

MEDICO-SURGICAL SUGGESTIONS

Vol. 1

APRIL 1936

No. 4.

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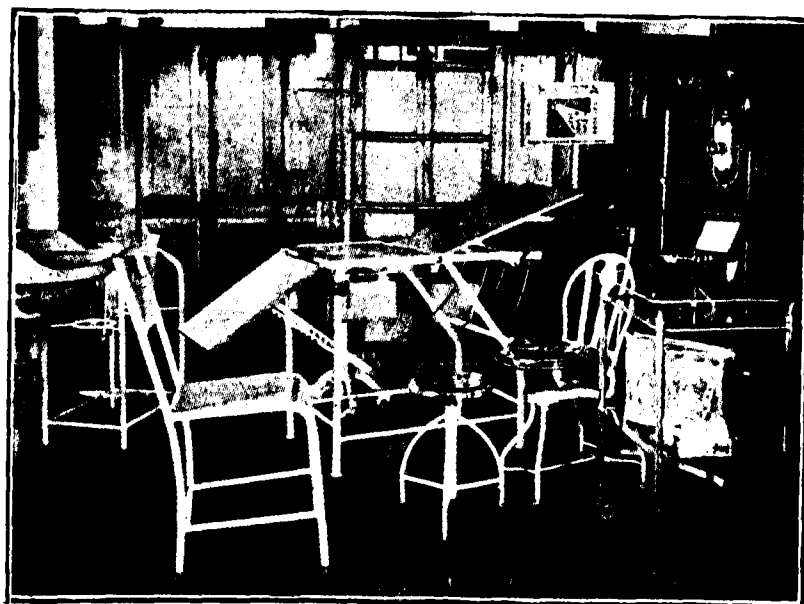
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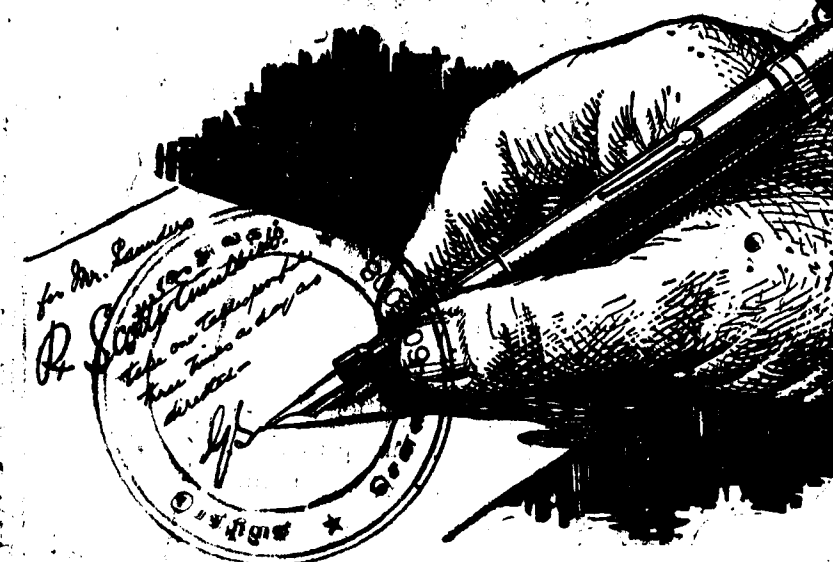
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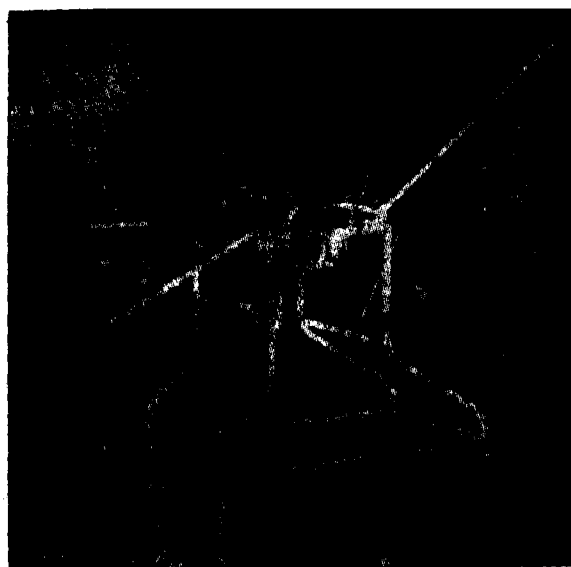
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MEDICO-SURGICAL SUGGESTIONS

A MONTHLY JOURNAL OF PRACTICAL MEDICINE & SURGERY

VOL. V

APRIL 1936

NO. 4

CONTENTS

LEADING ARTICLES	PAGE.
Affections of the Lungs and Pleura. (Contd.) By Dr. S. Sankara Raman, M.B., B.S. ...	97
The Role of Science in the recent progress of Medicine. By Sir U. N. Brahmachari, M.A., M.D., PH. D. ...	101
EXTRACTS ...	121
MEDICAL NEWS AND NOTES ...	125

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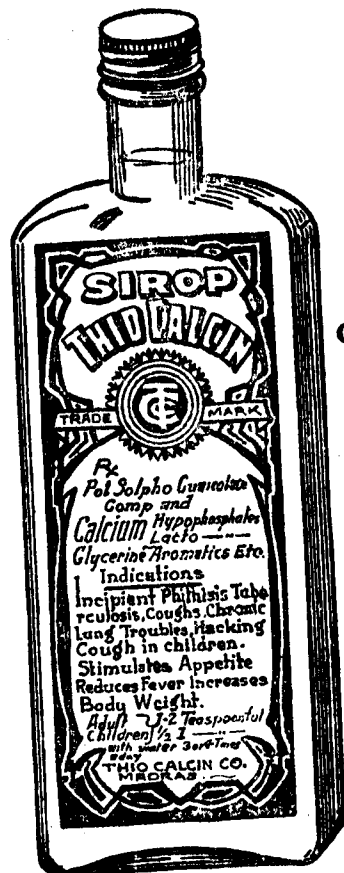
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Leading Articles

AFFECTIONS OF THE LUNGS AND PLEURA

BY DR. S. SANKARA RAMAN, M.B., B.S.

Cuddalore.

(Continued from the March issue.)

PULMONARY TUBERCULOSIS.

It was generally held that infection occurs during early life and that pulmonary tuberculosis in the adult shows the characteristics of localisation and chronicity, because it occurs in a person previously immunised by a mild infection in early years. Recent researches have established that in childhood, only a small number are infected and the percentage increases slowly till 18 years, and then rises rapidly during the working age. Agnes R. MacGregor's statistics show that tuberculous quiescent lesions are non-existent under one year, very rare under 2 years; and calcified foci are rare under 3 years.

The Tuberculin tests: Pirquet Test. A drop of pure tuberculin is placed on the skin of the upper part of the arm and a scarification 1 cm. in length is then made on the skin about 5 cm. above the tuberculin and then through the drop of tuberculin. Reaction manifests itself as redness and swelling at the sides of the lower scarification, the upper serving as a control. At least 1 mm. of erythema on each side of the scarified area must be present.

Moro Test. Tuberculin ointment consisting of 2 parts of tuberculin and 1 part of lanolin freshly prepared is used. Four squares of area 4 sq. cm. are mapped out over the middle of the chest, and separated from each other by 2 cm. The upper two squares are rubbed with a swab dipped in ether 12 times. The lower two squares are then rubbed with a bead of the ointment for 30 seconds. A positive reaction is manifested by the development of definite macules, papules or vesicles.

Mantoux Test. Dilutions of tuberculin with sterile distilled water and 0.5 per cent phenol are freshly prepared in the dilutions of 1:10, 1:100, 1:1000. Intradermic injections of 0.1 cc. are made 1:1000 on the right, 1:100 on the left forearm, 1:10 lower down on the right forearm and the control (Glycerine-Veal broth) on the lower part of the left arm. A positive reaction for any of the intra-dermal tests is evidenced by an erythema of 10 mm. diameter. Doctors Gregory Kayne and Weill Halle after careful investigations of 166 infants from 1 to 16 years found out that the Moro test is the least sensitive, the Pirquet and the Mantoux 1:1000 about equally sensitive and Mantoux, 1:100 and 1:10 increasingly more sensitive than the last two, percentages being Moro 42, Pirquet 48, Mantoux 50, 55 and 61 respectively. Von Pirquet's test is defective because

- (1) negative reaction is obtained when the tuberculin is not fresh
- (2) injection being made subcutaneously instead of intra-dermally;
- (3) the tuberculin being not left exposed to the air for at least a few minutes after the sacrifice.
- (4) The patient may have bovine infection and not human tuberculosis;
- (5) patient may be too feeble to react.

Positive reaction at the most means that the patient has at some time or other been infected with tuberculosis. For the individual with vague symptoms the Mantoux test, in common with all tuberculin tests, may be a good servant but a dangerous master.

The problem of prevention of tuberculosis in childhood is gaining the attention of all civilised countries. A study of the different papers read before the 21st annual conference of the National Association for the Prevention of Tuberculosis held at Southport last year only serve to emphasize the wide differences of opinion that exist in regard to this problem. It is clear that tuberculosis in children is due to ingestion of the bovine bacillus in milk or to ingestion or inhalation of the human bacillus as a result of contact with cases of pulmonary tuberculosis. The thorough inspection of cattle and a protected milk supply are aims that have been successfully worked out in America and to a certain extent in Denmark. No single method of prevention will solve the problem to-day.

Among the measures adopted are

1. isolation of the adult patient.
2. immunisation by B. C. G.
3. ideal environments as village settlement etc.
4. separation of child from home.

Though all four methods are useful in combating the spread of infection the choice of one or more must depend not only on the economic and general public health development of the country but also on the home conditions of each family. The discovery and isolation of the adult consumptive cannot be effectively carried out; village

settlements and open air schools though functioning effectively, cannot hope to solve the problem for a large proportion of tuberculous families; removal of a child from home can only be applied so as not to interfere with the family ties; but immunisation with B. C. G. protects to a considerable extent and will in future be the method of choice. A judicious use of isolation, immunisation, separation and environment suited to the needs of the individual child should result in a diminution of the tragic loss of life and the crippling caused by tuberculosis in childhood in the absence of compulsory B. C. G. vaccination.

Why is B. C. G. strongly advocated on the Continent and not in England? Doctor E. Rist of Paris, Dr. Wall-Guerin in Sweden, Heimbeck in Scandinavia and clinics in Tokio are all eulogising the virtues of B. C. G. The oral administration is irregular in its results but subcutaneous inoculation is very effective but produces a small ulcer and sometimes a fistula. The intradermal method never produces anything beyond a small ulcer. Incubation period is one month, for which time the child must be isolated from contacts.

B. C. G.—What it is. Professor Calmette has produced B. C. G. (bacillus Calmette-Guerin) after repeatedly growing the tubercular bacilli on bile-potato medium, 230 times. They lose their virulence but retain their immunising power. B. C. G. produces tuberculin hypersensitivity as well as immunity. In England, doctors believe that while the vaccinated child benefits by the prevention of the generalised form, the so-protected adult might develop the infection when in contact with a virulent infection because of his hypersensitivity.

Epituberculosis is the condition in children which shows the physical signs and radiological evidence of massive involvement of the lung affecting the whole or part of a lobe, usually apical. It is not of a serious nature, there is no fever, cough is not persistent, sputum is scanty and contains no bacilli. Resolution takes many months but is complete. It was regarded before as an inflammation of the lung, as a case of sub-acute bronchopneumonia or even as an unresolved pneumonia.

Though pathologically tuberculosis is classified as (1) acute miliary, (2) acute caseous or pneumonic, (3) fibrocaseous or broncho-pneumonic, and (4) fibroid tuberculosis, clinically, *Inman's classification* is followed.

Inman classifies as follows:—

- (1) patient febrile when resting;
- (2) patient is resting afebrile, but ambulant febrile;
- (3) patient is ambulant afebrile;
- (4) patient is working afebrile;

Turban Gerhardt's classification is an anatomical classification based on the extent of lung involved.

(1) early cases : physical signs : if unilateral, extend from apex to second rib, and if bilateral are limited to the supra-clavicular and supra-spinous regions.

(2) The signs if unilateral, do not reach lower than the fourth rib, and if bilateral, do not reach lower than the 2nd rib.

(3) . extensive lesions or localised lesions in which excavation is present.

Sir Robert Philip's Classification.

L1. Early cases, where physical signs are supra-spinous and supra-clavicular.

L1. s. where systemic disturbance is slight.

L1. S. where systemic disturbance is marked.

l1. S. where systemic disturbance is excessive in relation to lung involvement.

L2. lesions limited above 4th rib.

L2. s. where systemic disturbance is slight.

L2. S. where systemic disturbance is marked.

l2. S. where systemic disturbance is excessive in relation to lung involvement.

L3. extensive lesions.

L3. s. where systemic disturbance is slight.

L3. S. where systemic disturbance is marked.

l3. S. where systemic disturbance is excessive in relation to lung involvement.

These classifications help to give a correct prognosis. The activity of the disease rather than its extent is the important factor in determining the prognosis.

(To be Continued)

THE ROLE OF SCIENCE IN THE RECENT PROGRESS OF MEDICINE

BY SIR U. N. BRAHMACHARI, M.A., M.D., Ph. D.,

Calcutta.

Presidential Address delivered at the 23rd Indian Science Congress, Indore, on January 2, 1936.

(Continued from the March issue.)

PHYSICS.

I now pass on to the contribution of physics to medical science. Its application is partly for the purpose of diagnosis of diseases and partly for their treatment. Further, physics is slowly evolving new conception of living matter by X-ray analysis, by improved methods of microscopy and by the advancing knowledge of the constitution of matter.

It is not my intention to give here an account of the various apparatus that physics has made available for the diagnosis and treatment of disease as such an attempt will be merely cataloguing. I shall only refer here to some of them that have been of striking value in medicine or that may prove useful in the study of the structure of organic matter.

The Electro-cardiograph. The Electro-cardiograph is a valuable apparatus for studying certain diseases of the heart. A portable apparatus, which can be taken to the patient's house and which is constructed on the principle of the string galvanometer, is now available. Another portable Electro-cardiograph based on the principle of the valve-amplifier is also available. By means of a special Electro-cardiograph outfit, simultaneous records of a heart may be obtained in the wards of a hospital for purposes of research showing (1) heart sounds, (2) electro cardiogram, and (3) carotid pulse by means of Hill's wire sphygmograph. An apparatus consisting of a Stethograph combined with an Electro-cardiograph is now available. The combined Electro cardiograph Stethograph may prove a valuable aid in cardiology.

The Electro-cardiograph has shown that tracings taken of patients dying of various maladies can demonstrate that for some time after clinical death, some cardiac activity could be registered, the duration varying from six to twenty minutes. These observations show that in cases in which there is cardiac stand-still during anaesthesia or in the new born, resuscitation may be effected by timely cardiac injection or needle puncture. There may be other conditions that may be discovered in future in which the same may be possible.

It may just be mentioned here that a convenient new method of assay of vitamin B₁, based on Electrocardiographic measurements, has been recently described.

An Electro-encephalograph of the future. One of the most recent advances in biophysics is the discovery of some electrical phenomena in the human brain, which were originally studied by Berger and subsequently by Adrian and Matthews, the latter observers using the Matthews' Oscillograph constructed on the principle of a valve amplifier. The electrical changes consist of a rhythmic oscillation of potential with a frequency of about 10 per second appearing when the person experimented upon lies quietly with eyes closed and disappearing when his attention is fully occupied. Non-visual activities which demand the entire attention, e. g., mental arithmetic, as well as sensory stimuli demanding the same, abolish the waves.

Berger considers that this 'Berger rhythm' represents the normal activity of every part of the cortex of the brain, while the experiments of Adrian and Matthews point to the conclusion that they arise from the activity of cortical cells in some parts of the optical lobe connected with vision.

I consider that future researches in this line may be as important in studying, as pointed out by Hopkins, the functions of the brain as the electrical changes in the heart are in studying cardiac diseases. An Electro-encephalograph may then be a valuable apparatus in medicine and may be useful for the study of the diseases of the central nervous system or of the mind, such as, anxiety neurosis or psychosis as the Electro-cardiograph has been in studying the diseases of the heart. Further work in this direction in the hands of Adrian and his co-workers is awaited with keen interest.

Ultra-violet ultra-microscopy. One of the latest developments in microscopy is the use of ultra-violet light with dark ground illumination.

Barnard's technique and apparatus have made photography with ultra-violet light as certain and reliable as ordinary photomicrography. His microscope has already revealed the structure of some of the viruses and inclusion bodies. We are beginning to learn that there is no clear line of demarcation between the ultra-microscopic viruses and the visible bacteria. I hope that further advances in ultra-microscopy with shorter waves, aided with improved methods of fine adjustment and electrical equipment for producing the spark source, will in future reveal the nature of the bacteriophage, and that of the smaller viruses which is not possible at the present day without the aid of biological tests. Differential centrifugalization, graded ultra-filtration, the recently developed methods of electron diffraction and micro-dissection may be helpful in this direction.

Thanks to the recent advances in the Ultra-microscope the nature of the filtrable viruses as a biological problem has assumed a new aspect in recent days. The view that viruses are small micro-organisms similar to ordinary bacteria is being daily confirmed. There is reason to believe that the size of the smallest virus which

behaves like living organisms approaches that of the largest organic molecule. Until recently little evidence was available to suggest the existence of what may be termed saprophytic viruses except that of Rivers and Tillett who demonstrated in 1923 the presence in the testicles of rabbits of a virus that is not normally pathogenic. Barnard has however demonstrated by means of refined examination of the deposits, which some times occur in medium containing horse or rabbit serum, the presence of minute bodies, which in size, shape as well as general optical properties are in no way different from undoubted pathogenic viruses. These bodies increase in number and are seen to be in process of fission. They have been cultivated to the forth sub-culture. This demonstrates the existence of viruses which are saprophytic in habit, and tends more and more to lend support to the theory that viruses are living organisms. The recent announcement made by Stanley of the Rockefeller Institute, however, complicates our conception of viruses. He has reported the separation, from the juice of Turkish tobacco plants infected with the mosaic disease, of a crystalline protein that has the properties similar to tobacco-mosaic virus. It is too early to speculate on the eventual significance of this fundamental contribution, with regard to its relation to virus diseases in animals or to other virus infections of plants.

There is experimental evidence in recent times that the causal agent of acute rheumatism is probably a virus.

It is not my intention to continue further remarks on ultra-violet ultra-microscopy but I can foresee that aided by X-ray analysis it will reveal in future more and more new facts about the viruses and the bacteriophage than what is known in the present day and that the doubt very recently expressed by some observers whether the viruses will ever be seen will cease. The association of viruses with the specific micro organisms in bacterial diseases may in future be found to be more common than is imagined at the present day.

Infra-red photography. Photomicrography with infra-red light makes it possible to investigate, with transmitted light, many objects which are black or very dark brown in colour, and which consequently absorb very strongly both white light and for the most part also ultra-violet light. The infra-red rays enable one to photograph the veins of the skin or the diseased condition of its deeper layers or of the iris under an opaque cornea.

The Micropolychromar—Optical staining of colourless objects. In studying under the microscope colourless objects, medical, zoological or botanical, we meet with difficulties, because as a rule they exhibit little optical contrast and are barely visible. The usual procedure of chemically staining such objects is tedious and kills them unless they are stained with vital stains. The Micropolychromar opens up a new avenue for scientific investigation of such colourless objects. It provides a means of 'staining' them not

chemically but optically. This optical staining has the effect of showing up the object brightly illuminated in one colour on a differently coloured background. The objects are not merely differentiated from the background by virtue of their relative brightness but even when the background is as bright as the object, the object and background appear in contrasting colours. By means of this optical contrast staining, the fine structures are revealed with remarkable distinctness, the apparatus combining in one image the advantages of both dark field and bright field illuminations. The value of such an apparatus in studying the structures of living cells and tissues, particularly chromosome structure, may be great.

Ultropak. One of the recent advances in microscopy is due, to a great extent, to changes which have taken place in methods of producing the appropriate type of illumination. Of special importance is the arrangement for polarized light recently evolved for the Ultropak. This arrangement eliminates completely the glare and haze which arises from direct reflection, so that the inner structure of the object may be observed in every detail and with a remarkable degree of distinctness, the image of the object being formed only from diffused depolarized light reflected from its structure. It is a useful aid for the up-to-date worker engaged in microscopical research in general biology, zoology, parasitology and in experimental medicine, in which the observation of living organisms under high microscopic magnification is involved.

X-ray crystal analysis. Its aid to Organic and Biochemistry. But evidently the microscope has its limitations. Sir William Bragg's application of X-rays has led to the discovery of the proper structure of matter which is beyond the limits of the microscope. Until quite recently, the majority of the tissues, such as the hair and skin were believed to be non-crystalline, but recent investigations by means of X-rays and crystal physics have shown this belief to be incorrect and it has even been held that entirely non-crystalline materials are very difficult if not impossible to find. Minute regularities which are beyond the range of the microscope can now be detected by means of the X-rays.

Speaking of the crystal structures of the solid state, as revealed by X-rays, Sir William Bragg has stated that all the investigations of the solid bodies of every form aim at finding out the connection between their properties on the one hand and composition and architecture on the other. While some of these properties are directly dependent on the atoms of the unit cell in the crystal, there are others which depend on atomic relations which are not fully developed within the cell. The action of the atomic forces in groups of hundreds or thousands or tens of thousands of atoms must be considered before we can understand these other properties of the solid state. It is within a region of dimensions covering groups

like these and somewhere in the scale of sizes there perhaps enters, as Sir William Bragg says, the breath of life to control these atomic compositions which enter into living organism. It has been stated that 'in structure produced by organisms, forces are active in their formation which are not present in solutions when ordinary crystals are deposited. The presence of these additional forces in living protoplasm prevents a clean-cut regularity in arrangement of the molecules, that is, it introduces irregular arrangement of the molecules or a degree of amorphousness. If this is the case, then the determination of the space group for a given organised substance will have little value' (Sponsler). But it is possible that further improvements in X-ray analysis may prove one day useful in considering the activities which occur in the protoplasmic matrix of organisms, and of structures which are produced through vital process. They may enable us to look into the mysterious protein molecule without destroying it and to discover whether diminution of the above-mentioned forces in any tissue in disease or their cessation in death may be accompanied by a change of the amorphousness of the aggregates of the molecules to some more or less characteristic crystallite or crystalline state.

X-ray methods of analysis may be applied one day in the study of the cancer cell and it is hoped that its application may increase our knowledge of cell construction and cell growth, which helped by our future knowledge of the colloidal state in living cells may one day strengthen our powers in combating the dreadful scourge of malignant disease. The changes that take place in the tissues in cancer and other pathogenic conditions have been studied by this method by Clark and co-workers.

The animal fibres are built of stringy protein molecules, which are made of strings of groups of atoms. The length of these groups which are marked by joints at regular distances is always the same but their breadth varies and therefore a protein chain is more irregular than a cellulose chain. The protein chains can be made up in many different ways. The difference between species of animals may be due to changes in the order of the groups in protein chains contained in their body. If due to an accident or disease, the order of the groups in a protein chain in the dividing chromosomes of a fertilized ovum was upset, the basic pattern for part of the tissues of the embryo would be changed, and as the tissues would subsequently grow according to the new pattern, the final structure would have a new pattern and different properties. The shuffling of the order of the unit groups of protein chains may be a fundamental agency in the process of evolution, normal or abnormal. It is difficult to determine the order of the unit groups in a protein chain by the methods of organic chemistry. But X-ray analysis may make the problem easier in future. A comparative study of the orders of these groups

in the proteins of animals is now becoming possible and may one day enable one to investigate the internal structure of the organs more minutely than is possible at the present day. There is no doubt that X-ray analysis has opened up a new way for the study of living matter.

Electron diffraction gives information similar to that given by X-rays but with the important difference that a much smaller thickness of material is effective in producing the diffraction pattern. Layers with a thickness of about 10^{-6} cm. containing ten molecular layers or thereabouts have been used and the effective thickness can be made smaller still by using slow-speed electrons. Another modern branch of physics is being developed which may be of practical application in crystal physics, namely the technique of molecular rays. These have up to the present been used chiefly for studying the parts of atoms or molecules of substances which can be obtained in the vaporised state, such as the metals, the common gases, a few inorganic salts, and some organic liquids. Such a technique or that of electron diffraction may one day find application in medical as well as in textile research. The processes of absorption of drugs and dyes in the treatment of disease as also of antibodies as well as many other facts in immunity might in future be studied by these techniques.

Spectrograph. In recent years a new field has been opened up by the Spectrograph in the domain of chemical analysis, both qualitative and quantitative. It has now become possible to apply spectrum analysis to biological problems, among which are to be counted all the questions arising in theoretical and practical medicine regarding the metabolism of the heavy metals and its significance for the organism, whether healthy or diseased, or the treatment of disease by the administration of heavy metals (Gerlach and Gerlach.)

Until recently the only metallic elements considered as playing an important part in animal and vegetable life were sodium, calcium, phosphorus and iron and, to a less degree, potassium and magnesium and to these may be added silicon. The powerful influence sometimes exerted on life by very small quantities of elements, such as copper, arsenic, mercury, iodine and boron, etc., as revealed by recent knowledge has led to an increasing need for improved rapid and accurate methods of analysis for detecting and estimating minute quantities of elements. Results obtained by the flame method of spectrographic analysis are applicable for this purpose.

As an example of the application of the Spectrograph to medicine 0.1 c.c. of blood may be taken from a patient suffering from severe anæmia every 10 or 12 days to study the effect of treatment. The blood is rolled up in small pieces of ashless filter paper and spectrographed on a plate and thereby changes in the various constituents of the blood, such as potassium, rubidium, magnesium, calcium, iron and copper may be readily followed.

It has been shown by this method that human hair and finger nails contain minute quantities of copper and silver, varying in quantities with the age of the people. By its means the routine determination of the vitamins may be studied. The study of absorption spectrum bands given by the different vitamins has helped in the work for the determination of the chemical nature, the concentration and assay of vitamins. Similar methods of hæmoglobinometry are now available. Spectrum analysis has become of great importance in pathological as well as forensic medicine for detecting traces of metals in human organs. It has been recently employed for studying the nature and the constitution of the amino-acids of the protein molecule as well as for their quantitative analysis.

Ultracentrifuge. Studies on the size and structure of the molecules of proteins, as well as upon the molecular weights of certain enzymes, carried out with the aid of Svedberg's ultracentrifuge, constitute a new and promising application of physics to medical research and valuable work has been done with it in connection with blood pigments and serum proteins. It may be helpful in the study of immunology and the physical chemistry of blood.

Ophthalmo-eikonometer. The Ophthalmo-eikonometer has been developed for measuring the size and shape of ocular images and has opened up a new field in ophthalmology, psychology, and neurology. It consists of the study of image size variation in binocular vision.

A technique has been developed, 'by means of which the brains of mammals can be stimulated at accurately defined points and a correlation established between the locus of stimulus and physiological function'. Interesting possibilities lie in the determination of the influence of certain parts of the brain over some of the organs of internal secretion and over the functions of the gastro-intestinal tract, the kidneys, etc.

A method has been recently evolved which permits observation of the form and behaviour of living cells providing a valuable means for studying nervous control of the circulation and the nature of nerve destruction and regeneration.

Micro-manipulator and Micro-dissection. Operative work on the living cells has long been the aim of investigators in cytology and in experimental embryology. By micro-dissection and injection the physical structure of protoplasm has been determined by Chambers and others. Until recently the results obtained by the micro-dissection method related to the viscosity, the differentiation of cortex and interior, the nature of the surface film, the nature of chromatic and achromatic structures in dividing nuclei, internal and surface changes influencing cell division, protoplasmic changes accompanying fertilization, and the effect on protoplasm of the injection of certain substances.

One of the most important applications of micro-injection methods for the study of cell-physiology is the role of electrolytes in the maintenance of protoplasmic structure and function. K and Na are far more toxic when applied externally than when injected, the order of toxicity for the immersion experiments being K, Na, Ca, Mg. CaCl_2 is considered to have the most marked toxic effect on the internal protoplasm. MgCl_2 is considerably more toxic to it than either KCl or NaCl. From the above and similar experiments, it is presumed that the maintenance of the colloidal state of living protoplasm depends upon the presence of definitely proportional amounts of different electrolytes. The relative amount of different types of salt present must be in such proportions that the solidifying action of the one is balanced by the dispersive action of the other. K is said to be a labiliser while Ca is a stabiliser. Ca is essential for the formation and maintenance of the protoplasmic membrane.

The determination of the hydrogen-ion concentration of protoplasm has been considerably developed in recent years by micrurgical technique. Both colorimetric and potentiometric methods are possible for the determination of the pH of protoplasm by the use of micro electrodes. By means of this technique it is found that the living protoplasm of widely different types of cells has, under normal conditions, a remarkably constant pH value. The technique has also rendered possible the study of the oxidation-reduction potential of protoplasm.

The recent investigations in micro-dissection of human polymorphonuclear neutrophiles show no marked divergence from Chamber's excellent description of the physical structure of cells in general. It would seem, however, that the cell membrane, in this case, is more rarely a naked surface film than he ascribes to most cells. The cytoplasm is more liquid than that of the monocyte and clasmatoocyte.

Observations by micro-injection method on plant nuclei show evidence of an elementary structure together with a fluid sap in the resting nucleus and supports the view that, in plant cells at least, a persistent frame-work exists which might account for the genetic continuity of the chromosomes.

Radiology. X-ray diagnosis has improved in the present day to an almost spectacular extent; and radiation therapy has now established its claim to an important place in the treatment of malignant disease.

One of the recent advances in diagnostic radiology is undoubtedly the introduction of cholecystography by Graham and Cole. The radiologist can now visualize the biliary tract and the gall-bladder by means of tetraiodophenolphthalein; by the injection of air he can outline organs in the abdominal cavity and the sinuses of the brain. By the use of organic compounds of iodine he can make visible the lungs, the air passages, the interior of the uterus,

the spinal canal, the pelvis of the kidney and the urinary tract, and, by the use of a radio-active substance called thorotrast, the tissue of the reticulo-endothelial system including the spleen and the liver. Cerebral angiograms may also be taken by means of this substance for the purpose of localizing brain tumours. Modern fluorescent screen enables digestive movements, heart beats or lung movements to be watched or cinematographed. Placenta prævia has also been brought within the possibilities of radiological diagnosis.

Perthes has found that the intensity of radiation falling upon a surface perpendicularly is inversely proportional to the square of the distance of the surface from the focal point of the target of the tube. The cumulative effects of Roentgen rays were also studied by him, as also the fact that harder X-rays produce a longer *latent period*. He observed that X-rays as ordinarily used are composed of mixed rays and filters were first introduced by him to cut off softer rays.

By the standardization of physical and biological doses and the proper intervention of filters the dangers of radiation therapy have been greatly reduced in recent times. To-day with the improved technique and modern equipment we can safely work with rays of much higher intensity than before without the slightest danger to man, mind and machine.

X-ray and radium therapy is bidding fair to displace the knife in the treatment of certain forms of cancer. The response of tumours to radiation demands wide study, each type of tumour having a different response, both clinically and histologically. By contrasting the sensitivity of growths with that of skin—in both cases using the minimum lethal dose as the standard—it has been possible to place tumours in different groups—radio-sensitive tumours, epitheliomata, adenocarcinomata and radio-resistant tumours.

Views on radiation treatment have changed to-day and the single massive dose of X-radiation, advocated in former days, is now replaced by a series of smaller doses spread over a period of time. The real problem of malignant disease lies in the treatment of glandular metastases. For deeper lesions and gland areas we turn either to (a) X-rays which, excited by very high and ever-increasing voltages, tend to approach gamma-rays in quality, or (b) large quantities of radium placed at distances remote from the skin with the object of obtaining the large depth doses possible with X-rays.

The growing belief in the efficacy of 'teleradium' is indicated by the rapidly increasing number of large radium units being set up in the world. It is to be hoped that with advances in the technique of teleradium and deep X-rays, better results may be obtained in future in the treatment of cancer.

With improvement in apparatus and technique it has now been possible to distinguish radiologically the softer tissues of the body from each other and the extent of invasion of new growths in them.

Though the explanation of chemical, physiological and morphological changes in normal and pathological tissues on irradiation is very scanty in the present state of our knowledge, yet there is a promising beginning as will be seen in recent developments on the subject, especially in great laboratories in America, such as, the Mayo Clinic, Rockefeller Institute and the foremost medical schools. Special radiosensitiveness of cells has received emphasis in the hands of Desjardins and others.

I may just say a word about the application of X-rays to genetics. The origin of the new genes by mutation has been shown to be speeded up at least two hundred times by X-rays.

Radium and artificial radio-activity. Lawrence of the University of California has succeeded in producing a radio-active form of sodium from common salt, having remarkable properties. This will enable sodium to be introduced safely into the animal system, and is likely to be of great value in medicine. He has announced that it would soon be possible to produce cheap radium for commercial purpose and it has been claimed that the discovery of artificial radio-activity in elements, otherwise inactive, will be of greater importance in medicine than the discovery of natural radio-activity. Proto-actinium may have valuable therapeutic properties. The new artificially produced radio-active elements may before long replace the costly radium for therapeutic purposes and for the study of many biological processes.

Light therapy and Electrotherapy. I have already mentioned the uses of the ultra-violet and infra-red rays photography as an aid to medicine. They have also had therapeutic applications in modern times. It is generally considered by many authoritative observers that ultra-violet and infra-red rays modify each other's effects on the living organism, according to their several proportions in combined relations.

Short-wave and ultra-short wave therapy is one of the latest branches of physical therapy. It is not my intention to give an account of the various branches of electro-magnetic wave therapy. I shall only very briefly refer to short-wave and ultra-short wave therapy.

The better results claimed for the very powerful short-wave instruments may be partly explained by the greater capacity effect obtained in the tissue as the wave-length decreases.

It has been inferred that the more delicate the structure, either of cells or micro-organisms, the greater would be the disruptive action of short and ultra-short electromagnetic vibrations.

Though some observers hold that there is very slight or even total absence of appreciation of heat during the administration of a short-wave treatment which may be followed by most satisfactory results, yet many attribute the whole action of ultra-short waves to the heat action. They state that experiments which have been

carried out *in vivo* and *in vitro* show that they have no specific action on bacteria or tissue-cells and they have observed that bacteria soaked on to a piece of gauze, placed under the skin of animals and exposed to ultra-short waves, are undamaged with lethal doses of ultra-short waves, and there is no change in fragility, sedimentation rate, and bactericidal power of the blood following exposure *in vitro*. They conclude that the action of ultra-short waves appears to be coagulative necrosis and extreme vaso dilatation, which is similar to the action of diathermy high-frequency currents of about 300 metres.

Whatever may be the exact mechanism by which short-waves or ultra-short waves show their therapeutic effects, there is no doubt that the advent of short-wave therapy opens up a field of treatment of great possibilities hitherto totally unexplored. It has been held by some that the outstanding difference between long-wave diathermy and short-wave therapy is the peculiar effectiveness of the ultra short wave in infections and in conditions of suppuration, where diathermy is definitely dangerous, that this quality belongs only to the ultra-short waves of from 6 to 3 metres and that between 15 and 30 metres there is only heat effect.

I shall not detain you by discussing the principles of diathermy or the various forms of light therapy as they are beyond the limits of my thesis. It may be said in brief that the rays of different wave lengths and frequencies have come into modern practice for the treatment of many diseases with excellent results.

I hope that advances in photo-dynamic sensitization may in future lead to the discovery of therapeutic substances which will be activated by the short infra-red, luminous, red, and orange rays and act as sensitizers in the presence of blood-serum.

When we survey the immense development in the use of light waves, visible, ultra-violet, X-rays, and others in the investigation of structures and the treatment of disease, with their future potentialities, it may be said without conceit truly we are beginning to see through a glass less darkly.

Bragg-Paul pulsator. Artificial respiration. Among the many useful apparatus which physics has placed at the disposal of medicine in recent times for therapeutic purposes, I would like to mention here, as an example, one devised for prolonged artificial respiration. There has been of late an increased scientific interest in artificial respiration methods. The one mentioned here has been designed by Bragg and Paul and is known as Bragg Paul Pulsator. It shows the triumph of an artificial apparatus in maintaining one of the most vital functions of the body, i.e., respiration, which it is unable to perform due to a physical disability. There are some conditions, arising both from accident and disease, in which long-continued and regular artificial respiration is required. Bragg-Paul Pulsator consists of a pulsator which rhythmically inflates an air-bag encircling

the bony thorax of the patient below the armpits to a definite air pressure as indicated by a manometer. Although the lengthy need of an artificial respiration apparatus is rare, still it must prove very satisfactory in cases where its use is indicated. In one case a patient had artificial respiration on this principle for over two years with satisfactory results.

GEOLOGY.

The geologist has discovered numerous spas and springs which refresh and renovate the human system today. In schemes of drainage and irrigation, and of water-supply in general, that are bound up fundamentally with the health of mankind, the public health departments of civilized countries all the world over, look forward to the aid of the geologist. It is perhaps known to you that in one section of a town in an English country, the effects of calcium deficiency among most of the children was traced by the geologist to the poor-in-calcium drinking water of the clay zone area of the town. In the investigation of silicosis, a disease prevalent chiefly among miners, we find the physician working hand in hand with the geologist who has been charged with the identification of the minute particles of mineral matter that find their way into the lungs of the miner. The application of the geologist's methods has led to the detection of china clay and talc in adulterated food-products. In the investigations of the dust problems in big cities, the aid of the geologist is indicated. Endemic goitre has been traced to iodine deficiency in drinking water. Excess of iron may give rise to an endemic disease, the 'so-called mottled enamel' in man and some animals in certain places, such as Algiers, Tunis and others.

PSYCHOLOGY.

Mental disease, before the advent of psychology in medicine, was a *terra incognita*. Recent researches in psychology have thrown a flood of light on the domain of psychiatry. The significance of a mental approach to the problems of psychology had long been misunderstood, but today not only we have a better understanding of mental diseases by means of the psychological method but also we get extremely encouraging results in the treatment of such disorders and psycho-therapeutics has found a place in the armamentarium of the medical men.

I do not know whether one would agree that the services of Freud to knowledge have been as great as those of Darwin, and whether Freud's extension of the idea of sex will stand the test of time, but there is no doubt that one of the greatest contributions to medical psychology in recent times is the concept of the dynamic unconscious. To trace the genesis of mental disorders one has to dive deep into unconscious region of the mind. That the mind has an unconscious component was not at first accepted by physicians trained in the orthodox school. Awareness is not an essential

characteristic of mental process. Significant changes may go on in the mind without our being conscious of them. It is in this unconscious region that the roots of mental disorder lie.

It has been recognised that the explanation of many fully conscious occurrences—which had previously been left unexplained as simply coming 'out of the blue'—might be found in this dimmer region. It was from this region of the mind Lady Macbeth uttered 'Here is the smell of the blood still; all the perfumes of Arabia will not sweeten this little hand'.

Attention has now been concentrated upon what might be described as the border region between the psychical and the physical. In fact, some of the psychologists—the behaviourists—might be said to have gone over the border-line altogether and merged the psychical in the physical, but those medical men who have come back again to their own special domain *via* psychology of this kind, have been disposed to view the physical from the psychological point of view. Today a firm alliance has been concluded between medicine and psychology, and medical men have more and more fully recognised the necessity of studying the mental history of their patients. Much work has been done in the study of the unconscious in many institutions, notably, the Nancy School. The aftermath of the great war was seen in many cases of nervous debility which are treated in famous clinics *e.g.* of Hadfield and others. The power of the instincts and the inhibition of the latent forces, of their release, as well as the phenomena of fatigue, have been thoroughly studied to the great advantage of medical practice and efficiency. Modern psychologists and medical men are paying more and more attention to that aspect of psychological investigation of the body-mind known as sublimation of instincts and emotions. Many medical men at the present day devote themselves as specialists to the practice of psycho-therapy.

It may be that the theories of genetic inheritance perhaps apply partially at least to mental characters. It is important, as Dawson has stated, that the latter should be distinguished and the manner of their inheritance traced out. Much work is being done in recent times for diagnosing and measuring unitary mental traits with the view of satisfactorily studying the genetic basis of mental traits. In this respect the co-operation of the medical man, the psychologist and others is imperative.

To some psychologists there is nothing more noticeable in recent years than the *rapprochement* between medicine and psychology due to a fundamental cause. They hold that partly this fundamental cause is that the ultimate character of reality is mental, and that the days of scientific materialism are gone which ruled over advancing thought in the last quarter of the nineteenth century, under the leadership of Huxley, Spencer and those who thought with them. The attempts to explain all phenomena in terms of

matter, which were in vogue half a century ago, have been considered to be unsatisfactory by those who hold that mind is no longer to be either ignored or compelled to wait in the ante-chamber assigned to non-descript characters called epiphenomena.

The effect of this has been seen amongst medical men and has made them more disposed to admit a close association between mind and matter. It is recognised by them that mental factors are amongst the most important, and that these may be treated with a considerable prospect of success.

In the present day, it is all to the good that man should be treated as a unity of body and mind, instead of being handed over as it were to rival practitioners—to medical men on the one hand, and to the psychologists on the other. Therefore the alliance between medicine and psychology is to be welcomed. It is fitting that medical men

'Should study passion; how else cure mankind

'Who come for help in passionate extremes.'

'Who could express with more prophetic vision this subtle relationship better than he who was both poet and physician for in truth the mind is undissociable from what it contemplates.'

MATHEMATICS.

Bayliss once remarked that the ultimate aim of all sciences is to express in a mathematical form the discoveries that have been made in them. Though it is a difficult problem to express all facts in medicine in a mathematical equation, yet the application of mathematics to medicine is increasing in recent days.

Within recent times nomograms or alignment charts have been constructed for finding the total number of calories contained in any diet of known composition, for respiratory quotient, and for colour index of blood. Observers have worked out more or less elaborate mathematical methods for building up a suitable diet for any particular diabetic patient. These have been calculated on a knowledge of the so-called basal metabolism needs of the patient, his body weight, and surface. The vitamin requirements of man have been put in a mathematical formula. The curve of healing of a wound was developed by Carrel and others during the war.

Various equations and curves have been formulated in connection with disease, such as the periodicity curves of epidemics, theory of happenings in its application to epidemic and endemic diseases, of life tables and of carriers of disease. The latter is of special value in India. I need not dilate upon them in detail here any further.

It has to be remembered that the application of mathematics to medicine has its limitations. All patients do not react in exactly the same way and some subjects appear to be beyond the control of mathematical formula. The various tables and curves used in modern work are no doubt of great scientific interest but they have their limitations.

Undetermined factors exist in more exact sciences like physics and chemistry. It is therefore to be expected that the same might be still more manifest in the science of medicine which has to deal with diseases of the body and mind and in which there are many complicated and undetermined factors to operate. In investigating a science which deals with diseases of the mind we have to employ our mind to tell us about itself, and this we must do as a necessity, since we have no other instrument with which to conduct our investigation. Mind is therefore both executive and judicial, it is both judge and jury in its own cause. In such a science there must be many undeterminable factors.

CONCLUDING REMARKS.

Forecast.

From what I have stated, it is clear that the various sciences can be of great service to Medicine. Some of them have contributed very substantially to the relief of human suffering from disease. They can obtain valuable findings for the clinician in diseased conditions which may be helpful to him, but the responsibility finally rests with him as to how to act upon their findings. This shows the great importance of what is called to-day Clinical Science. Anatomy the science of structure of the body, physiology the science of function and the meeting of physics and chemistry in their application to problems of health and disease, and biochemistry the science concerned with the chemical processes underlying the activities of living matter, can be of great service to the clinician. In recent times, the need for increased application of physics and chemistry to medicine has grown with tremendous rapidity.

'The aim of all medical science is to control suffering to prolong life and to keep mankind in a state of vigorous health'. The science of Medicine, which was once mostly limited to the study of disease, is now concerning herself with the study of health, by the increasing knowledge of nutrition, environment and eugenics. Though some may say that mathematics or metaphysics is the queen of sciences, yet I hold that Medicine is still another or more properly speaking, she is supreme among the queens of all sciences. I hope that all your sciences will serve her duly and to her best advantage, so that the person who professes her may give more and more relief to his patients in the mitigation of their sufferings by the light that he gets through your agency.

The newer conception of life advanced in recent years have opened our minds as to the nature of the living organism. Evolutionally, we see life adapting itself to many varied conditions and to considerable extremes of environment. The most versatile is man who is found from pole to equator. His capacity for adaptation has been achieved and can be maintained only by the possession of an almost changeless and constant medium, the blood, which acts as

the direct environment of his most valuable possession, namely, the brain. Man's whole body mechanism is organised in order to preserve *La fixité de milieu interne* as it was called by Claude Bernard. One hears in physics of the so-called constants of nature such as speed of light or Plank's constant, but surely the level at which the essential blood constituents are maintained may also with justice be called the supreme constant both of and for *Homo-sapiens*. It is no passive state; dynamic equilibrium holds it where it is, and it preserves for us the sole condition for the progress of the development of man and his civilization. And when disease sets in, medicine comes to his aid to maintain this constant or else he may deteriorate and die.

'Yea and how delicate. Life's mighty mystery
 all its self propagating organisms exist only within a few degrees
 of the long scale ranging from measured zero to unimagined heat
 Nor could they endure were't not that by a secret miracle of chemistry they hold
 internal poise upon a razor edge that may not even be blunted, lest we sicken
 and die.'

In million million years, the earth's temperature may be reduced to such an extent that it would be rash to predict how such a fall of temperature may affect man's life. What then will be his blood constant? I cannot say. If then he lives, Medicine will still be called upon to mitigate the diseases that may attack man in that dim distant future.

It is immaterial for the purpose of my thesis whether the universe is fast proceeding to dissolution and death, by the rapid increase of entropy, according to the laws of thermodynamics and along with which man will meet the same fate, or whether creative evolution will lead in millions of years to the production of superman with new superkingdoms which are beyond the limits of our imagination. But whatever that may be as long as man exists, Medicine will have to deal with the infirmities of the degenerate man or the superman, as the case may be.

The discoveries in Medicine and its ancillary sciences in recent times have been phenomenal. We do not despair and say what Richet has said in the 'Impotence of Man' that 'with the aid of a few drugs, we succeed in minimising for a time a few trifling morbid phenomena which cause us discomfort.' As Du Nuoy has stated, a day may come when the methods of treatment, generally used today, will appear to us as gross as do now the methods of Mr. Purgon, of Moliere's 'Malade imaginaire.'

Who knows what the future of Medicine after ten or hundred thousand years will lead to. Perhaps, in æons to come, it will be the conquest of old age and in complete immunity from disease. Could we do not dream of a day when one shall see 'all diseases quenched by science, no man halt or deaf or blind.' What sort of bodymind will then be evolved, I shall not speculate to say.

But man's destiny may take a different and darker turn in future. Newer diseases worse than cancer or plague or the worst virus disease of today may attack him in the future. Circumstances over which man may have no control, may lead to the deterioration of his body and mind resulting in the creation of newer maladies. These may render the task of Medicine more and more difficult. Catastrophies may occur in the world and civilization may regress. Such a cataclysm may be a geological one or due to a devastating world war much more terrible than is ever known in history or to a fatal epidemic which may spread from one part of the world to another with terrific rapidity or as Spengler and others hold, it may be a cyclic process passing through the alternate periods of growth and development on the one hand and decay on the other, as evidenced by the various ancient civilizations of the world which have now ceased to exist. But whatever that may be, 'Medicine and civilization will advance and regress together' for all times to come.

The contribution of Medicine to civilization aided by the other sciences is great. A healthy body means a healthy mind, and such minds are less likely to cause internal or external strife. There is no doubt that a large part of the greatly increased comfort and safety that we enjoy today is the result of the phenomenal advances that have been made in the medical sciences in recent times. I would say with Howard Haggard 'And finally the physician.' He rightly holds that 'Medical history discloses the forces that have made our modern civilization possible That modern medical science is today one of the strongest forces operating for human betterment—it is the religion of healthy childhood, manhood and womanhood.'

In spite of recent occurrences, will not a day ever come when one may say that

The war-drum throb'd no longer,
 And the battle-flags were furl'd
 In the Parliament of man, the Federation
 of the world?

I conceive such a day may come and that slowly and slowly, physical warfare will give place to warfare of the intellect. There will be no jealousy, and superiority or inferiority complexes will cease to exist. Slowly and slowly, man will live not by the destruction of the lives of his neighbours and seizing their property, but by making every part of the world healthy and habitable by improved methods of hygiene and thereby minimizing the need for the control of population, the overgrowth of which has been considered to be, to a great extent, responsible for many wars of the world. There will be no inadequacy of food supply which had led to many wars of aggression in this world.

With his conception of the horrors of war, the medical man is a fit person for preaching the gospel of abhorrence of war. He can

depict to you scenes in which, with his Sisters of the Red Cross, he picks up the wounded from the battlefield in the midst of most frightful agonies and tries to extract a bullet from the heart or the shattered brain or to transfuse his own and his assistant's blood into the vein of a dying soldier when the guns are roaring in the battlefield, irrespective of whatever camp he belongs to. I hope that in every peace league of the world, the medical man may have some representation, not as a diplomatist, but as one whose motto is that the well-being of mankind throughout the world should be effected without any destruction of life. A day may come when the war mentality of individual statesmen, which may lead to war psychosis among the people, will be analyzed and corrected by the psychiatrist and the psychologist. In this connection one welcomes the recent manifesto issued by the Committee for War Prophylaxis of the Netherlands Medical Association.

Could we not dream of a day when economic depression and unemployment will be ended, thanks to the increasing scientific development of newer industries and newer fields of fruitful work, and there will be leisure to enjoy the beautiful fruits of the earth that science may provide, and when man relieved from toil by his mastery over the great sources of power in Nature, will have the opportunity of being richer, happier, healthier and freer than ever before. I conceive that this is possible if, as Jeans has suggested, there is a proper balance between labour-saving devices and industry increasing discoveries. Medicine which includes preventive medicine may help here in its own way by eradicating and preventing disease and thereby increasing man power and the capacity of the people for work, for taking part in the development of newer industries and agriculture, and for defending the country in times of need.

If one studies the evolution of man, one finds that his intellect is going out of proportion to his body. The caveman was perhaps stronger in bodily strength than the strongest man of today. Is it possible that man's body may become smaller and smaller, his fierce, destructive, and other base instincts and feelings may be sublimated and his mind grow more and more and in the æons to come become independent of matter? Even then medicine will minister to the 'mind diseased' in which perhaps physics and chemistry may have no part to play. Or is it possible that after reaching its zenith of development, the mind may begin to regress and body begin to grow and thus a perpetual cycle may continue in which body and mind may alternately undergo growth and decay for eternal times? Or is it possible that, finally, the mind of man may merge into the eternal and infinite Mind and feel '*Soham*' i.e., I am He.

If in dealing with my subject, I have sometimes drifted to a mystic region, I would justify myself by repeating what Einstein said: 'It is enough for me to contemplate the mystery of conscious

life perpetuating itself through all eternity, to reflect upon the marvellous structure of the universe which we can dimly perceive, and try humbly to comprehend even an infinitesimal part of the intelligence manifested in nature.'

Some of you may perhaps say that 'the progress of science does not afford any evidence that the behaviour of living matter is governed by any other than the laws of physics and chemistry' (Bertrand Russell). But who can deny what Gowland Hopkins once said that 'there may be yet higher levels calling for discussion in quite different terms'? The mechanism of life cannot be explained by the physics and chemistry of today, though perhaps some of it may be explained by some ultra-physico-chemical laws that may be discovered in the future. Even then one may not be able to say wherein, from the radiations to the bodymind, enters the breath of life.

The bodymind of man is the finest product of the universe even when compared with the most magnificent of the stars and the nebulae. Man's appearance cannot be regarded purposeless or accidental or as a sign of disease. He has discovered the laws of motion and of relativity as well as of radio-telegraphy, radio-telephony, aviation and television. He unfolds the constitution of the stars and the nebulae, millions and millions of miles away from the earth. He calculates the weight and temperature of the stars and determines their ages. He finds out the constitution of the atoms and discovers the cosmic rays. He smashes the atoms and produces new radio-active elements. He transforms one element into another. He may, one day, be able to determine the mathematics of the atom by means of his calculator. He tries to find out when and how primordial life came into existence. He tells the story of the oldest man who existed in the earth a million years ago, and gives the history of his evolution. He discovers the chromosomes and finds out the structures that are responsible for heredity. He discovers and dissects the micro-organisms of disease, and finds the defensive mechanism against their attacks. He studies the specific carbohydrates and proteins, and tries to discover the structure of the viruses and the bacteriophage. He discovers the treatment of diseases once considered incurable. He records the electric changes of the brain cortex of man in various cerebral states, and may one day record human thoughts on a sensitive plate. He studies the endocrine glands, and synthesizes their secretions. He may one day be able to influence the sex of the embryo at his will. He cultures the organs of the body and studies their growth *in vitro*. Ponce de Leon did not perhaps search for the impossible and unattainable when he sought the fountain of eternal youth, for man may one day conquer old age, disease and death. Though I dare not say what the 'final secret' is likely to be, yet the bodymind of man must be today the consummation of the work of the Great Design. In this most com-

plicated machine in which, it may be said, 'matter, life and mind translate roughly into organisation, organism and organiser' (Smuts). Medicine tries to give the healing balm to act as a powerful agent for the maintenance of harmony and strength when disease sets in.

Let me now tell you what Medicine may do in other directions.

In the present day one cannot fail to be struck by the great increase in the varied functions that have come to be regarded within the province of the medical man. 'He has in large part taken the place of the parson. He has made encroachments on the functions of the lawyer, the legislator and the judge, of the school-master, the architect and the statistician. He has assumed some of the duties of the parent and guardian, while even the soldier and the policeman are to some degree under his control. In the ordering of their lives, and even in the regulation of their vices and the reform of their shortcomings, men and women are far more willing to seek the advice and help of the medical man than once they were. The reason is, without doubt, that his advice is much more worth having than it once was' (Singer).

Lastly there is that wonderful influence of the mind of the true physician upon his patient's body and mind. The influence has been well expressed in the following words: 'Nothing can take his place—not priest nor minister nor all the clinics that science can provide. There is a rapport and a confidence between him and his patient which has been known to accomplish miracles.' If this force exists, I call it 'personalitism', the force that mind may exert upon mind, body and disease.

Thus we see that the functions of the medical man are manifold. Still with all humility he says

'If I can ease one life its aching
Or brush away one pain
If I can stop one heart from breaking
I'll not have lived in vain.
If I can help one failing brother
Into his strength again
If I can calm one fretted mother
I'll not have lived in vain.'

I am afraid my address is 'not much better than that noise or sound which musicians make while they are tuning their instruments . . . So I have been content to tune the instruments of the Muses, that they may play that have better hands.' (Francis Bacon).

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- (6) Does not produce any harmful effects like cardiac pain, palpitation, giddiness, numbness and insomnia that are caused by Ephedrin, Asthma powders and Cigarettes.
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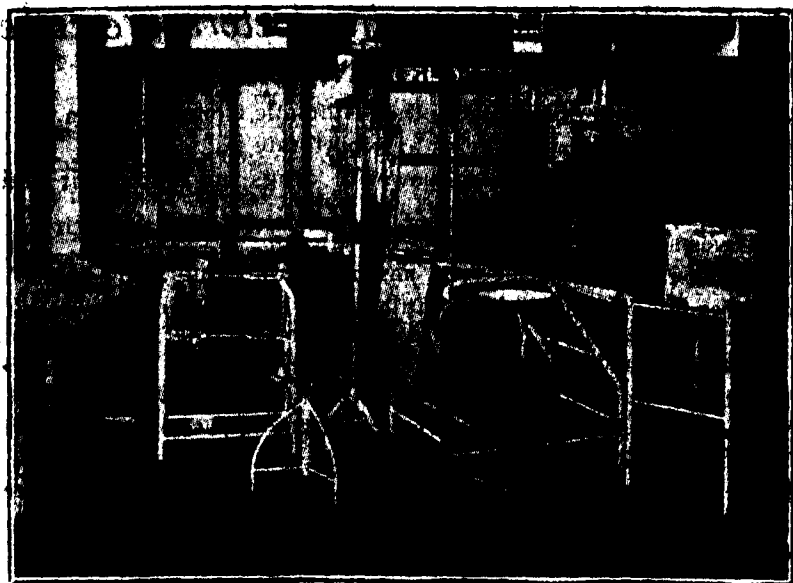
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Extracts

NEPHRITIS FROM A CLINICAL AND THERAPEUTIC STANDPOINT.

(H. W. JONES : *Transactions of American College of Physicians*.
1934. ii. 219).

The clinician owes a great debt to the physiologist, pathologist, and physiological chemist for clearing many obscure and controversial points in the disease nephritis. Nephritis is a generalised disease, giving rise secondarily to diseases of other organs. In recent years there is a better understanding of the disease, and the diminishing number of cases admitted in hospitals is due to removal of focal infection, more sensible treatment of the early case, increased knowledge and use of the electrocardiograph, and the exclusion of cases of advanced pernicious anaemia.

The most common chief complaints of the ambulatory nephritic patients in order of their frequency were nocturnal frequency, hypertension, albuminuria, and oedema.

Treatment: No fixed rules can be given for the treatment of nephritis as each case is an individual problem. Water is the best diuretic. In acute and chronic nephritis a moderate quantity is to be preferred, avoiding extreme limitation or tremendous excess. The value in the necrotic type of nephrosis of free intravenous administration of fluid, especially of glucose solution, up to 5 or 6 litres daily, deserves attention.

Sodium chloride in moderation, up to 7 to 10 grams a day, is recommended, supplemented by saline solution by hypodermoclysis or intravenously in cases of dehydration. Hypertonic saline solutions are dangerous, and extreme salt-poor diet routinely in hypertension is poor therapy.

Sodium carbonate may allay the dyspnoea of chronic nephritis. Calcium gluconate solution, 10 per cent intravenously may be used to relieve muscular twitching and tetany. Adequate protein intake and blood transfusion are useful for combating the anaemia of chronic nephritis.

Diuretics: Ammonium nitrate or chloride, salyrgan, eufhylline and thyroid extract are the diuretics of choice. The ammonium salts stimulate a rapid elimination of chloride, but in so doing a certain amount of sodium and water from the tissues is also eliminated. Diuresis will not occur with these salts when there is insufficient available base (sodium).

Salyrgan increases the transference of water from the tissues to the blood stream. It diminishes tubular resorption. In conjunction

with the ammonium salts it is most efficacious in cardiac oedema and nephrosis. Diuretics are not indicated in acute nephritis.

Euphylline increases the number of glomeruli through which the blood may flow at a given time. It also increases the transit of fluid and salt from the tissues to the blood stream. It is sometimes active when salyrgan is not. Salyrgan intravenously has even produced death.

Thyroid extract accelerates the transition of salt and water from the tissues. It is best used in chronic nephrosis in doses from 3 to 15 grains daily in conjunction with a high protein diet.

Diet: The red-meat-free, low protein diet is contra-indicated. Daily intake of 30 to 50 grams of protein is necessary to take care of waste of body protein. In chronic glomerulonephritis with nitrogen retention the protein intake should be at least this much. With a nephrotic syndrome 60 to 100 grams will often affect the patient favourably. In chronic nephrosis 140 to 200 grams daily is usually sufficient to control the oedema and restore osmotic equilibrium. Acacia intravenously to restore the osmotic equilibrium should not be used except in carefully controlled cases. Sufficient carbohydrate must be given to prevent starvation ketosis. As a rule, a low fat diet is better tolerated, particularly in those cases in which hypertension is a prominent feature.

CARBUNCLE OF THE FACE.

(S. N. MISTRI: *Sind Medical Journal*. 1935-36. viii. 117.)

The commonest site of this dreaded lesion is the upper lip, and it has a very sinister reputation as it gives rise to thrombosis of the cavernous sinus which frequently heralds the onset of a fatal pyaemia. It is, therefore, of the utmost importance to realise that to squeeze, incise, or to scrape in cases of facial carbuncle is the essence of meddlesome surgery.

The question of prophylactic ligature of the angular vein to prevent the process of thrombosis extending along it, comes up for consideration in every carbuncle of the face. The sign which one must be on the look out for, is spreading oedema from the ala of the nose to the inner canthus. When this sign is present, timely interference is essential, and ligature of the angular vein should be performed under local anaesthesia.

Once the cavernous sinus thrombosis has taken place, the case is absolutely hopeless and a fatal termination is imminent. In such cases a desperate attempt to save life by the following two-stage operation is sometimes successful:

Stage 1—The common carotid artery on the affected side is ligatured in the neck.

Stage 2—Next the eyeball is enucleated. It requires courage to remove an eye which is not yet blind, but it is the only means of saving life. A sinus forceps is introduced through the sphenoidal fissure and the cavernous sinus is drained from there.

THE USE AND ABUSE OF FORCEPS IN MIDWIFERY.

(C. S. LANE-ROBERTS: *Practitioner*. 1935. cxxxiv. 731.)

The midwifery forceps, as an instrument, is used far more frequently than it should be, and often far earlier in labour than is safe for either mother or child, as is shown by the "failed forceps" emergency cases that are from time to time admitted into the larger maternity hospitals. Trauma is still one of the most important contributory factors in the incidence of puerperal sepsis, so that everything possible should be done to avoid its occurrence.

It is instructive to see when and where a "forceps delivery" could have been avoided. Usually the expulsive powers are beginning to flag and require re-inforcement.

A. An alteration in the position. If the left lateral has been chosen, it is strange how much improvement may be obtained in the pains and in the progress of the case if the mother is placed on her back with the thighs flexed on the abdomen and supported by a wide bandage round the neck; she may be instructed to hold her knees with her hands and, during a pain, to flex them hard on her abdomen and push down, if necessary accompanied by an anaesthetic and an injection of pituitrin or thymophysin. The result will be that the forceps is not needed at all, or only terminally to bring the head through the perineum, instead of having to be applied in a difficult posterior position of the occiput.

B. The type of analgesic or anaesthetic may make a big difference. Chloroform may sometimes mean a certain forceps delivery, whereas if gas and oxygen can be obtained and the patient properly instructed to push down, then take three deep breaths of anaesthetic, then push again, the pains may improve and steady progress be maintained.

C. Among the methods of improving the flagging uterine forces the best is $\frac{1}{2}$ cc. thymophysin, repeated $\frac{1}{4}$ cc. after $\frac{3}{4}$ of an hour if necessary; or 2 units of pituitrin or pitocin, repeating the same dose in 30 or 50 minutes when necessary. These methods have mostly avoided the application of the forceps.

D. Sometimes when the perineum is stretching rather too slowly, a timely stretching and "ironing out" of the vagina and vulva with ether soap on the fingers may save a forceps delivery.

In unreduced occipito-posterior cases, manual rotation of the foetal head and body so as to bring the occiput to the front usually suffices, followed by, in multigravidae, by a small dose of pituitrin, but

in primigravidae instrumental delivery will be necessary. Everything must be done to avoid placing the forceps blades except in the coronal diameter of the head. Others find careful rotation of the head with the forceps followed by a re-application when the occiput is to the front may be the method of choice; this is the type of case for which Kielland's forceps are eminently suitable. In all these cases the greatest care must be taken of the baby and the foetal heart frequently watched.

The fear of childbirth breeds inertia and inertia often calls for manipulative interference. Before applying the forceps everything must be done to diminish fear and pain, and to increase the expulsive force by safe methods. If given enough sedatives, without great concern for the baby's ultimate welfare, it may be said that most cases of "rigid" cervix and inertia will eventually deliver themselves. The dilatability of the cervix must be made out and further dilatation carried out with the utmost gentleness. The forceps must then be applied carefully, the cervical rim is slowly pushed up posteriorly, then laterally, and lastly anteriorly. If the cervix cannot be satisfactorily dilated, either a Willett's forceps may be attached to the scalp, or the forceps applied and a 4 or 5 pound weight tied to the handles. These severe cases of inertia do not appear to respond to injections of pituitrin or thymophysin. The results of traumas of difficult instrumental delivery are seen in lax vaginal walls, descended cervix, and cystocele.

Medical News and Notes

HAEMOSTATIC PROPERTIES OF SNAKE VENOM. According to Burgess Barnett, viper venom is a potent haemostatic in haemophilic and other hæmorrhage when employed as a local application without toxic effects, says the *British Medical Journal*, June 8, 1935. He examined venoms of many viperine snakes with a view to their therapeutic application as blood coagulants in haemophilia. The venom of *Vipera Russellii*, the commonest and the most dangerous viper in India, known as the daboia, was found to be the most potent, and from this a sterile and stable product was made which, when added to blood *in vitro*, behaved as activated prothrombin. The venom is used in dental surgery, abdominal surgery, in tonsillectomy, and in prostatectomy with good results. Haemophilics are effectively treated for epistaxis and profuse bleeding after dental extraction, by means of snake venom.

COIMBATORE DISTRICT MEDICAL ASSOCIATION. A meeting of the above association was held on the 7th March at the M. G. Eye Hospital with Dr. T. V. Raghothama Rao in the chair. Dr. T. K. Narayanan was "at home" to the members. Dr. B. S. Viswanathan read a paper on "Epidemiology of tuberculosis in Coimbatore." A discussion followed.

MADURA DISTRICT MEDICAL ASSOCIATION. The eighth annual meeting of this association was held on the 7th March at the Victoria Edward Hall under the presidency of Lt. Col. P. Verdon, I.M.S., District Medical Officer. The association resolved to affiliate itself with the Indian Medical Association and to discontinue publication of the association journal. The president also opened the medical exhibition organised in connection with the function. Some of the members and visitors gave talks on medical subjects. The function terminated after light refreshments and a cinema show.

CHITTOOR DISTRICT MEDICAL ASSOCIATION. A meeting of the above association was held on the 21st March at Palmaner with Dr. Kantzar of the Renigunta Mission Hospital in the chair. Dr. V. R. R. Naidu delivered a lecture on "birth control." The subject was discussed from all points of view. Dr. Naidu entertained the guests at dinner at night.

GUNTUR DISTRICT MEDICAL ASSOCIATION. The first annual meeting of this association was held on the 22nd March at the Police Club Hall under the presidentship of Major A. Krishnamurthi, B.A., M.B., C.M., A.I.R.O., District Medical Officer. The president said that valuable practical experience was exchanged among the members during the last one year. The annual report of the association was presented by the secretaries and was adopted. Major Krishnamurthi was elected president and Drs. N. Padmanabha Rao and

P. Veeriah Chowdhury were elected secretaries. Dr. U. Ananthayya read a paper on "pathology and rational treatment in medicine and surgery". Dr. P. Veeriah Chowdhury read a paper on "stricture of the urethra." Dr. K. Venugopala Rao Naidu read papers on "acute abdominal conditions" and "Madras eye."

EAST GODAVARI DISTRICT MEDICAL ASSOCIATION. A meeting of the above association was held at Rajahmundry on the 21st March. Captain J. S. McMillan, I.M.S., District Medical Officer, presided. Dr. Mahomed Abdul Allam Sahib of Rajahmundry described a case of kala-azar. Dr. P. Audinarayanamoorthy of Cocanada described a case of pyaemic abscess in the orbit and a case of cystic kidney. Dr. Miss T. E. Stephens of Rajahmundry read a paper on "Eclampsia". Dr. Y. Ramasubrahmanyam of Cocanada discussed the treatment of "retention of urine," and described the method of staining for tubercle bacilli by the concentration method with sodium hydroxide and liquor sodi chlorinata. The president announced that the first number of the Journal of the Association would be published in April and requested the members to co-operate in making it a success. The members dispersed after dinner.

WEST GODAVARI DISTRICT MEDICAL ASSOCIATION. The third annual meeting of the above association was held at Ellore on the 29th March with Rao Bahadur M. Kesava Pai, M.D., O.B.E., of Madras in the chair. An exhibition of Swadeshi articles, medicines, and surgical appliances was held in connection with the function and was opened by Dr. C. Ramanujayya, District Medical Officer. At the general body meeting, Dr. H. V. Jogiah Sarma, Secretary, read the annual report, which was adopted. Dr. C. Ramanujayya was re-elected president, Dr. A. E. Clarke of Narsapur was elected vice-president, Drs. V. Narasimha Rao and M. Jagannadharaju were elected secretaries. The association passed some resolutions, among others, deprecating the practice of the Public Health Department of allowing non-medical men to give inoculations. Dr. M. Rangayya welcomed Dr. Kesava Pai in a small speech. Dr. Kesava Pai delivered three lectures, on "the social duties of medical men," "nutrition," and "skiagraphy in pulmonary disease" respectively. Dr. E. Dixitulu read a paper on "care of the eye". Dr. R. Venkata Rao, assistant D. M. O. demonstrated some interesting cases. Dr. Ramanujayya, in bringing the meeting to a close, thanked Dr. Kesava Pai for presiding over the deliberations, and wished that the association would gather strength and usefulness to the medical profession of the district. A cinema show by Bayers was held, showing the manufacture of their pharmaceutical products.

BELLARY DISTRICT MEDICAL ASSOCIATION. This association met on the 28th March, with Lt.-Col. A. S. Leslie, M.D., I.M.S., District Medical Officer, in the chair. Dr. C. A. Venugopal, L.M.S., Superintendent of the Wellesley Sanatorium Jail, Bellary, delivered

a lecture on "the causation and prevention of tuberculosis." He said that nearly 50 per cent of all children were infected with tuberculosis before they were three years of age and that over 93 per cent of children below fifteen years showed signs of infection. He also suggested some prophylactic measures to be taken in children and in adults, and appealed to organised bodies to carry on a fight against tuberculosis. The association passed a resolution requesting the municipal council to suggest ways and means of inaugurating a campaign against tuberculosis in Bellary.

TUTICORIN MEDICAL UNION. A meeting of the above union was held on 28th March, under the presidency of Dr. K. S. Iyengar, L.M.S., Civil Surgeon. Dr. Pitchumani Aiyar, Assistant Port Health Officer, was "at home" to the members. Dr. G. Manuel delivered a lecture on "Recent advances in Medicine."

TANJORE DISTRICT MEDICAL ASSOCIATION. An ordinary meeting of the above association was held on the 29th March at the Municipal Hall, Mayavaram, under the presidency of Capt. M. G. Kelly, I.M.S., District Medical Officer. After tea, Dr. Sundararajan of Shiyali showed two patients with compound fracture of the skull treated successfully, and described two difficult labour cases. Dr. D. K. Chandrasekharan, M.B., B.S., read a paper on "insomnia, its causes and treatment." Members participated in the discussion.

MALABAR DISTRICT MEDICAL ASSOCIATION. This association met at Calicut on the 5th April with Major J. F. Shepherd, I.M.S., District Medical Officer, in the chair. Dr. Achan, District Leprosy Officer, read a paper on "common diseases of the skin." Dr. C. K. Menon, M.B., B.S. was "at home" to the members.

HERR HITLER ON INDIA. An urgent meeting of the Bombay Medical Union was held on the 21st February 1936, at the Hall of the Union, when the President of the Union took the chair. In a recent speech delivered before Nazi University students at Munich, Herr Hitler of Germany directed insulting remarks against India and Indians and strong resentment was felt and given expression to by the members of the Union against the speech. The meeting unanimously passed the following resolution as a retaliatory measure, and it was further hoped that various associations, medical as well as others, in the country will take up this question of national self-respect and pass similar resolutions and act up to them. The resolution runs as under:—"This urgent meeting of the Bombay Medical Union resents the insult gratuitously hurled by Herr Hitler at the people of India in a recent speech, and unanimously resolves to recommend to the members of the Union and to the medical profession in India, the boycott of German-made goods in general and the boycott of Drugs, Chemicals, Stains, and all Medical and Surgical requisites in particular, wherever and whenever possible, until an *amende honourable* is made.

INTERNATIONAL UNION AGAINST TUBERCULOSIS. The tenth Conference of the International Union against Tuberculosis (Secretary General: Prof. Fernand Bezancon) will meet in Lisbon, from 7th to 10th September 1936, under the chairmanship of Prof. Lopo de Carvalho, President-elect of the International Union. The discussion will be limited to three main subjects. Biological subject: "*Radiological aspects of the pulmonary hilum and their interpretation*", opening report by Prof. Lopo de Carvalho (Portugal). Clinical subject: "*Primary tuberculous infection in the adolescent and the adult*", opening report by Dr. Olaf Scheel (Norway). Social subject: "*The open case of tuberculosis in relation to family and domestic associates*", opening report by Drs. Ch. J. Hatfield (United States) and D. A. Powell (Great Britain). Ten speakers selected in advance from a list presented by the 44 countries belonging to the Union, have been designated to open the discussion on each of the questions on the agenda. The Organization Committee of the Conference has prepared a very attractive programme of receptions and excursions; the latter will enable members of the Congress to visit the chief anti-tuberculosis institutions as well as the most picturesque scenery in various parts of Portugal. Members of the International Union are invited to take part in the Conference free of any contribution fee. They may forward their application through the King George Thanksgiving (Anti-tuberculosis) Fund, or directly to the Organising Committee in Lisbon, at the following address: Organising Committee of the tenth Conference of the International Union against Tuberculosis, Assistencia Nacional aos Tuberculosos, Avenida 24 de Julho, Lisbon (Portugal). Persons who are not members of the Union and who wish to take part as "Members of the Conference" must forward their application, together with a contribution of 200 escudos (approximately 125 French francs), exclusively through the medium of King George Thanksgiving (Anti-tuberculosis) Fund, Talkatora Road, New Delhi.

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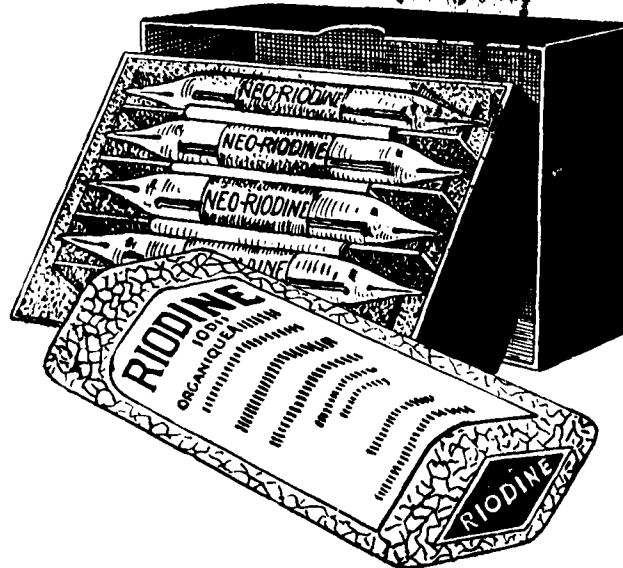
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