlov	for studies in organic chemistry
Ivan Isakov	for the scientific work en- titled "Marine Atlas"
Lev Berg	for his study "Fishes in the Fresh Waters of the U.S.S.R. and Contiguous Countries"
Vadin Poretsky	for the study "Diatom Analysis"
Mikhail Usyevich	for investigations in the field of higher nervous activity
Boris Lazarev	for research into the magnetic properties of metal at low temperatures and an original method of enriching helium with light isotopes
Vasily Tarasov	who elaborated the new quantum theory of the heat capacity of higher solids
Israil Gelfand	for studies in the theory of groups
Dmitri Menshov	for investigations in the theory of trigonometrical series
Nikolai Smirnov	for a study of the properties of variational series and non-para- metric problems of mathematical statistics
Anatoly Doronitsyn	for research in aero-dynamics
Boris Arbuzov	for studies in the chemistry of terpenes and dienes
Vasily Korshak	for a monograph on "The Chemistry of High Molecular Compounds"
Dmitri Tischenko	for research into the chlorination of hydrocarbons
Arkady Yakubovich Sergei Makarov	for theoretical studies in organic chemistry

Artavazd Avakyan	for work on the theory of the development of vegetable organisms
Alexei Zakhvatkin	for the work on "Comparative Embryology of the Lowest Invertebrates"
Irina Pokrovskaya	for work on "Pollen Analysis"
Georgi Lang	for research summarized in the study "Hypertonin"
Herman Rubinstein	for "Differential Diagnosis of Pulmonary Ailments"
Irina Zarutskaya	for research on a gypsometrical map of the U.S.S.R.
Lev Zenkevich	for oceanological investigations.

PERSONAL NEWS ITEMS

Dr. F. C. Frank, Bristol University, is leaving April 19 for the General Electric Laboratories at Schenectady where he will stay for four months. His field is solid-state physics with particular reference to dislocation theory.

Dr. N. P. Allen, Superintendent of Metallurgy at the National Physical Laboratory, Teddington, will leave May 14 for a month's tour of American laboratories and universities. His trip is sponsored by the Bureau of Standards. He is interested in high temperature alloys.

Dr. J. O'M. Bockris of the Imperial College of Science and Technology is sailing on 24 March for the United States, where he will deliver the Richards Memorial Lecture of the Electrochemical Society on 9 April. His program includes other lectures and visits at Carnegie Institute of Technology, Massachusetts Institute of Technology, and Brooklyn Polytechnic Institute. He will be in the United States until 25 April.

Professor Göran Liljestrand of the Karolinska Institute, Stockholm, will deliver two lectures at the Universities in Oxford, Cambridge, Leeds, Birmingham, Liverpool and London in May. The subjects of his addresses will

be (1) Studies on the regulation of arterial blood pressures, and (2) Action of some drugs on respiration.

Professor M. Polanyi has left Manchester to assume his new duties as Professor in the Department of Social Sciences at the University of Chicago.

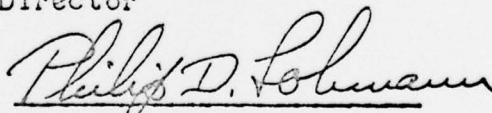
Dr. L. E. Sutton of the Physical Chemistry Department, Oxford University, has been invited to give a course of lectures at the Harvard University Summer School. He will leave for the States at the beginning of July and will attend the Fall Jubilee Meeting of the American Chemical Society.

FORTHCOMING EVENTS

The following meetings are considered to be of future interest to American scientists:

<u>Date</u>	<u>Meeting</u>	<u>Place</u>
28-30 June	International meeting on spectroscopy	Basel
9-13 July	70th Annual Mtg of Society of Chemical Industry	London
5-7 July	Summer Mtg of Physical Society	Belfast
16-21 July	Intl Conference on T.B. and Diseases of the Chest	Oxford
24-26 July	Summer mtg of the Royal Astronomical Society	Exeter

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