

Indian Medical Journal

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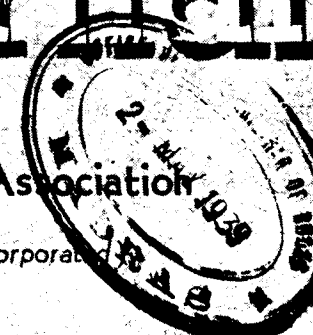


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Organ of the All-India Medical Licentiates' Association

(With which THE AGRA MEDICAL CLUB JOURNAL is incorporated)



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Vol. 33. No. 4

CONTENTS

April, 1939

EDITORIAL : History of Medicine

.... 105

SPECIAL ARTICLES :—

History of Pathology by T. S. Tirumurthy

.... 106

Makers of Modern Bacteriology by A. K. Maitra

.... 129

History of Human Anatomy by S. L. Roy

.... 132

History of Surgery by C. P. V. Menon

.... 136

Status of Modern Ophthalmology by T. S. Doraiswamy

.... 138

The Art of Medicine by A. Viswanathan

.... 141

Preventive Medicine—Past, Present and Future
by Geoffrey Bewley

.... 145

Hygiene—Old and New by E. D. Irvine

.... 159

Medical News—Indian and Foreign

.... 160

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SUPPLEMENT TO THE INDIAN MEDICAL JOURNAL

MADRAS

APRIL 15, 1939

No. 4

CONTENTS

	Page		Page
Indian Medical Council Act	57	Health of University Students by	
Demands and grievances of the		Dr. V. Krishna Rao	68
Punjab Licentiates	59	Assam Medical College Day	70
Medical Aspects of Air Raids by		Service Notes	71
Major General Wilson	65	Association Notes	72
Public Health—The Foundation of Nation-Building		Association Accounts	72
by Col. A. H. Russell	67		

The Indian Medical Council Act

[The following is an editorial indictment of the Indian Medical Council Act by the *Medical World*, December 2, 1938. We are gratified to find, for the first time, that a British editor of a British Medical Journal has correctly understood and interpreted the attitude of the Indian Medical Profession towards this Act. We are particularly thankful to the editor of the *Medical World* for his generous references to the All-India Medical Licentiates' Association and the *Indian Medical Journal*. In fact, his editorial note seems to be based on our last September issue which dealt with the History of Medical Licentiates in India. Ed., I.M.J.]

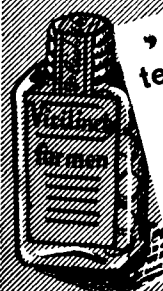
THAT all is not well so far as this Act is concerned may be gathered from the words recently expressed by Dr. Rau who is General Secretary of the All-India Medical Licentiates' Association. He says: "As long as that BLACK ACT, the present unwanted undemocratic Indian Medical Council Act, remains in our Statute Book . . . we have perforce to conform to the minimum standard of education as laid down by this Council. The question now remains whether there should be one or two portal systems of medical education to achieve that end. It is well known that, excepting in the land of our rulers, all other countries in the world have but one portal of entry for aspirants of medicine, the University, which confers the M.D. degree. Even in England that powerful organisation, THE MEDICAL PRACTITIONERS' UNION, has of late been agitating for a one portal system. in spite of the existence of perfect equality in status, etc., between the alumni of their Universities and the Royal Colleges." We desire to thank Dr. Rau most heartily for this laudatory reference to the M.P.U. It is obvious that even in India we are being recognised as a "powerful organisation." This proves that our influence is being felt beyond the limits of our own country.

In India at the present time there is a perfect inequality existing between the licentiate and the University graduate; and under existing conditions it is most desirable that the term and status of licentiates should be entirely abolished in that country. It has been asked by more than one prominent Indian medical man how long medical education in India is to be allowed to be exploited by I.M.S. men or the General Medical Council of Great Britain, or by those in possession of foreign degrees and diplomas. One Indian practitioner goes so far as to say that when every member of the profession in India, whether he be a licentiate or a University graduate, recognises that the Indian Medical Council is anti-national and anti-Indian it will be seen that it becomes our paramount duty to kick the Act and request all present members of this Council to resign and so make it a defunct body. The Indian Medical Council is the result of an Act which was carried through when the members of the Assembly belonged to the Government group and did not in any respect truly represent the true Indian opinion. Indian medical education, therefore, it is pleaded, should not be modelled in accordance with the dictates of such an anti-national Medical Council.

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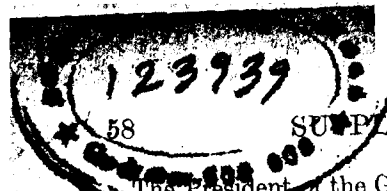
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The President of the General Medical Council is reported to have stated that "We have received during the year a number of friendly communications from the Medical Council of India. . . . The Medical Council of India have made a good start on the enormous problems which confront them." The editor of *The Indian Medical Journal* in the September issue contributes a leader on the subject in which he says that on the twentieth of September the Indian medical profession will again, for the fifth year, raise its voice in protest against the Indian Medical Council Act whose provisions, he says, are an insult to its self-respect and were foisted upon it by an irresponsible Central Government who were more inclined to please the tin-gods of the General Medical Council than the unsophisticated medical leaders of India. It is a tyrannical and outside body which must be fought by all to the finish. The view is further expressed that this unwanted Act could have been easily thrown upon the scrap-heap of refuse had not the medical leaders of the Indian profession sought election to this Council after their denunciatory agitation against it. These renegades, when the day of reckoning comes, says the writer, will go down in history as having betrayed the cause of a large section of the profession and the best interests of India.

As is only too well known the Indian Medical Council Act of 1933 deliberately excludes licentiates from being placed on the register of those possessed of duly recognised medical qualifications. An attempt to remedy this state of affairs was made when it was suggested that all medical schools in India should be affiliated to the respective provincial Universities in order that there might be one standard of medical education and one common medical degree. The Government would not even consider such a proposal. As the Editor of *The Indian Medical Journal* very wisely points out, "The tragic irony of the situation is that while the medical licentiates are condemned as possessing inferior medical qualifications, the system which produces them is connived at and condoned." It is a well-known fact that to-day the number of licentiates has grown enormously. Indeed, nearly two-thirds of the medical practitioners in India at the present time are licentiates in medicine. They are denied many rights and privileges such as eligibility to the Indian Medical Service and even to the Provincial Medical Services. Moreover, they cannot avail themselves of the facilities for higher and post-graduate education in their own country. All this, it is said, is due to the action of officials of the Indian and the Provincial Medical Services in whose hands rested the control of medical education and who strove to maintain the inferior status of these licentiates in order that they themselves might remain the perpetual masters over the latter.

The time seems ripe for a change in the system of medical education in India, and indeed in this country. What is needed is a one-portal system under which all would have an equal status. The present multiplicity of degrees and diplomas is

most misleading, especially to the public. In India, however, the condition is infinitely worse than it is in this country, for Indian licentiates constantly have indignities heaped upon them, notably by the Indian Medical Council Act of 1933. A solution is suggested by the editor of *The Indian Medical Journal*. He says that in any case "We should insist on statutory protection of the existing licentiates so that they may not suffer from any kind of handicap in entering paid or honorary service under the Provincial Governments and the local self-governing bodies." These licentiates, we may add, possess a very powerful Association which is doing all it possibly can to better their position and to obtain for them equal rights with University graduates.

The Secretary of the All-India Medical Licentiates' Association in Chapra considers that the establishment of a one-portal system of medical education, excellent as it may be, is not possible in India until that country possesses full freedom for moulding its destinies. Dr. Prosad adds that, "probably true uniformity will be established in our country when we shall be able to produce a truly national system of medical education. Then we would confer the M.D. (India) degree after giving the highest possible standard of medical education." He says very significantly that India will be able to achieve this only when it has a free hand in its medical education and when the General Medical Council of Great Britain ceases to dictate to it. This is strong and unmistakable language which goes to prove that the bulk of the medical profession in India must be definitely opposed to the interference on the part of our General Medical Council with medical education in that important country.

As regards the one-portal system, Dr. Das, a well-known Indian professional man, states that it is his considered opinion that this system should be adopted as the one method of reforming the existing standard of medical education in India. There must, we feel, be such a uniform standard adopted in this country also. The time is now ripe for this one-portal system. Uniformity must be our one aim in this connection. The M.P.U. has long asserted this; but the powers that be are slow to move just as they are with regard to India. As regards India it has been pointed out that conditions in that country are not at all favourable for the adoption of our system of medical education with its many different degrees and diplomas. Such a system, if adopted in India, would merely serve to aggravate the invidious distinctions already existing between various classes of medical practitioners in that vast country. On the other hand, the introduction of the one-portal system would lead to a uniform standard of medical education, and so tend entirely to abolish the artificial distinctions at present existing between licentiates and University graduates.

The General Medical Council, however, is a too highly conservative body to recognise the urgent need for changes. Even when they do introduce

new measures these are not always too well-advised. Certainly the new Indian Medical Act is never likely to be popular with the majority of Indian medical practitioners, however much our G.M.C. may think and speak to the contrary. We have unmistakable evidence that this Act is not wanted. Like our own Medical Act it needs

amending and reforming before it will prove acceptable or even useful to the profession. Meantime the All-India Medical Licentiates' Association will continue to do all in its power to make its influence felt throughout the length and breadth of India in opposition to the working of this, to them, obnoxious measure.

Demands and Grievances of the Punjab Medical Licentiates

[The following is a memorandum of demands and grievances submitted to the Hon'ble Abdul Haye, Minister of Health and Education, Punjab, during October, 1938, by the Punjab Branch of the All-India Medical Licentiates' Association. It is a closely reasoned document, moderate in tone and accurate in facts. And as the problem of the licentiates is the same in other provinces as in the Punjab, we are publishing the Memorandum *in extenso* for the information of our readers. The arguments put forth in this Memorandum on each aspect of the problem are unassailable. The recent retrenchment in the pay of the Punjab S. A. S. is a measure for which we cannot imagine any justification. We understand that arrangements are already made to reform the standard of medical education at the Amritsar Medical School. This is very encouraging. We do hope that the Punjab Government would also amend the Punjab Medical Registration Act, as in Madras, and thus effectively do away with the caste-system in the profession. —Ed., I. M. J.]

On behalf of the All-India Medical Licentiates' Association, Punjab Branch, we thank you for permitting to meet you in deputation, and to present this memorandum of our demands and grievances personally. We hope to convince you of their legitimacy and request you to do justice to our class of medical men who by service and attainments have been helping the Government in all possible ways open to them.

Our Association has no Political Motive

It may not be inappropriate if we preface our memorial that our Association is not political in character but is wholly concerned with the advancement of the medical profession in general, and of the medical licentiates in particular, and with the finding of ways and means of giving effective medical relief to the people of this province in co-operation with the Government and other Public Bodies engaged in this work. We have therefore no political motive in approaching you with this memorial of our grievances and in seeking redress of the same, but to put them before you, an elected minister of the people in charge of Public Health, in the hope that it is our duty to do so, and equally in the hope that you would understand the legitimacy of our grievances which have remained almost unredressed for the last so many decades in great detriment to the progress and solidarity of the medical profession and medical relief. We are really hopeful that you will not only concede the justness of our grievances but also take such steps as would give us maximum amount of redress possible, and in doing so you will be helping the medical profession to discharge its duties unhampered by discontent and uninjured by acrimonious distinctions among its members. You will pardon us, sir, if we go a little further and say that we have got great confidence in you, not merely because you are a member of the elected Government of this Province but also

because, by virtue of your undoubted legal acumen and ability to sift true facts from the false, you will be able to see easily and clearly how far our case is genuine and to what extent it needs redress.

Raise the Standard of Education at the Medical School, Amritsar

The need for two different standards to meet the exigencies of service does not exist now, firstly because such dual standards are inimical to the growth of Scientific Medicine, secondly because the licentiates of to-day are as costly as the graduates or graduates have become as cheap as the licentiates, and unemployment among them is as great as among the latter.

Raising of the Standard will not involve much Expenditure

The oft-put forth plea by the previous Governments that such a raising of standard of medical school education would involve much expenditure is, we humbly beg to suggest, rather exaggerated, and even were it true such an investment is worth the trouble. The raising of the preliminary general qualification from matriculation to the intermediate in science and enhancement of the course of medical studies from 4 to 5 years are the bare requirements to raise the status and the usefulness of the Amritsar Medical School, and these, we submit, can be accomplished by the Government without incurring much extra expenditure, and as this expenditure will be spread over a period of five years it will be least felt by the Government. Such a step has already been taken in the Province of Madras and Bombay, and the U. P. Government have referred this question to a special Committee. In our own province the Punjab Medical Council and the State Medical Faculty have unanimously recommended that the medical school education should conform to the minimum standard laid down by the Medical Council for India,

and the State Medical Faculty, Panjab, have appointed a sub-committee to consider the question of raising the curriculum for the examination for the licentiate of the State Medical Faculty from 4 to 5 years. Thus, sir, judged either by academical needs or by legal implications involved in the decision of Statutory Bodies like the Punjab Medical Council and the State Medical Faculty, it becomes the imperative duty of the Government to initiate the necessary reforms which would put the Medical School Education in this province on a footing of academical security and of a minimum standard of efficiency.

The wholesome Effects of such Reforms

These suggested reforms, if effected, are bound to produce wholesome effects in many ways and in many directions. Firstly, the class distinctions in the profession which at present mar its fair name, will disappear within the course of next ten years. Secondly, the Government would be in a position to offer the people best type of medical men and correspondingly better forms of medical service. Thirdly, the members of the medical profession will make a common endeavour and a concerted effect towards enriching the science of medicine by research and other allied work instead of dissipating their time—as they do now—in mutual praise or condemnation as to the superiority or inferiority of their medical qualifications, or as to the differential treatment between the Provincial Medical Service and the Provincial Subordinate Medical Service. Sir, you will be earning the undying gratitude of the medical licentiates of this province if you could only convince your Government as to the urgent need for raising the standards of medical education in the Amritsar Medical School, and carry out without any loss of time the reforms which we, in common with the Provincial Medical Council and the State Medical Faculty, have often and repeatedly suggested. Sir, we beg of you to understand clearly that in suggesting the reforms in the Amritsar Medical School we are not guided by any motives of special benefits and privileges to the existing medical licentiates but that we are solely guided by the larger interests of the profession as a whole and the still larger interests of medical relief to the people of our Province.

A General Review of the Grievances of the Members of the Subordinate Medical Service

The grievances of the members of the subordinate medical service can be put in a nutshell by quoting the pathetic tale contained in the parable of the sesame seed:

The sesame seed wept bitterly when it sprouted; it thought of the inevitably waiting crushing mill.

Sir, that is literally the position of the medical licentiates when they enter service. From the very beginning to the end of their service they have to lead a life of privation and disappointment, of service unrecognised and unrequited, and of hopes deferred and ambitions assailed. It would certainly not be an exaggeration to say that of the many subordinate departments of the Government, the subordinate medical department is easily the most

neglected, the more hard worked, the more fettered and the less paid than the rest, although the Government know that their general educational qualification and 4½ years of rigorous professional training are better than, at any rate, in no way inferior to the incumbents of other subordinate departments. Sir, you would excuse us if we say frankly, there is no justice and fair play in such arrangements. Not only are they paid the lowest salary, their future prospects and promotion to the higher rank are strangled by restrictions which are not applied to the members of other subordinate departments of the Government but which are designed to keep the members of the Subordinate Medical Service in a state of perpetual inferiority. Sir, it will be a meaningless prudery and sheer hypocrisy on our part to hide from you the fact that owing to the unjust and unattractive terms of service in the Subordinate Medical Department, there is a profound discontent among its members. We appeal to you to realise the situation and do the needful, and in order to enable you to understand the nature of this discontent we give below specific items for your kind consideration and favourable decision.

The Recent Retrenchment in Pay

The foremost among the causes of their discontent is the recent retrenchment in their scale of pay from Rs. 70-175 to Rs. 55-130. Sir, where is the justification of retrenching the pay by over 20% of their previous scale? If it be remembered that the previous scale of pay was obtained by the licentiates after decades of passionate representations to the previous Governments, and if it be known that the difference between the professional qualifications of the Medical Licentiate and the Medical Graduate (whose scale of pay in the Provincial Medical Service is from Rs. 225 to Rs. 1000) is more in form than in substance, it will indeed be difficult to justify this vicarious retrenchment. You may not be unaware of great many Sub-Assistant Surgeons who have done, and are still doing, skilled medical work, and still they won't be helped by the Government out of the rigid boundaries of the Subordinate Medical Department. We give below a comparative table of surgical work done by the Assistant Surgeons and S.A. Surgeons in some of the important dispensaries of the Punjab in 1935 and 1936 which will tell their own tale:

No.	Name of Dispensary	District	Incharge	Selected operations in 1935-36	Expenditure
1.	Gojra	Lyallpore	Graduate	4340 4496	81,502
2.	Moga	Ferozepore	"	2890 2388	38,580
3.	Sangla	Sheikhupura	"	966 926	9,454
4.	Banga	Jullundar	Licentiate	3055 3402	11,097
5.	Beri	Rohtak	"	2167 2475	6,962
6.	Kaithal	Narnal	"	2081 2318	5,287
7.	Daska	Sialkot	"	1857 1806	13,528
8.	Arifwala	Montgomery	"	1008 1118	6,270
9.	Malaudh	Ludhiana	"	929 1287	4,104
10.	Mukerian	Hoshiarpur	"	919 1067	7,142
11.	Barsar	Kangra	"	743 ...	5,266
12.	Shahpur	Sargodha	"	... 1080	17,888
13.	Daudkhal	Mianwali	"	... 997	4,751
14.	Jampur	D.G. Khan	"	... 668	5,921

Sir, does not this treatment of the members of the Subordinate Medical Service favour of invidiousness and partiality, and does it not indicate that their services are judged not from the quality of their performance but from their caste in the medical profession? Even comparing their treatment with the members of other subordinate departments, one cannot escape the conclusion that the Sub-Assistant Surgeons are treated like Harijans—without even the good luck of Harijans nowadays, whose uplift has become a settled policy with all the Provincial Governments. In the following table of pay of the subordinate departments and Sub-Assistant Surgeons in other Provinces, you will find that the Sub-Assistant Surgeon occupies the last rung, notwithstanding his high general and professional qualification.

Services	Preliminary Education	Professional Training	Revised pay Fixed
Thesildar	Matric	Nil	200-400
Naib Thesildar	"	"	80-185
Sub-Inspector of Police	"	"	80-180
Deputy Supt. Jail	"	"	150-375
Asst. Supt. Jail	"	"	65-170
Excise Inspector	"	"	135-225
Agricultural Assistant	"	4 years	80-225
S.E. Service	"	2 years	65-200
Forest Ranger	"	2 years	65-190
Veterinary Asst. Surgeon	"	4 years	80-225
Women Sub-Asst.	"	"	"
Surgeon	"	4½ years	75-200
Civil Sub-Asst. Surgeon	"	4½ years	55-130

PAY DRAWN BY THE SUB-ASSISTANT SURGEON IN OTHER PROVINCES		
Name of Province	Selection Grade	Revised Pay
Bengal	200	60-5-100-5-150-5-155
Bombay	200	60-5-170
Madras	200	65-7½-110-10-2-170
Assam	200	75-5-105-110-5-140-145-5-175
Burma	200	80-20-5-160
U.P.	180-200	60-4-100-5-130-140-5-150
Punjab	115-130	55-3-100

Sir, we appeal to you to understand our unenviable predicament, and we also appeal to you to realise that the sub-assistant surgeons have done yeoman service to the Government in times of war, peace and epidemic, and that it is they who have carried, and are carrying, medical relief to the poor of the country scattered in the innumerable villages of this province.

Having regard to the facts enumerated above, we suggest that their service may be allowed to continue on the old scale of pay i. e., Rs. 70-175 with a selection grade at Rs. 200/-p. m.

Promotion to the Rank of P. C. M. S.

The second cause of discontent is the very poor prospects of promotion and the way by which even this scanty promotion is circumvented and circumscribed contrary to the previous declarations of the Government. We regret to point out to you that the hope of better prospects in subordinate medical

service is as little as the pay is too small and incommensurate to the qualifications of and the actual service rendered by the incumbents.

Only six seats for over 600 Medical Subordinates are reserved in the P. C. M. S. cadre, when in the same department the following seats in the higher rank are reserved for the Assistant Surgeons with a cadre of 175 only.

1. Civil Surgeon.....9. (actually held 11 for the last many years).
2. Clinical Assistant.....8.
3. Vice Principal, Medical School, Amritsar...1.
4. Assistant to the Professor.....4.
5. Assistant Inspector-General, Civil Hospitals, Punjab.....1.
6. Professor, King Edward Medical College, Lahore.....1.
7. Assistant Chemical Examiner.....1.

During the last few years the case of sub-assistant surgeons not in possession of M. S. M. F. or higher diploma was not considered for promotion to the rank of P. C. M. S. against the spirit of para 252 of the *Punjab Medical Manual* with the result that the deserving candidates lost opportunity for such promotion for good, as none of the six seats now filled up by our men would be vacated before 1943.

We believe, sir, you would agree with us when we say that the case of the sub-assistant surgeon with higher medical qualification promoted to the Provincial Medical Service can hardly be called "Promotion", because he earns this by acquiring higher medical degrees or diplomas. "Promotion" would ordinarily mean recognition of services rendered without special reference to higher academical qualification, and that is the practice and convention in all the subordinate and other departments of the Government, and that is also the spirit underlying the Government of India letter No. 280 dated 23-9-1915 which states quite definitely:

"The Government of India trust that the possession of higher qualification will not be regarded in any way as an indispensable condition of promotion to the rank of Civil Assistant Surgeon. There are doubtless many Sub-Assistant Surgeons who have been precluded by the very nature of their work from undertaking the study necessary to obtain such qualifications but who are well qualified by practical attainments for promotion to the rank of Civil Assistant Surgeon. In the opinion of the Government of India it would be unreasonable that such men should be superseded by others who have made a point of passing these examinations but have failed to distinguish themselves in the actual practice of their profession."

It is the misfortune of the licentiates to have even favourable rules interpreted and applied unfavourably, and to be treated in a manner as if they are undeserving non-entities in public service. We would beg of you to realise the intrinsic justice of our claims and render us justice in the same manner and in the same terms as your Government deals with other departments in relation to the question of promotion. If higher degrees are not necessary for the promotion of an Assistant Surgeon to Civil Surgeon, if a Tahsildar

can become Deputy Commissioner, nay even as Commissioner, without any extra qualification save the departmental tests, if a Sub-Inspector of Police can become a Superintendent of Police without any high general or special qualification—if, thus, meritorious services alone are taken as a criterion of promotion in these cases—we ask you, sir, in all humility, why a similar criterion should not be applied in the case of the Subordinate Medical Officer?

Is it fair that the sub-assistant surgeon who bears the brunt of the work in the profession, who is its backbone, who is found in the battlefield, in the hut of the farmer and the palace of the rich, and who hazards his life in plague, influenza and cholera (more often than the members of the higher rank) should be refused the courtesy, the honour and the right to legitimate ambition to higher rank? We only claim equality and wish that the door to fair and just ambition should not be closed, that our fate should not be hermetically sealed, that the same facilities should be offered to us, and in cases of real merit our right to a future career should be fully recognised.

Sir, the following views of the Heads of Medical Department would show the justness of our cause and the efficiency of medical licentiates in State Service.

Col. Bryson once wrote in the *India Medical Gazette*:

"Efficiency, patience, loyalty, devotion to duty, and a dozen other attributes belong beyond question to the Sub-Assistant Surgeon. The great mistake of mistakes is that he is under-rated and under-valued."

Major General Sprawson, D. G. I. M. S., remarked:

"The licentiates are not only the most numerous body of those practising modern scientific medicine in this country, but are also those who form the bulk both of general practitioners in our towns and the large majority of our country doctors, as well as the most numerous class who attend on the soldiers of our Indian Army in peace and in war. The licentiates are our first line of attack on disease, since it is they, who as a rule come first in contact with the patients and on whose advice these patients depend for the maintenance of their health or recovery from sickness. With so important a body as the licentiates not only the licentiates themselves, but the country as a whole is interested in their past, their present and their future. Times have changed, licentiates have improved knowledge and so different a position has evolved that we are now brought to think whether it would not be a good thing but a possible thing if we could lessen this gap between the two great branches of the medical profession in India and bring them into such harmonious relation as obtains between similar branches in other countries. We should aim at lessening the gap between them until for practical purposes such as employment and reputation, distinction shall depend on individual ability and regard rather than on a class separation from which there can be no recovery unless some higher professional examination be taken later. The gap between graduates and licentiates is a large one, there is no denying the fact. What can we do to lessen it and to bring the two classes nearer?"

A Lieut. Governor of this Province once remarked:

"That a Sub-Assistant Surgeon should be condemned by our system never to be able to rise above the post of a Sub-Assistant Surgeon, without going through a college course, is in my opinion a serious blot on our medical organisation."

Major-General J. W. D. Megaw, late Director-General, India Medical Service on 19-2-'31 in reply to our deputation remarked:

"He always insisted that Medical Licentiates should be judged by the quality of the work they have done rather than by any artificial standard of academical qualifications."

Major-General G. Gifford, late Surgeon-General of Madras, was pleased to remark:

"In what country in the world is there to be found medical profession divided horizontally into layers, the member of each layer (a service) separated as in water-tight compartment, from those above and below it: we have the R. A. M. C., the I. M. S., the I. M. D.; the graduates of the Indian Universities, apothecaries and the medical licentiates, the members of one service being unable to pass into another. It must be made possible for a qualified man to look forward to rising to the top of his profession without finding himself hopelessly handicapped from the start."

Col. D. P. Gail, Inspector-General, Civil Hospitals, Punjab, was pleased to remark—

"He (referring to a Sub-Assistant Surgeon) is a man of remarkable talents who is devoting them whole-heartedly to the service of the people without any idea of personal gain. It has been a great pleasure to me to meet him and see the wonderful work he is doing. I heartily congratulate him and wish him well for the future. He deserves well of the public as well as of the department. This wonderful work is, I fear, in a precarious condition. He has great ideas and ambitions and if he is encouraged, as he well deserves to be, much more will be achieved than hitherto."

It will meet the ends of justice and exigencies of service if, for the present, you reserve twenty seats in the P.C.M.S. instead of six as now, so as to admit sufficient number of sub-assistant surgeons with higher medical qualifications and those who have shown exceptional attainments in the discharge of their duties and cancel sub-para 2, 3, 4, of para 252 of the *Punjab Medical Manual*.

Encroachments on the Rights of the Subordinate Medical Service

There has been a definite trend in recent years to appoint Assistant Surgeons in charge of hospitals which, till now, have been put in charge of Sub-Assistant Surgeons and whose popularity and output of medical relief have been built up by their ability, assiduity and ardour. It may be well-known, sir, that the Sub-Assistant Surgeons have been responsible for popularising many a Tehsil and Rural Hospitals in this province by dint of their personality, enthusiasm and labour, but you will find that the reward for this solid and useful contribution does not accrue to the class to which these selfless workers belong but to others who had contributed very little in raising these dispensaries and hospitals to a status of effective usefulness to the people. For instance, Moga, Banga and Nankanasahib hospitals which owe their present popularity to Medical Licentiates are now made a close preserve for Assistant Surgeons. We would therefore implore you to see that such encroachments are not allowed and that the benefits accrued to our class as a result of the meritorious services rendered by the distinguished members should naturally go to the members belonging to the same class.

Abolish the Sub-Assistant Surgeon Rank

It would be to the efficiency of the Medical Department if all the medical practitioners registered in the Punjab Medical Council are allowed to compete for service. The difference either from academical or practical point of view, between the medical licentiate and the medical graduate, is not so great as to warrant the continuance of different cadres of Medical Service. Even if there be a difference, a competitive examination will settle the matter and the Government will thus have best of men both from the Amritsar Medical School and the Medical College, Lahore. In the United Kingdom, both the medical licentiates and the graduates are treated alike by the Government, and we believe, sir, that time has also come for us to adopt the same system of equal opportunities for all legally qualified registered medical practitioners. All the medical men who enter State Medical Service should be designated as Assistant Surgeons, allowing the best of them to be promoted to the higher grade of Civil Surgeons. It is an anomaly, sir, that the Government should treat with such scant consideration the products of the Amritsar Medical School which is run by the Government itself and which is as efficient as the University Medical College save in some non-essential matters. The alumni of the medical school hold a registerable medical qualification recognised by a Statutory Body, like the Punjab Medical Council, and in no part of the world, except in this unfortunate country, are the registered medical practitioners, although they may hold different academical qualifications, treated invidiously for the purpose of entry into State Medical Service. This is an anachronism which we beg of you, sir, to do away with at an early date, in the interest of fair play and equally also in the interest of the solidarity of the profession itself. It is also beneficial in the interest of economy, for, then, the cost of the Provincial Medical Service which is almost four times that of the Subordinate Medical Service, notwithstanding the preponderantly greater number in the latter, could reasonably be reduced without in the least affecting its efficiency, as the present Sub-Assistant Surgeons' cadre consists of men having foreign British qualifications, graduates of the Punjab University, Members of the State Medical Faculty Punjab, and the Licentiates of Provincial repute whose medical record is more than the work of ten Assistant Surgeons put together for the same period. We therefore propose for the consideration of your Government the following scheme of State Medical Service:—

1. Subordinate Medical Service on a scale of Rs. 75-5-150.
2. Provincial Medical Service on a scale of Rs. 150-10-200-10-250-15-400.
3. After 25 years approved service in the Subordinate and Provincial Medical Service cadre, Assistant Surgeons of distinguished services be promoted to the rank of Civil Surgeon with higher pay.
4. A competitive examination for entry into the Subordinate Medical Service to be opened to all medical men registered in the Punjab Medical Council with the designation of Assistant Surgeon.

5. 30 per cent of Assistant Surgeon's cadre in the Subordinate Medical Service to be promoted to the Provincial Medical Service on a scale of Rs. 150-10-200 and 10 per cent of the cadre of Subordinate Medical Service to be promoted to the Provincial Medical Service on a scale of Rs. 200-10-250-15-400.

The good points in this scheme are:

1. All the registered medical practitioners will be subject to fair opportunities and there would be no complaint that a fortunate M.B.E.S. is taken on Rs. 225 p.m. while the other unfortunate one is accepted on Rs. 55 p.m.
2. The Government will have the benefit of best selection of the really able men.
3. It will reduce the cost of Medical Personnel.
4. It will enable the Government to employ greater number of medical men in State Medical Relief at a much lesser cost than now.
5. It will be a fair utilization of the taxes paid by our poor peasants.

Representation on the Punjab Medical Council and the State Medical Faculty

Another major grievance of the medical licentiates of the Punjab is their poor representation in the Punjab Medical Council and the total absence of the representation in the Punjab State Medical Faculty, and this, sir, falls too much below the representation given to the same class of people in other provinces. In Bengal three seats are given to the licentiates, and in rest of the provinces excepting Punjab they are given two: the State Medical Faculties of the U.P. and Bengal give two seats for the licentiates, and ours give none. Again if we compare this representation to that given to the medical graduates, you will find that although the latter is in a minority they are given a highly disproportionate number while the majority community a very, very low percentage of representation. This question can be viewed from another point of view also: from the point of medical ethics. If medical registration means legal equality between the members of the profession with different academical qualifications—in fact that is the very essence of medical registration by a statutory body like the Provincial Medical Council—how then can a different percentage of representation be maintained for the registered members of that Body. We, therefore, submit, sir, that, viewed from any point of view the present allocation of seats in the Punjab Medical Council is invidious, undemocratic and unethical. It is directly opposed to decent principles of democratic representation, and it is certainly contrary to the code of medical ethics. It is, hence, highly imperative that your Government should settle this question amicably and justly, and we offer the following suggestions which may help the Government in arriving at a reasonable solution:

1. The Punjab Medical Registration Act may be amended, as was recently done by the Government of Madras at the suggestion and guidance of the Madras Branch of the All-India Medical Licentiates' Association, in such a manner as would throw open 75 per cent of its seats to general election from among the registered medical practitioners.

2. If the Government do not agree to this, at least 4 seats may be given to the licentiates, although even this cannot be said to correspond to their numerical strength.

3. 25 per cent of the seats should be reserved for the licentiates in the Punjab State Medical Faculty.

Sir, these claims may look preposterous and extravagant at the first sight, but we are confident that if you study the question from all points of view you will inevitably come to the conclusion that they are essential, just and reasonable. The following statistics will prove our case:

REPRESENTATION IN THE PROVINCIAL MEDICAL COUNCIL

Province.	Registered Licentiates.	Registered Graduates.	Number of Licentiate seats.	Number of Graduate seat.
Punjab	2996	1414	1	5
Bengal	5661	3048	3	17
U. P.	1962	608	2	6
Bombay	3295	3311	2	4
Madras	4199	1407	2	5
Assam	980	118	2	2
B. & O.	2367	697	2	3

REPRESENTATION IN THE STATE MEDICAL FACULTIES

Province.	Licentiates.
Punjab	Nil
U. P.	2
Bengal	2

Sir, our claim is that, had we been given greater representation in the Provincial Medical Council and State Medical Faculties, we would have long ago established equality of status among legally qualified and registered medical practitioners, and we would not have allowed the medical schools to suffer the accusation of inefficiency and sub-minimal standards of medical education which are now levelled against them by the very persons who were responsible for the control and guidance of standards of efficiency and equipment in these schools. This is our basic argument in favour of more representation of licentiates in these important statutory medical Bodies, apart from the legal and ethical aspects of the question which we have just now put before you. Sir, we appeal to you to take up and tackle this question earnestly and set right this time-worn grievance of the medical licentiates. Once these things are accomplished, the future Ministers of Public Health will have no occasion to receive memorials of this type, while on the other hand, they will be able, with the willing co-operation of one and all of the profession, to establish an extensive and effective system of Medical Relief in this Province, as in Great Britain and other countries. The greatest defect, to our mind, in the medical administration in this province, as in others, is that the majority members of the profession have to spend too much of their time, which ought to be devoted to better use, in fighting for their essential rights and privileges which are vicariously administered not with any reference to the quality and extent of the

work rendered but from the sole point of view of higher academical qualification. We recognise that this is one of the cruel legacies of medical history in India, but we submit, sir, that in the same manner, as you and other illustrious members of the Punjab Cabinet under the enlightened guidance of the Premier, Sir Sikander Hyat Khan, are devoting the best part of your attention to the shaping of our political evolution, you should also, at the same time, shape the medical policy in right manner and thus earn the gratitude of the profession.

Leave Reserve of Assistant Surgeons to be abolished

The Association submits that in the interest of economy in the medical department and in the light of working of medical licentiates in the Punjab Province, leave reserve of Assistant Surgeons should be abolished and Sub-Assistant Surgeons be promoted to the rank of P.C.M.S. in leave arrangements without affecting the efficiency in the department, as there are in the rank of P.S.M.S. fully qualified persons with distinguished careers, officers who can hold superior appointments with credit and distinction.

Personal Assistant to Inspector-General, Civil Hospitals, Punjab

In this connection we beg to lay before you, sir, a resolution passed at the 15th Punjab Conference of the All-India Medical Licentiates' Association held at Delhi on the 30th April and 1st May 1938.

"Resolved that this conference requests the Punjab Government to appoint a Sub-Assistant Surgeon as Personal Assistant to Inspector-General, Civil Hospitals, Punjab to serve in the interest of a large body of medical licentiates in service."

The need for the central control of Rural Medical Relief by the Medical Department

Sir, the fate of the Rural Medical Officers is too hard to be described in words. Notwithstanding their great services to the people, we regret to point out that this vital class of Medical Officers are being ignored, not only ignored but also put to unnecessary humiliation and embarrassment in more than one way. We are afraid that if this state of affairs continues, this service will not be able to draw best men to its fold, and the object of efficient rural medical relief will thus be frustrated. The administrative control of the Rural Dispensaries and of the rural Medical Officers are at present vested in the District Board and though in principle it is difficult to argue against such a procedure in view of the general desire and public opinion in favour of complete autonomy of these Bodies, we are however constrained to state that in the present stage of their development such administrative powers and control, more often than not, degenerate into party and personal questions and the problem and

personnel of rural medical relief do not receive that proper attention they deserve. We, therefore, take the liberty of suggesting to you to transfer the ultimate control of rural medical relief to the Inspector-General of Civil Hospitals, Punjab and there is no reason why the Government should not do so, as they contribute cent per cent of the cost of maintenance of this service.

The recent Government order placing them under the control of the Public Health Department (in 5 districts) has come as a rude shock to them because it is a strange event, even in the erratic medical history of India, that medical men doing hospital, and not public health, work to be placed under the apron strings of public health department which is directly concerned with the prevention of diseases and not with the care of the same.

1. The present pay of medical officers is indeed too small to be attractive or too meagre for the services rendered.

2. They are more often than not made a mere pawn in the party politics of a District Board.

3. The usual privileges of casual and privilege leave are not given to them on the same lines as in the regular departments of the Government.

4. They are subject to arbitrary cuts of pay and interference by the local authorities.

5. They are deprived of the privileges of private practice and of undertaking medical legal work.

Sir, all these require your close enquiry and sympathetic attention, and unless their grievances are redressed in time, Rural Medical Service will be a failure in the Punjab.

Facilities for Post-graduate Studies

Lastly, we come to the most important of our grievances, namely, a complete lack of facilities for post-graduate course. In Germany, sir, every medical man has compulsorily to undergo a periodical post-graduate course and the Government provides all facilities for such a course. In Great Britain, there is no compulsion, but by convention every medical man undergoes, every 5 or 6 years, a post-graduate course in the subject in which he is interested. So also in the United States, Japan and other countries. Post-graduate studies have become a great necessity in modern medicine owing to rapid advances being daily made in the theory and practice of medicine and unless facilities are given for the medical practitioners to make themselves up-to-date, their efficiency would certainly be impaired and they would not fully serve the purpose for which they are intended. It is, therefore, highly imperative in the interest of medical education and equally in the interest of up-to-date medical relief that the Government of the Punjab should offer full facilities for post-graduate studies to all medical officers and as this can be achieved without extra cost to the Government and within the existing hospital and teaching organisation, it only remains for the Government to take the initiative.

Conclusion

Sir, we have stated our case plainly and frankly in the hope that you will deal with us justly as would a Minister of a popular and elected Government. Our real position is that we are the scape-goats of a medical bureaucracy, the victims of vested medical interests, and the proverbial Cinderellas of the medical profession. Sir, we appeal to you to examine our case carefully and if you honestly find our case just and right it is up to you to apply the proper remedies early and effectively. Our Association, as a whole, has got full confidence in your Ministry that it will not fail to do the right thing if so convinced. We are confident that redress will be given to us, and this hope is based on the excellent reception which Col. G. G. Jolly, the Inspector-General of Civil Hospitals of this province, gave to the recent deputation of our Association. We bank on the keen appreciation and interest he had shown with regard to our representation, and are quite sanguine that he would receive with satisfaction any scheme of reform, relief, and redress which you may initiate in the light of this memorandum.

Sir, we have now finished. We hope we have not unnecessarily trespassed on your time. We heartily thank you for your courteous reception, patient attitude and commendable forbearance with which you have listened to this inevitably long memorandum—long because the Government have allowed these grievances to grow in number and from bad to worse during the last 300 years since 1640, from the very beginning of the East India Company till today.

Medical Aspects of Air Raids

● Major General Wilson, I M S., Surgeon General, Madras

I would like first of all to say something regarding what we have learnt about Air Raid attacks up to date, for I feel that this knowledge gained in the past will give one a better idea of what might be expected in the case of an Air Raid attack on Madras and the part our medical organisation will be called on to face.

We may assume that the main objects of attack from the air are to dislocate traffic, road, rail and sea, by destroying railway and port centres, and destroying munition centres and centres of Naval and Military organisations, and the destruction of the morale of the civil population. In the Great War the range of air craft was limited, and our defence in England against air craft in the early days of the war was nil, and therefore there was a strong desire on the part of the Germans to strike England by air. Throughout Britain during this period as a result of German air raid only 1,414 persons were killed, and 3,416 were wounded even though 8,500 bombs were dropped. The material damage amounted to less than 3 million pounds.

sterling. These air raid attacks proved so costly to the Germans that during the last six months of the war no air raids took place over London, and the French too abandoned long distance bombing because of the losses they suffered in proportion to the gains. Since these days bombing technique has improved, and the range, speed and carrying capacity of air craft has been increased, though these advantages have probably been more than offset by the greater efficiency of fighter planes and anti-aircraft guns. It is interesting to compare what effect air raids had in the Great War to the effect that air raids are having in the wars which are now being waged in China and in Spain. It was stated before the League of Nations Assembly in Geneva in September last that the Spanish insurgent war planes had dropped 24,000 bombs on the civilian population of Spain and as a result 7,000 non-combatants had been killed and 11,000 wounded.

Similarly in China, statistics show that during the period from July 1937 to June 1938, about 2,500 air raids were carried out on China cities by nearly 17,000 Japanese planes and over 33,000 bombs were dropped, resulting in 16½ thousand non-combatants being killed and 21,752 being wounded—a little more than one casualty per bomb. These raids, I understand, were carried out against communities very poorly equipped to resist attack.

As to the missiles used in air attacks, General Foulkes in his book "Gas", the story of the Special Brigade published in 1934, while freely admitting the grave danger to cities of attacks from the air, does not believe that gas in bombs or in the form of spray would inflict anything like as much loss of life as the high explosive shell. Instructed opinion is now almost unanimous in believing that it is very unlikely to be used in an air raid at all, not because of its supposed inhumanity but because it would not be as effective, weight for weight as high explosive.

Gas will still find its use in the battle field. It was employed in Abyssinia and by the Japanese, but not by the Japanese against Chinese cities nor has it been used up to now in Spain against the civil population.

Incendiary bombs too have not been found to be as effective as was once supposed. Many were used in Spain (in Madrid) during the present conflict, but they seem to have done little damage.

The High Explosive Bomb

So now we realise it is the high explosive bomb which is the chief danger in an air raid. We do not only require to protect ourselves with gas masks, for it will be seen danger does not only come from gas, but direct hits from high explosives will completely demolish every large building, and should they land in the open streets the blast and fragmentation from them would undoubtedly constitute the most serious damage of an air raid, and, therefore, the morale of a people might be

shattered. So, we, can take it if Madras is ever attacked by air, high explosive bombs fitted with delay action fuses will undoubtedly be used, and the casualties resulting from this type of bombing will be heavy and serious.

Whatever form of bombing takes place over Madras, there is one thing that is certain, and that is very little warning of the approach of bombing planes will be given. These planes will be catapulted from the decks of enemy ships, both fighting and mercantile, a hundred miles or more away, and after dropping their bombs, will return. These attacks may even be night attacks.

Medical Precautions

From the medical view-point, we have to make good an organisation for air raid casualties. These casualties will naturally cover a large field of surgical and medical work and will include:

(1) Persons suffering from wounds as the results of high explosive shell. These wounds are ghastly and very intensive and all who are hit will suffer from a severe type of shock.

(2) Severe bruising and fracture of bones as the result of falling debris.

(3) Severe forms of burns.

(4) Persons wounded and at the same time contaminated with persistent gas should gas bombs be also used.

In Great Britain, a very elaborate medical organisation has been formed to deal with air raid casualties, and well written and clear pamphlets have been published by the Government from time to time, dealing in detail with every point. Each town has to work out its own organisation on stereotyped lines, and from this literature at one's disposal one is able to put up a scheme for the treatment and evacuation of casualties resulting from air raid attacks. The outline of the Medical Organisation for Madras will consist of the following:

Formation of First Aid parties, available to be despatched to any place where air raid casualties occur. The men comprising these parties, will be taken from the St. John Ambulance Brigade, these parties will be equipped with first field dressings, bandages and splints and will carry stretchers and will attend to casualties as they occur and transport them to the First Aid Posts on stretchers.

Formation of First Aid Posts: to these posts casualties will be taken by the first aid parties. These First Aid Posts will be in the charge of Medical Officers attached to the St. John Ambulance Brigade with a staff of St. John Ambulance Nursing Orderlies, and will be responsible for the treatment of casualties and the forwarding of them to Casualty Clearing Hospitals and Base Hospitals. These posts will be situated close to areas that have been bombed.

"Casualty Clearing Hospitals" should normally be one of the local hospitals, where severe casualties from the First Aid Posts can be taken for immediate operation or treatment if necessary before being sent on to a Base Hospital. In the event of bombing taking place instruction will be

sent to these local hospital to evacuate the less ill of their patients to make room for bomb casualties. I feel that the Government Ophthalmic Hospital would be suitable to be converted into a Casualty Clearing Hospital. The extra staff of nurses required to deal with these casualties would be obtained from the Nursing Divisions of the St. John Ambulance Brigade.

Base Hospitals should be situated outside areas of special danger; in Base Hospitals patients are kept till they are cured or convalescent, and it would not be advisable to have such a hospital in the heart of a city which at any moment is liable to be bombed. Large buildings such as Government House, Guindy, would do excellently as a Base Hospital for Madras or any such house in the vicinity of Adyar capable of expansion. The nursing of the sick would be carried out by nurses in the Madras Nursing Service supplemented by women of the St. John Ambulance Nursing Divisions and the extra medical staff would be recruited from the ranks of the local general practitioners.

Ambulance Transport Service is for use in conjunction with first aid Stations and Casualty Clearing Stations to transfer the wounded eventually to Base Hospitals. They will also be useful in transporting casualties picked up by First Aid Parties to either First Aid Posts or Casualty Clearing Hospitals, depending on the extent of their injuries. In Madras, we have a limited number of Ambulances at our disposal, but in the case of war, motor lorries with little difficulty could be converted into motor ambulances. In any case, additional drivers and attendants would be recruited from this Service. The organisation of Ambulance Transport would be under a special officer and these ambulance depots would be central and on the telephone.

Provisional Preparations

It is necessary now to work out "Provisional Preparations" and I am glad to say that provisional preparations are now under consideration. The preparations which Madras is making can be summarised as follows:—

Sites are being selected as depots for First Aid Parties and lists of equipment have been made and the source from which it could be assembled.

Sites for First Aid Posts have been selected throughout the City of Madras.

A survey is being prepared of the accommodation available for the necessary Hospitals.

The St. John Ambulance Brigade No. IV Division is being strengthened and systematically trained and women both British and Indian are being trained in First Aid and Home Nursing to form Nursing Divisions of this Association.

Local medical men are being recruited to give their services in case of emergency.

Ambulance Transport is being tabulated and an estimate made of the number of Supplementary Ambulances which would be needed and could be improvised from motor lorries.

Public Health—The Foundation of Nation-Building *

• Sir Colonel A. H. Russell, C.B.E., K.H.S., I.M.S., Public Health Commissioner with the Government of India

Many of you no doubt are acquainted with the Biblical story of the wise man who built his house upon a rock in contradistinction to the foolish one who built upon sand with disastrous results. Similarly in nation-building, we must be sure of our foundations and it is my purpose tonight to try to demonstrate to my listeners that the one sure foundation on which to build a happy and prosperous nation is that of health,—not only health of the individual but health of the community. We are all so apt to leave community health, or public health as it is usually called, to the other fellow, forgetting that it is the cumulative effort which counts so much. So it is that I have no hesitation in claiming that public health, and all that that phrase implies, is the sure foundation on which to erect the structure of national health. Without that foundation, no nation can hope to be strong enough to resist successfully the strain of economic and social storms.

The purpose of all nation-building activities is to make the life of every citizen fuller, richer and happier. This implies that the individual citizen should be provided with suitable opportunities for a desirable self-expression, in respect of his physical, intellectual and emotional equipment, because only by that means can he hope to enlarge his experience and his capacity for enjoyment of life. Modern public health development stands for the creation and maintenance of all those conditions which will enable each individual to attain these objects. Sickness, pain and suffering, poverty, malnutrition, maladjustments in his home or in his work or in his social environment, these are largely responsible for depriving the average citizen of his inherent right to enjoy life. A well-organized public health campaign must take cognizance of all those deterrents to happiness and I for one believe that in the advance of public health we have the solution.

For many centuries past, human society has recognised the necessity for treatment and care of the sick, but the conception of prevention of disease and sickness by means of an active programme of ameliorative measures intended to render it possible for the people either to maintain health, or, at least, to live more healthy lives, is one of much more recent origin. In fact, it is not yet 100 years since in England the importance of preventive medicine came to be recognised and was made the foundation of the many-sided social and health services now in existence in that country.

But, you may ask, how does the public health worker seek to bring greater happiness to the individual and to the community? It is by no means easy to summarise in a brief talk the many different directions in which health work should be planned, because it has become obvious,—at least to those who have real vision,—that preventive medicine includes in its range of activity, "the whole nature of man, as shaped by his home, his surroundings, his work, his recreation, his struggles and his aspirations." This, as you will appreciate, is a formidable task, but, for my purpose tonight, it might perhaps be divided into four parts:—

(1) State aided health services capable of providing care for every individual, from the pregnant woman and

* A Broadcast Speech from. Delhi Feb. 14-39.

unborn child to the adult and the aged. These services would also include separate branches for special health problems such as those associated with tuberculosis and leprosy.

(2) Improvement of environment by the provision of sanitary houses, fresh air, pure water and nourishing food, both for humans and cattle.

(3) Education of the people.—especially the wives and mothers.—in the principles of health so that the active co-operation of every individual may be obtained. The search for health demands the abandonment of many undesirable habits and the practice of others which science has shown to be necessary to man's well-being, but here perhaps we are faced with our greatest problem because "all our life, so far as it has a definite form, is but a mass of habits"—good, bad and indifferent and the inherent inertia of man always acts as a serious handicap to change.

(4) Promotion of physical and mental welfare with the object not only of increasing the resistance of the body to disease and of promoting happiness in bodily activities, but also of assisting the individual to secure harmonious development of his intellectual and emotional faculties.

Such a comprehensive programme must of necessity lay a heavy burden of expenditure on the State and, even in the wealthiest countries, it has been found impracticable to carry it out other than by successive stages, and, then only, as and when the necessary public funds become available. It is not sufficiently realised, however, that all social and economic progress is seriously hampered by sickness and a low level of physical fitness, and this is particularly true of India. Improvement of public health is essential if, for instance, the working capacity of the agricultural or industrial labourer is to be raised; and those acquainted with existing conditions in this country are only too well aware of the handicap to efficiency which is caused by bad health and poor physique. The fact that the deaths from malaria in British India alone total 1,250,000 yearly indicates the amount of suffering, incapacity for work and loss of income caused by this one disease especially among the rural agricultural populations, on whose productive capacity the prosperity of this country so very largely depends. Another striking illustration may be found in the large numbers of deaths among young mothers and their infants, and these, of course, represent only a small fraction of the amount of ill-health and suffering which is borne by the women of India. Whilst no estimate can be made of the economic loss these and other mortality figures represent,—although it must extend to many crores of rupees each year,—they certainly point to the necessity for progressive health work as the essential foundation for sound and secure nation-building.

Another aspect of the economic question is that State action directed towards improvement of health has undoubtedly beneficial repercussions in many other directions. Take, for instance, the question of nutrition. During more recent years, we have been able to obtain a more accurate picture of the amount of malnutrition from which the people of this country suffer, and it has also been shown that an adequate state of nutrition is of the greatest importance, not only in the prevention of disease but also in increasing man's resistance to infection and his sense of well-being. Solution of the nutritional problems in India, however, depends on improved agricultural and animal husbandry practices, the development of trade and industry, the encouragement of co-operative enterprise, banking and other activities. There is no shadow of doubt that every step towards better national health will lead to the development of all these

activities which are so fundamental in any nation-building campaign.

Improvement of public health demands that every individual should develop a sense of responsibility in respect of his neighbour's welfare in addition to his own. It is not enough for the house-holder to keep his own restricted environment tidy and clean, if by doing so he creates afresh conditions favourable for the development of ill-health in his neighbour or in the community. Modern science has shown that, in matters relating to health, man is his own worst enemy and much of the disease which now works havoc over large areas could be avoided if the community sense were better developed and if the individual were brought to realise the danger of his own actions to community health.

The remedy for these errors, which are usually—but not always—the result of sheer ignorance,—lies in health education, that is, in teaching the people how to avoid actions which assist in the spread of disease. Such instruction is essential for real citizenship, because it is only when the individual comes to realise that his interests and those of his neighbours are identical in respect of health matters that he develops the wider outlook which is so essential if his actions in other spheres of life are to be to the benefit of the State and to his fellow-citizens.

The history of the public health movement in England and elsewhere clearly indicates that the initial stimulus towards necessary reform has repeatedly come from private individuals or from voluntary organisations. Whether it be in respect of factory legislation for the improvement of the conditions of factory workers, of measures for saving the lives of mothers and infants, or of prevention of tuberculosis or of other efforts for alleviation of human suffering voluntary effort has led the way to State action in practically every civilised country. Even when Governments have assumed responsibility, there always remains room, however, for the resources in time, money and labour of humanitarian individuals and voluntary organisations in supplementing official activities. It has been remarked that "to save and prolong man's life, there is nothing so effective in the long run as collective humanism". There is no doubt that "collective humanism" is a living force in this country, as the recent result of Her Excellency's appeal on behalf of the tuberculous sufferer has indicated, but the urge towards high human endeavour requires a much wider development if it is to meet adequately the heavy and urgent demands which must be obvious to all thinking men and women in this country. In so far as the public health movement can help to foster man's fellow feeling for man, its contribution towards nation-building will be of an enduring and beneficent nature, resulting in a vastly desirable increase of human happiness and well-being.

Health of University Students*

● Dr. V. Krishna Row, L.M.S., Medical Officer, Presidency College, Madras

The duty and function of a University, in regard to the health of the students, have been well emphasised by the Calcutta University Commission Report (1917-19).

"The University must be in a position to assure the public that the students, to whom it awards its Degrees,

*A memorandum submitted to the Inter-University Board, Bombay on 15-2-39.

have received their training under conditions favourable to health and character, as well as to intellectual attainments."

That Universities afford ample opportunities to develop and achieve intellectual attainments need no comment. But how far, they have *equally* attended to favourable healthy conditions, let each University, each Vice-Chancellor, and each Government answer frankly. It is a tale of not having done the right thing.

Thanks to the above Report, the Universities throughout India, have imposed statutory obligations on all the affiliated and constituent Colleges to have the students medically examined once in 3 years, regularly from 1927 onwards. But beyond this, they have not taken any step to make this scheme (which is part of a major national health policy, to build a healthy citizen, *a firmer*). There is no follow-up medical work. The present medical inspection of elderly College students is a waste of public money, for it benefits neither the students concerned nor the institution, nor the doctors.

It is true that medical examination of children, the future citizens, has begun at the wrong end (with grown up boys) rather than young school-children. But this is no excuse for any University to shake off its responsibility, in a distressed country like ours. Unless the University (elder brother) leads, the school (younger brother) will not follow, or even emulate—which all result in a growing race of sickly, undeveloped, underfed people, *unfit* for any walk of life.

The evil effects of higher education on the health of the students, the future prop of the country, have been forcibly expressed by leaders, from Swami Vivekananda to Mahatma Gandhi. The present educational policy has resulted in the cartoonist caricature of an educated or literate Indian (synonymous with a University product), as "*all head and no body*." That is, his normal physical body-build has not grown and kept pace *paripassu* with the rapid growth of his intellect, resulting in poor physical wrecks of otherwise intellectual or intelligent giants. A University student or graduate knows all about History, Geography, English literature, Mathematics, and Sciences, except his own vital health problem. Obvious instances of great living Indians and sickly graduates could be cited, if necessary. Suffice to point out, the principle, *Mens Sana In Corpore Sana* has been practically ignored in producing an educated Indian.

A fallacy exists that the students (16-20 years) manage to keep their health intact, during their University career, but in reality they do not. Not only they do not keep good health but also they deteriorate in their physical strength and body-build, during this precious period. My research work into the causes of students' absence from College studies has shown that nearly 55% of them fall sick and complain of remediable diseases, which affect them in later life, after leaving the school or the University.

The percentage of Indian recruits rejected by the Indian Army is 37 for 1937 and 36 for 1936—an increased percentage. The diseases which have disqualified them are the common eye-troubles (trachoma), ear-ache, heart disorders, tonsillitis, and venereal diseases.

My College statistics regarding the physical defects tell the same sad story, for all the 12 years of my examination. The percentage of diseases is on the increase. I find there are increasingly more students suffering from heart disorders, lung weakness, bad state of nutrition and nervous temperament than in previous years.

If this is the state of affairs in an aristocratic and well-to-do students' population of the premier insti-

tution, one might as well guess the poorer state of less fortunate students in other less endowed Colleges. If this again is the regrettable health condition of elderly college students, how much more so in elementary and secondary school-pupils, who come from lower strata of society, and who do not get the benefit of any medical examination or advice, it is needless to comment. The health reports of premier municipalities on school-children are anything but complementary.

PHYSICAL EDUCATION OR TRAINING

The word "*physical education*" is a misnomer in India to-day. The correct word should be "*physical training*." Any how, it has become the parlour-language, by constant usage. Fetish is made of the term and its significance. My short notes would help to show that the entire physical training activities in India have again been looked at from the wrong angle, like the scheme of medical inspection. There is too much loose talk and also thinking about physical training by responsible officers in position.

UNIVERSITY TRAINING CORPS AND MILITARY TRAINING

A glamour has been spread about the military training and the U.T.C. This idea originated with the late Mrs. Annie Besant, in creating a citizen army, and the formation of the I. D. F. (consisting of University students) in 1917. The present U.T.C. and the military training has no health basis and no proper foundation of physical well-being. As long as the physique is poor and general level of health is low, the present approach to the military training and the U.T.C. is just like the cart being put before the horse. Till sincere attempts are made to improve the health of the Nation and secure better health-welfare, all talk about military training would be mere platitudes, which serve no useful and definite purpose. The passive anti-gas training for our U.T.C. cadets without a strong lung, good health, and well-developed body, would only result in our younger generation being made the targets of attack by diseases and bullets. The U.T.C. has been in existence for the last 15 years. What beneficial purpose has it served, except as a stepping stone to jobs? As it is, it has not yet played any practical part in the politics of our country. The primary need of the hour, is therefore, the proper and careful health education of the youths and children, on the right lines for the benefit of the Nation, healthy and physically fit for any walk of life.

I may draw your attention that the Inter-University Board took active interest in 1931 in issuing a brochure—instructions to medical officers regarding the medical examination of the pupils—but they have not taken any further action, to note whether their recommendations have been actually carried out. Their enthusiasm has evidently waned. This is regrettable.

Few teachers have interested themselves in the health of their students but this does not serve the purpose of a uniform policy throughout India—the health, happiness, and well-being of children. The apathy of the educational authorities could be noted from the fact that the Central Advisory Board of Education to the Government of India, that met under the Chairmanship of Hon. Sjt. B. G. Kher, Premier of Bombay, in last January 1938, while considering a number of subjects, Wood-Abbott's reports and even religious instructions failed to tackle the health problem.

The Public Health Departments have been devoting their attention to the treatment of those who actually fall ill.

"To cure is the voice of the past, to prevent the divine whisper of to-day".

The present unhealthy state of children in India is *all due* to the fact that we have been till now treating health problems in a *laissez-faire* manner, a social question, rather than of nation health-building activities.

My suggestions to improve the health and physical fitness of students (which I had submitted to the Madras University), is enclosed for general adoption. As conditions of ill-health are practically the same throughout India, the same remarks hold good. And it is for the Central Inter-University Board to suggest the necessary changes in the existing unhappy order of affairs.

The problem that is most likely to absorb your Board's immediate attention is:

"Whether education is to be used as a means of making good human beings, or a particular type of thinker, needed by the State at the time, or whether the administration is to be strongly centralised in a small group of people, who can easily have a mistaken conception of what is best for the Nation".

I venture to suggest and submit that the success or failure of your meeting would depend to the extent that you give the correct answer and the right lead to these vital problems at the present historical period of Indian renaissance.

This is the most propitious moment (when we are enjoying provincial autonomy), to inaugurate health reforms, which are as necessary and important as the agricultural, educational, prohibition, political, or any other reform. The Inter-University Board is in a position to exert its positive influence on the body-politic of our country by adopting some suggestions, made here. "If it were done, 'twere well, it were done quickly".

I appeal to the Inter-University Board to take up this question now and in right earnest. My humble services are placed at its command. May God bless the Board in its worthy endeavours for a cause—the primary cause of the youth's health, and make "THE YOUTHS OF THE NATION THE TRUSTEES OF POSTERITY".

APPENDIX I

Suggestions to the University of Madras to improve the physical fitness and health of the College students: made in 1937-8.

1. Medical examination of students to be extended to all classes in the College—from 1st to 5th years. This would naturally lead to a *Follow-up* policy.

2. The present medical inspection schedule forms require modification, so as to be in conformity with what is advocated by the Inter-University Board, 1931.

3. A small health "clinic" for each College, with a College health committee to be instituted, for the small sum of Rs. 50/- per annum. The objection that this medical service to students is possible only in residential Colleges, and not like those affiliated to the Madras University should be over-ruled in the interest and welfare of the students.

4. Gymnasium classes should be re-introduced and all Colleges must be made to provide themselves with gymnastic apparatus, out of the "Game Fees", collected which has been rightly or wrongly called an *Impost* on the parent.

5. The University Training Corps should be made more attractive and popular, so as to make it available to all classes of students; only 600 students are admitted out of a students' population of 13,000 and odd.

6. The large expenditure on "physical education" synonymous with playing of sports and games should be better utilised, with real and permanent advantage to the students.

7. An annual report on the health of the University students should be published.

APPENDIX II

Physical fitness statistics.

"STATE OF NUTRITION"—(ENGLISH STANDARD)

* Indian students (16-20 yrs.) English Boys (below 16 yrs.)		
Excellent	8.7 %	14.6 %
Normal	60.0 %	74.1 %
Sub-normal	24.2 %	10.6 %
Bad	7.1 %	0.7 %

* These data are the average of 2,000 South Indian students, judged by me, according to the latest British standard of computation and assessment. The figure for the British boys is taken from the Report of the Chief Medical Officer, Board of Education, England.

LEVI'S INDEX OF NUTRITION—BETWEEN 17 & 21 YRS.

South Indian students	2.19*	
Bengal Hindus	2.22	
Mysore students	2.25	
High caste Hindus	2.26	
Low caste Hindus	2.25	
Red Indians	2.13	
North Chinese	2.38	Vide Calcutta
South Chinese	2.29	University stu-
Javanese	2.25	dents' Welfare
Japanese	2.37	Report 1930.
Belgians	2.37	
Dutch	2.37	
English	2.38	
Swiss	2.39	
Jews	2.39	

LEVI'S INDEX FOR AGE 12 IN INDIA

Madras Corporation schools	2.11*
Bombay " "	2.15*
Bengal " "	2.23
New York corporation "	2.21*
Mahratta boys in Bombay	2.21*

N.B.—I have selected the age 12, since this is the average age, when the boy settles to reading and understanding of education, imparted to him. It is self-evident our Indian boys & students have a *lower index* than other races.

VITAL CAPACITY OF LUNGS OF STUDENTS

Bengal students	2.50 litres
South Indian students	2.10 litres*

N.B.—Those figures are 10% less than American figures. * Denotes my own research work figures into the physical fitness of South Indians.

ASSAM MEDICAL COLLEGE DAY

A public meeting was held at Dibrugarh on Sunday the 12th February 1939, to observe Assam Medical College Day. Many gentlemen of the town and a large number of medical men and students were present. Khan Bahadur Saidur Rahman, M. A., B. L., M. L. A. was voted to the chair.

Dr. S. P. Nath in explaining the objects of the meeting gave a short history of the origin of the Western Medical Science in India from the time of East India Company and the designation of the country doctors according to the particular fancy of the military surgeons. He appealed to the public to demand for the better training of medical men by raising the status of the medical schools to that of colleges.

Mr. J. C. Sen, B. L., spoke in favour of conversion of the B.W. Medical School to that of a college. He said that there will be no difference of opinion about this or out of the Assembly. He said that the average area served by each Dispensary in Assam is 160 sq. miles. and the average cost under the head—medical aid—is

one anna and eight pies per capita, which is quite inadequate. He emphatically impressed that the villagers have got their legitimate right to claim for better medical aid. He requested the public to urge on the Government for immediate reforms in medical education on the lines of the Madras Government. Dr. Rahman, Dr. K. L. Ghosh and others supported the object of the meeting and said that one and all should unite to put forth the demand of a Medical College in Assam.

"It is a matter of regret that public has not taken the cause in right earnest and that a certain section of medical men are also apathetic to this," said Khan Bahadur Saidur Rahman in his learned Presidential speech. He continued: "In these days of socialism there should not be any caste system among the medical men. The cause of medical education is a matter of every-day interest. From the time of birth till death we require help and advice of doctors. Rural uplift, which has recently attracted the attention of all, cannot be done without the help of medical men. This claim to raise the status of the B.W. Medical School is a legitimate one. From the interpellations during the last session of the Assembly he showed that the Government is already spending nearly one lakh and a half annually including the contributions to the Bengal Government for the medical education of this Province and this with the tuition fee and income from other sources will be sufficient to run a Medical College without further grant." He concluded by saying that as the consensus of opinion is in strong favour and there is growing demand, the Government should borrow money, if necessary, for the initial expenditure to start a Medical College in Assam.

Mr. K. K. Nath, M. A., B. L., said that every one now feels the necessity of a University for the Province. "There is appeal for legal matters to the higher courts up to Privy Council, but there is no such appeal if a life is lost either through mistake or ignorance of a doctor," said he, while stressing the need of better medical aid to the rural public and the establishment of a medical college in Assam. He then moved the following resolution which was carried unanimously.

"Resolved that in view of decision of the A. I. M. L. Association, the recommendation of Representative Conference at Delhi for future medical education and the Health Ministers' Conference held at Madras, to adopt only one uniform standard of medical education throughout India, without lowering the standard of University education, the Government be moved to raise the standard of the B.W. Medical School, Dibrugarh to that of University College at an early date.

Further resolved that the course of the B.W. Medical school be forthwith raised to five years with I.Sc. as pre-medical qualification for admission and copies to be sent to the Hon'ble Minister, medical department, the I.G.C.H., Assam, to the Press and the medical journals."

SERVICE NOTES

[As per Resolution No. 18 of Gauhati Conference, A. I. M. L. A., we are publishing below only the transfer and leave of such of the Sub-Assistant Surgeons in each province who are only members of the Association. The numbers given against their names indicate their membership roll number—Ed., I. M. J.]

U. P.—January 1939

- 2516 Dr. Shiva Lal, Bazpur, Nainital, leave 14-1-39 to 28-4-39.
94 ,, Raj Bahadur Nagina Bijnor, leave 5-1-39 to 25-1-39.

- 2571 Dr. Ram Prasad, Rajapur, Banda, leave 25-1-39 to 24-2-39.
891 ,, Manohar Behari Lal, Kandhla, Muzaffarnagar, leave, 19-1-39 to 18-3-39.
2387 ,, Puran Mal Garg, Kitcha Nainital, leave 28-1-39 to 27-2-39.
1669 ,, Lal Bahadur, leave to Police Hospital, Lucknow.
397 ,, Rikhab Chand, Kunwarpur, Sitapur, to Jail & Police, Unao.
477 ,, Jagat Narain Mathur, Jail & Police, Unao, to Reserve Duty, Cawnpore.
252 ,, Zahuruddin Rizvi, Deoband, Saharanpur, to P. M. S. charge, MacLaren Leper Hospital, Dehra Dun.
2536 ,, Shiva Kumar Divedi, Reserve Duty, Hamirpur to Naraini, Banda.
2726 ,, N. L. Garg, Solon, Rae Bareilly, to Sadar, Rae Bareilly.
389 ,, A. D. Bhandari, (R. S.), S/C Balrampur, to P. M. S. Charge, Balrampur.
1369 ,, Jai Krishna Lal Arora, Jail & Police Hospital, Basti, to Bela Haria.
2112 ,, Harish Chandra Varma, leave to District Jail, Etawah.
94 ,, Raj Bahadur, leave to Jalesar, Etah.
1639 ,, Chandu Lal Modi, Jail & Police, Muzaffarnagar, to Budhana, Muzaffarnagar.
146 ,, Ram Chandra Singh, Budhana, Muzaffarnagar, to Nagina, Bijnor.
1375 ,, Bhagwati Prasad Srivastava, leave to Maharajganj, Rae Bareilly.
2956 ,, Ahmadullah, Tanda, Fyzabad, to Bausdib, Ballia.

Punjab—January 1939

- 128 Dr. Jagan Nath, leave to Kotla Dispensary.
2229 ,, Chaman Singh, General duty Civil Hospital, Ludhiana, to General Duty, Sirsa.
36 ,, Tulsi Das Mehtani, General duty, Civil Hospital, Multan to Kabirwala Dispy.,
2162 ,, Kishore Chand, General duty, Civil Hospital, Amritsar, to Demonstrator in Materia Medica, Medical School, Amritsar.
2180 ,, Chuni Lal Sharma, General duty, Civil Hospital, Montgomery, to General duty, Civil Hospital, Hissar.
2948 ,, Narindar Singh Bedi, leave to General Duty, Civil Hospital, Rohtak.
2948 ,, Narindar Singh Bedi, General Duty, Civil Hospital, Rohtak, to Kosli Dispy.,
2110 ,, Abdul Wadood Qureshi General Duty, Civil Hospital, Amritsar, to Jalalabad.
2054 ,, Sadiq Ali Bokhari, Barapind Dispy., Jullundur District to General Duty, Civil Hospital, Amritsar.
710 ,, Harcharan Singh, General duty, Civil Hospital, Gujrat, to General duty, Civil Dispensary, Lahore.
565 ,, Jai Gopal, 2nd class senior, Dipalpur Dispensary, Montgomery District to Okara Dispensary.
1943 ,, Zia Ullah Qureshi, General duty, Civil Hospital, Ambala to Ballabgarh Dispensary.
2147 ,, Datlat Ram Mainderatta, L. T. M. (Calcutta), leave to General duty, Mayo Hospital, Lahore.
2064 ,, Tulsi Ram, D. T. M. (Calcutta), 2nd class senior, invalided on expiry of leave.

Bengal—January 1939

- 3305 Dr. Hem Chandra Mukherjee, Supernumerary, Campbell Hospital, Calcutta to Brahmanbaria Dispensary.
857 ,, Sureb Chandra Das Gupta, Senior grade, Brahmanbaria dispensary, Tippera to Supernumerary, Sadar Hospital, Comilla.
205 ,, Shyamapada Roy Choudhury, Honorary Jamadar, Bashirhat Sub-division and dispensary 24 Pargs. to Sadar Hospital, Jessore.
694 ,, Atulananda Chakravarty, Selection Grade, Sadar Hospital, Jessore to Bashirhat Sub-division and dispensary.

in towns and districts where they do not exist. An appeal along with this resolution be sent to all the licentiates in the province under the signature of the President.

(3) Read the Government communiqué appointing a Committee with its terms of reference including the important questions of raising the standard of Agra Medical School, appointing honorary physicians and honorary surgeons for hospitals, permission for licentiates to obtain M. B. B. S. degree and setting up some standing machinery to advise Government in medical matters etc. The Standing Committee notes with regret that there is not a single representative of this Association as such in the Committee, when most of the terms of reference seriously affect the licentiates. The Secretary brought to the notice of the committee various representations and D. Os. addressed to the Hon'ble Minister of Health to include two of our representatives on this committee but without any effect. The committee regrets the decision of the Government on the point and thinks that it may be due to misrepresentations of those who hold views adverse to this class. The committee wishes once again to inform the Government that the Association is an old established Association having on its roll over 3000 members and on its provincial register, about 400, and that it is the only competent body to represent the views of the licentiates, who number about 2000 in these provinces, representing persons in service and in private practice.

It is essential that the point of view of the licentiates should get proper consideration; hence two of our members be taken on this committee.

(4) That a sub-committee be formed of the following members with powers to co-opt to draft a memorandum in reply to the points of reference issued by Government along with other suggestions and present them before the committee appointed by the Government:—Doctors K. B. L. Varma, (Convener), Mohan Lal, Indra Narain Saxena, R. N. Lal, P. S. Varma, Mathuri Pershad Varma. The sub-committee so formed shall prepare a memorandum and submit it to the members of the Standing Committee for their opinion and then finally redraft it and submit to the President and members of the committee formed by the Government.

(5) The Standing Committee approves the action of the President in not recognizing Dr. Mahmudul Hassan as Joint Provincial Secretary as he was not a member of the Association. The Provincial Secretary now informs that Dr. M. Hasan has recently paid his subscription and has become a member of the Association. The Standing Committee is of opinion that he be again elected as Joint Provincial Secretary and be requested to take interest in the work.

(6) Resolved that Dr. Miss T. Zachariah be elected as Joint Provincial Secretary and she be requested to take active interest in enlisting members etc.

(7) The Provincial accounts from 1-5-36 to 31-3-38 having now been audited be taken as passed in compliance with Aligarh Conference resolution No. 26.

(8) Read Auditor's objections regarding accounts. Resolved that in future all account books in the office of the Treasurer, U. P. Branch, be maintained like account books of the Honorary Treasurer and Finance Secretary of the mother Association. That the funds of the branch be deposited in some bank and that the accounts be audited every six months and all the auditor's objections and suggestions should be complied with and the objections concerning old office-bearers be referred to them with notes of the present Treasurer and the replies be sent to the President for approval and disposal.

(9) The propaganda and provincial accounts from 1-4-38 to 30-9-38 being duly audited, were read and passed.

(10) That T. A. should be paid to members of Standing Committee attending its meetings.

(11) A typewriter be purchased for the office of the Provincial Secretary and a part time clerk be engaged by the President at his discretion.

(12) That typing charges of late Provincial Secretary Dr. Bhandari amounting to Rs. 20 and covered by two payment receipts without vouchers be passed as a special case.

(13) Dr. S. L. Sharma having been a representative of our Association during the last nine years ending 15th

November 1938 on the governing body of the U. P. State Medical Faculty and also being an ex-President of the Association and well aware of the practices of the Association, presented his allegations against Dr. K. B. L. Varma President of the State Medical Faculty instead of to the committee, and the meeting hereby resolves that Dr. S. L. Sharma should be asked as to why his action should not be condemned.

As the Branch has come to know that a civil suit has been filed by Dr. Sharma against Dr. K. B. L. Varma, the Provincial Secretary, in respect of the election to the whole matter is sub-judice, the Branch therefore refrains from making any comments in respect of the allegations of Dr. Sharma against Dr. K. B. L. Varma for the present.

(14) The Branch is satisfied that the suit has been filed at Aligarh by Dr. S. L. Sharma, the ex-President of the Association, in respect of some alleged irregularities in the recent election for membership of the Governing Body of the State Medical Faculty against Dr. K. B. L. Varma in his official capacity as Provincial Secretary. The Branch therefore resolves that a sub-committee consisting of Doctors Jawahar Lal, M. L. A., Mohan Lal, P. S. Varma and K. B. L. Varma, Provincial Secretary, be formed to defend the case and the committee is permitted to spend to the extent of Rs. 200 in defending the aforesaid case in the original court from the funds of the Branch.

(15) Dr. Miss Ganga Bai Sharma having been a representative of our Association during the last three years ending 15th November 1938 on the Governing Body of the U. P. State Medical Faculty and being well aware of the practices of the association presented her allegations against Dr. Kunj Behari Lal Varma, the Provincial Secretary, to the President of the State Medical Faculty instead of to the Standing Committee; and the meeting hereby resolves that Dr. Miss Ganga Bai Sharma should be asked as to why her action should not be condemned.

(16) That bye-laws for smooth and successful working of the U. P. branch be framed and that a sub-committee consisting of Doctors I. N. Saxena and Dinesh Varma be formed to draft them subject to the rules of the Association and approval of the Standing Committee.

(17) Resolved that in order to give due effect to rule 65, the Provincial Secretary should call for the names of its representatives from each recognised branch for membership of the Standing Committee one month before the provincial conference.

(18) Read letter dated 30-11-38 from lady Doctor L. M. Chowdhry of Sambhal regarding grievances of women doctors. Resolved that it be circulated to branches and to lady doctors for their opinion after which necessary representation should be made in proper quarters.

(19) Resolved that Dr. P. L. Jaini be elected as delegate of U. P. branch to the Gauhati Conference.

(20) The Standing Committee has learnt with regret that some district boards are not making regular payments of salaries to the M. Os. Resolved that the attention of chairman concerned be invited in the matter and necessary representation be made to the I. G. C. H. and the Government.

(21) The I. G. C. H. be requested not to give any preference to junior M. B. B. S. Officers in the P. S. M. S. cadre and dispensaries. Further resolved that senior P. S. M. S. officers should not be posted to jail and police hospitals in the usual way.

(22) A memorandum regarding jail grievances should be submitted to the Government on behalf of the association.

(23) In future the boarding charges of Standing Committee members attending its meeting be defrayed from provincial funds.

(24) That a representation be submitted to the authorities in connection with the recent orders of the Government to recruit 10% M. B. B. S. in P. S. M. S. cadre while only 3% P. S. M. S. are taken into the P. M. S. cadre.

Mussorie (U. P.): Meeting held on 7-1-39. 3 members were present.

Resolution:—This branch puts on record its sincere and heartfelt sorrow at the untimely and unexpected demise of Dr. S. L. Sharma and expresses its deep condolence and sympathies with the bereaved family. The death of Dr. Sharma has caused a great and irreparable loss to the Association as he was an indefatigable worker of the Association practically throughout the whole of his life time and was a great supporter of its cause and held important offices in the Association. Resolved that a copy of the above resolution be sent to Mrs. Sharma, Aligarh.

Bareilly (U. P.): Meeting held on 20-1-39. 5 members were present. Dr. R. S. Garga spoke on the life of late Dr. S. L. Sharma.

Resolution:—1. That the members deeply mourn the sad demise of Dr. S. L. Sharma, the ex-President of the A. I. M. J. A., member of the U. P. Medical Council and U. P. State Medical Faculty, and offer their sincere condolence to the bereaved family, and pray that his soul may rest in peace. Further resolved that a copy of this resolution be sent to his family and also to the press.

2. The proceedings of the last meetings of 12-9-38 and 25-10-38 were read and confirmed.

3. That this branch has learnt that resolution No. 10 was passed in the meeting of the Standing Committee at Agra on 29th and 30th October 1938, in which it was proposed that in appreciation of the services of Dr. S. L. Sharma (now deceased) a prize known after his name be awarded annually to the best student in Dissection at the Agra Medical School. Now this branch recommends that it is good opportunity that this resolution be brought into practical shape as a memorial.

4. That this branch has learnt with great pleasure that R. S. Dr. R. N. Lal has unanimously been elected as Chairman of City Board, Mussorie, and this branch offers its sincere congratulations to him on this achievement which he so richly deserves.

5. That in the vital interests of the efficiency of the work of the dispensaries maintained by the local bodies, the services of the compounders and menial servants attached at these be placed entirely under the civil surgeons and the medical officers respectively without the least intervention of other bodies. An appeal in case of the dismissal of compounder shall lie to the Board and in case of menial servants to the Civil Surgeon. A copy of this be sent to the I. G. C. H., U. P., and to the Secretary to the U. P. Government Medical Department, through the Provincial Secretary.

6. Read resolution No. 5 of the Family Fund regarding transfer of office to Bombay and recorded.

7. That the contingent bill from 12-9-38 to 19-1-39 and T. A. bill of Dr. R. S. Garga, delegate to Gauhati conference, as presented by the Secretary be passed.

8. Election of office-bearers for 1939:—Dr. Krishna Sahai—President, Drs. Babu Ram and Shyam Behari Lal Gupta—Vice-Presidents, Dr. R. S. Garga—Secretary.

Nainital (U. P.): Meeting held on 20-2-39. 3 members were present.

Resolution:—This branch expresses its heart-felt sympathy with the members of the family of late Dr. S. L. Sharma who died on 4th January 1939. The services which the late doctor rendered to the Association are well known.

The bill of doctor Balmukund for attending Gauhati conference was passed for Rs. 65-8-6.

Resolved that the next meeting be held at Ramnagar.

Nadia (Bengal): Meeting held on 25-1-39. 16 doctors were present. Dr. D. N. Adhikary at first gave an introductory speech. Dr. K. R. Ray, Secretary of the branch described the present situation of the A. I. M. J. A. and claimed the full co-operation and sympathy from all the doctors employed under the District Board, Nadia, and from other non-members of this district. Scientific discussion on "Beri Beri" were made by the members present.

9-2-39. 10 members were present. Proceedings of the last meeting were read and confirmed.

Considered the letter of the Provincial Secretary, Bengal, No. 13 dated January 1939. This branch approved the idea of the conference.

Resolutions:—1. It is resolved that Dr. K. R. Ray, Secretary of this branch and Dr. D. N. Adhikary be

appointed as members of the Provincial Standing Committee, Bengal.

2. This branch nominated Dr. A. D. Mukherjee of Calcutta for the presidency of the next Bengal Provincial Conference.

3. Drs. K. R. Roy and J. N. Ray have been elected as delegates to attend the Provincial Conference, Burdwan.

4. Monthly accounts for January 1939 were examined and passed.

5. The present rate of house allowance at the rate of Rs. 5/- per month for the relieving medical officers of the District Board, Nadia, is too inadequate. Under the circumstances either the allowance should be increased at the rate of Rs. 10/- per month or a free quarter be provided in lieu thereof. A copy of this resolution be sent to the Chairman, D. B., Nadia, for favourable consideration.

6. Scientific discussions on Small Pox and Tuberculosis were made by the members present.

18-1-39. 10 members were present. Read and confirmed Burdwan (Bengal) Meeting held on the proceedings of the meeting held on 13-12-1938.

Election of office-bearers:—Dr. Satya Charan Mitra President, Dr. Rama Prosanna Roy, Vice-President, Dr. Bannanda Mukherji Secretary, Baidyanath Sen Gupta, Assistant Secretary, Dr. Atulpathi Banerji Treasurer, B. N. Bose, Auditor, Dr. Sisir Kumar Sinha Propaganda Secretary.

Executive Committee:—Doctors Paritosh Mukherji, Bhutan Mohan Sen Gupta, Ajit Kumar Chakrabarty, A. Hamid, Jaigopal Ghosh.

Dr. Sisir Kumar Sinha be requested to take active steps to recruit new members to the Association and all the members of this branch be also requested to enroll members of the Association.

Unanimously resolved that a draft letter addressing all the medical licentiates of this District be printed and circulated by post in order to hold the Provincial Conference at Burdwan.

The contingency bill amounting to Re. 0-14-6 for the month of December 1938 was passed.

26-1-39. Special meeting held at the Ronaldshay Medical School, Burdwan. 40 members were present. Unanimously resolved that the 6th Provincial Conference be held at Burdwan. Reception Committee:—Drs. Satya Charan Mitra Chairman, Dr. Baidyanath Sen Gupta Secretary, Dr. Bhualendra N. Bose Jr. Secretary, Dr. Atulpathi Banerji Treasurer, Drs. Anil Mohan Bhattacharyya and Sisir Kumar Chatterji Volunteer Captains.

Resolved that a minimum fee of Rs. 2/- be fixed for membership of the Reception Committee.

Resolved that the date of holding the conference be Sunday, the 12th March 1939.

14-2-29. Monthly meeting. 5 members were present. Read and confirmed the proceedings of the last meeting. Considered provincial secretary's letter No. 24 of 24-1-39. The following members are appointed as members of the Provincial Standing Committee:—Drs. Gunananda Mukherji, Secretary, and Atulpathi Banerji.

The following members are appointed to form a sub-committee to draft the resolutions for the ensuing 6th Provincial Conference:—Doctors Satya Charan Mitra, Joygopal Ghosh, Gunananda Mukherji, Atulpathi Banerji, Sisir Kumar Sinha and Ramaprosanna Roy. Secretary to arrange a meeting of this sub-committee.

Contingency bills amounting to Rs. 11-10-0 for January 1939 was passed.

3-2-39. 16 members were present. Proceedings of the Meeting helden last meeting were read and confirmed.

Resolution:—1. That Dr. A. D. Mukherjee be elected as the president of the ensuing Bengal Provincial Conference.

2. Resolved that any two of the following will represent this branch as delegates at the ensuing provincial conference: Doctors T. N. Bhattacharjee, H. Bagchi, M. S. Rai Chaudhuri, A. Talukdar, B. Chaudhuri.

3. The contingency bill from 1-8-38 to 31-12-38 for Rs. 2-6-0 only was scrutinised and passed unanimously. The branch secretary is requested to submit the same to the General Secretary.

Midnapore (Bengal): Proceedings of the 12th meeting held on 22-1-39. 11 members were present.

Minutes of the last meeting were read and confirmed. The postal account of the branch amounting to Rs. 0-4-6 for December 1938 was put up to the meeting and passed unanimously. A suggestion for holding a District Medical Licentiates' Conference at Kharagpur during the ensuing Easter holidays under the auspices of the A. I. M. L. A. was put up before the meeting by Dr. D. K. Dutt. The idea was welcomed by all present and a reception committee was formed for the purpose. It was also unanimously resolved that Dr. A. D. Mukherji be elected president for the same.

12-2-39. 8 members were present. Proceedings of the last meeting were read and confirmed.

Drs. J. N. Sen and D. K. Dutt were unanimously elected as delegates for the ensuing Provincial Conference. In the event of the latter's failure, Dr. B. C. Ghosh was appointed as substitute.

Drs. D. K. Dutt and B. C. Ghosh were unanimously elected to represent the branch in the Provincial Standing Committee under contemplation.

Chittagong (Bengal): Meeting held on 9-12-38. 6 members were present. Proceedings of the last meeting were read and confirmed. Circular Nos. 31, 32 of 10-11-38 from the General Secretary was read and filed. Considered circular No. 34 dated 24-11-38 from the General Secretary and filed.

20-1-39. General meeting. 11 members were present. Proceedings of the last meeting were read and confirmed. Resolved that the election of office-bearers be postponed for next meeting.

Resolved that Drs. S.B. Ghose (Secretary), A. Chaudhury, A. Quasem and D. B. Das be requested to meet all the medical licentiates of the town to enlist them as members of the mother Association.

10-2-39. Annual general meeting. Dr. J. P. Biswas was in chair. 19 members were present.

Proceedings of the last meeting were read and confirmed. The annual report for the year 1938 was read by the Secretary. The following office-bearers were elected for 1939:—President, Drs. J. C. Mitter; Vice-Presidents, D. C. Das Gupta, J.P. Biswas; Secretary and Treasurer, S. B. Ghose; Joint Secretaries A. Quasem, A. Choudhury; Auditor, D. B. Das.

Members of the Executive Committee:—Drs. M. Choudhury, J. C. Chakrabarty, Solomon Choudhury, S. C. Khastgir, M. Barua, C. H. Datta, and D. M. Ohanda.

Resolutions:—1. Dr. K. P. Sen to be the President of sixth Provincial Conference to be held at Burdwan.

2. That Drs. D. B. Das and S. B. Ghose, be elected as delegates of this branch for the sixth Provincial Conference at Burdwan.

3. That Dr. C. H. Datta be elected as a member of the standing committee of the Provincial Branch from this branch and also the Secretary.

4. That annas four only be fixed as monthly subscription for each member to meet the expenses of the branch. Rs. 2/- only, if paid in advance, will cover the subscription of the whole year.

5. That this meeting requests the members to become members of the Chittagong Medical Association, for it is in the welfare of our class that we should take more interest in shaping the policy and programme of that Association.

Madras: 22-1-1939. First Managing Committee Meeting held with Dr. T. V. Ranganatha Rao in the chair. 10 members and 2 non-members were present. Dr. G. Subbarayudu was at home to the members.

Minutes of the Managing Committee meeting held on 29-11-1938 and the General Body Meeting held on 9-12-1938 were read and confirmed.

Accounts relating to L. M. P. annual dinner held in honour of the election of Dr. D. V. Venkappa as President

of the Annual Conference of the A. I. M. L. Association for 1938 were read out by Dr. U. D. Gopal Rao and passed unanimously with a request to hand over the balance to the local fund account of the Branch as noted below:

Subscription receipts towards the dinner	Rs.	A.	P.	
Expenses towards the dinner	181	8	0	
	180	2	0	
Balance	Rs.	1	6	0

Accounts for December 1938 amounting to Rs. 5 11 0 were gone through and passed.

Dr. G. Subbarayudu, one of the delegates to the Annual Conference (1938) at Gauhati gave vivid and interesting account of the Conference and was ably supplemented by M. V. Suryaprakasa Rao, A. Viswanathan and T. A. bills of delegates, Drs. G. Subbarayudu, K. Rama Rao, M. V. Suryaprakasa Rao were gone through and passed unanimously.

Dr. D. V. Venkappa spoke of a programme of work to be carried out as early as possible and it was decided unanimously to call for a general body meeting as early as No. 59, Thambu Chetty Street, Madras. The drawing up of an immediate programme of work was entrusted to Dr. A. Viswanathan.

The following resolutions were passed unanimously:

(1) Resolved that this Branch places on record its deep sense of grief at the irreparable loss sustained by the Assn. by the death of Dr. S. L. Sharma of Aligarh and conveys its respectful condolences to Mrs. S. L. Sharma and family. Resolution to be communicated to Mrs. S. L. Sharma, Maternity Home, Aligarh.

(2) This meeting places on record its appreciation of the services rendered to the Association last year by the office-bearers of the Branch and particularly by Honorary Secretary, Dr. U. D. Gopal Rao.

(3) Resolved that this Branch requests the Local Government through the Surgeon-General with the Government of Madras, to fill up the vacancies that are likely to be caused by the retirement of Dr. K. S. Sivaramakrishna Iyer, Civil Assistant Surgeon and the impending retirement of Civil Assistant Surgeon, Dr. T. Venkatarangam Naidu by the promotion of two sub-assistant surgeons to the Civil Assistant Surgeon grade from among the class of sub-resolved that the resolution be presented personally by Drs. K. B. Bhujanga Rao and D. V. Venkappa.

(4) Resolved that the quorum of the Managing Committee meeting be six.

Letter from Hon'ble Dr. U. Rama Rao regarding his election as Patron of the above Branch for 1939 was recorded.

Tingri Valley (Assam): Proceedings No. 1. Meeting held on 29-1-1939. 9 members were present. Dr. K. P. Hare, Patron of the Branch, was voted to the chair. The President, in a sympathetic speech, explained to the members the usefulness of such a Branch in this district.

Resolved that the following office-bearers be elected for 1939: Drs. J. C. Dutta President, S. C. Dutta Secretary.

Members of the Managing Committee: Drs. D. D. Sarma Barua, H. C. Das, J. Nandi.

Resolved that this Branch of A. I. M. L. Association be named as "Tingri Valley Branch".

Resolved that the general and scientific meetings of the Branch be usually held at Keyhung Hospital, which is near to all the members of the district.

Resolved that subscription for the Branch be Re. 1/- only for each member for this year.

The next meeting will be held on 26-2-39. The subject for the scientific discussion will be "Joint pain".



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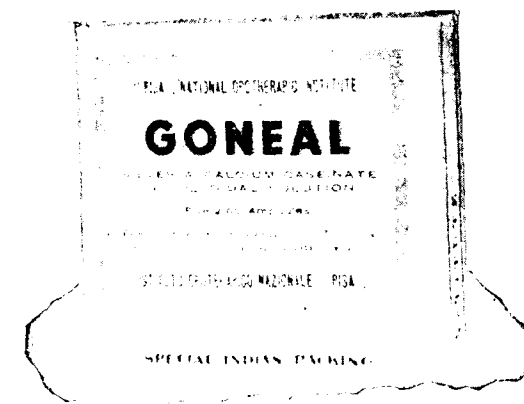
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Vol. 33. MADRAS: April 1939 No. 4

History of Medicine

We entirely agree with Prof. Tirumurthy that it is a great pity, certainly a great disadvantage, that the study of History of Medicine is not included in the curriculum of medical colleges and schools in this country. This deficiency is deplorable from many points of view. It does not imbue the medical student with that enthusiasm which is necessary to keep him continuously interested as to how and why progress has been made possible in Medicine and allied sciences, and how and why this has been co-eval with the progress of human thought and endeavour in the different departments of human activity. It does not create in the mind of the medical student that historic sense and understanding which is relevant and essential to the interpretation of what he reads today in the textbooks of Medicine. Thus the modern medical student fails to do historic justice to the great Medicine Men of the past whose contributions may look so trivial when compared to the present but without which the present position would have been impossible. It separates him from the past to which he owes his all at present. This is not fair.

It may be said that the present medical curriculum is already overburdened and it cannot be saddled with another extra subject. We know this is too true to be denied, but we think it is not impossible to make suitable adjustments. As the *Medical Officer* truly observes, the medical curriculum, as it is now, contains much that might be omitted and omits much which should be included.

We consider it desirable that a study of History of Medicine should be introduced in the fifth year of the medical course and taught within the compass of a dozen or two illustrated lectures. We do not think an examination is necessary on this subject. What is required is after all a general knowledge of the History of Medicine—a feeling of indebtedness to the past, a general understanding of the process of progress, a correct perspective of the past and the present, and an urge for the contribution to the future of Medicine.

Otherwise, the names of Hippocrates and Galen, Charaka and Sushruta, Lister and Jenner, and a host of others, innumerable to mention, carry no import to the modern student of medicine, no inspiration to work and endeavour, no goal to conceive and aspire for, and no *pubulum* to sustain his future medical practice.

No wonder that the average medical student today, all the world over, enters the portals of medical schools more with a view for a career than for service of mankind. We do not mean to say that the former is wrong, but a career with a purpose and mission is by far a nobler ambition than the mere craving of a career alone. If this unfortunate mentality is to be rectified, it can only be by making the medical student see the glorious past which would inevitably, if sub-consciously, urge him to contribute his best, howsoever little, to the future.

This back-ground seems to us very necessary in the make-up of a medical man of today. It may not materially profit him, because the recent advances have far outstripped the achievements of the past. But that is no reason to ignore them, for, out of them we have created the present.

It is from this perspective, and also because very few of us really know the trend of ancient thought, that we are publishing this month a Brief History of Medicine, covering some of its important fields. This Special Number may not be of practical use to our readers. We are fully conscious of this. Let them, then, enjoy it as a recreation—just as they enjoy in going to a cinema or a cricket match.

History of Pathology*

• Dr. T. S. Tirumurthy, B. A., M. B. & C. M.,
D. T. M. & H., F. N. I., Principal, Stanley
Medical College, Madras

"We cannot know Modern Medicine, unless we study it as a whole, in the past as well as in the present." Clifford Allbutt.

No apology is required for my choosing for the Presidential Address this year the subject—'A brief account of the History of Pathology,' when we all know that, in none of the medical colleges or schools in our country, a Chair for the History of Medicine has been created or the subject of "the History of Medicine" included in the curriculum of studies of the medical student or admitted for post-graduate study or research.

The branches of medicine have become more and more divided and sub-divided and each, in turn, so much highly specialised that the student of medicine requires a watch tower, from which he could survey Medicine as a whole from its dim, indeterminable origins in the past to its bright glorious scientific achievements of the present day. Only a study of the History of Medicine can be the golden key, which will open to the student the door of the great 'Edifice of Medicine,' wherein he can obtain an insight into the highest human endeavour to fight and subdue or prevent disease. The History of Medicine is a fascinating story of the most laborious and painstaking of all human enterprises.

Fortunately, a study of the History of Medicine is no longer merely a diversion for the ordinary historian, the philologist or the student of the classics, as it was until the close of the last century. In 1902 was founded the first German Society for the study of the History of Medicine. In 1905 the Institute for Medical History was established at Leipzig. Materials for study were collected from libraries, old manuscripts, ancient classics, biographical sketches, bibliographical references, etc. More and more materials were gathered. The medical profession, since then, have begun to realise the cultural value of the scientific study and interpretation of the evolution of modern medicine from the earliest times. Apart from its general cultural value to all persons, to the practising clinician a historic perspective of the subject is useful towards his attempts to solve many problems of disease and its processes.

* Presidential Address, Medical Research Section, 26th Session of the Indian Science Congress, January, 1939, Lahore.

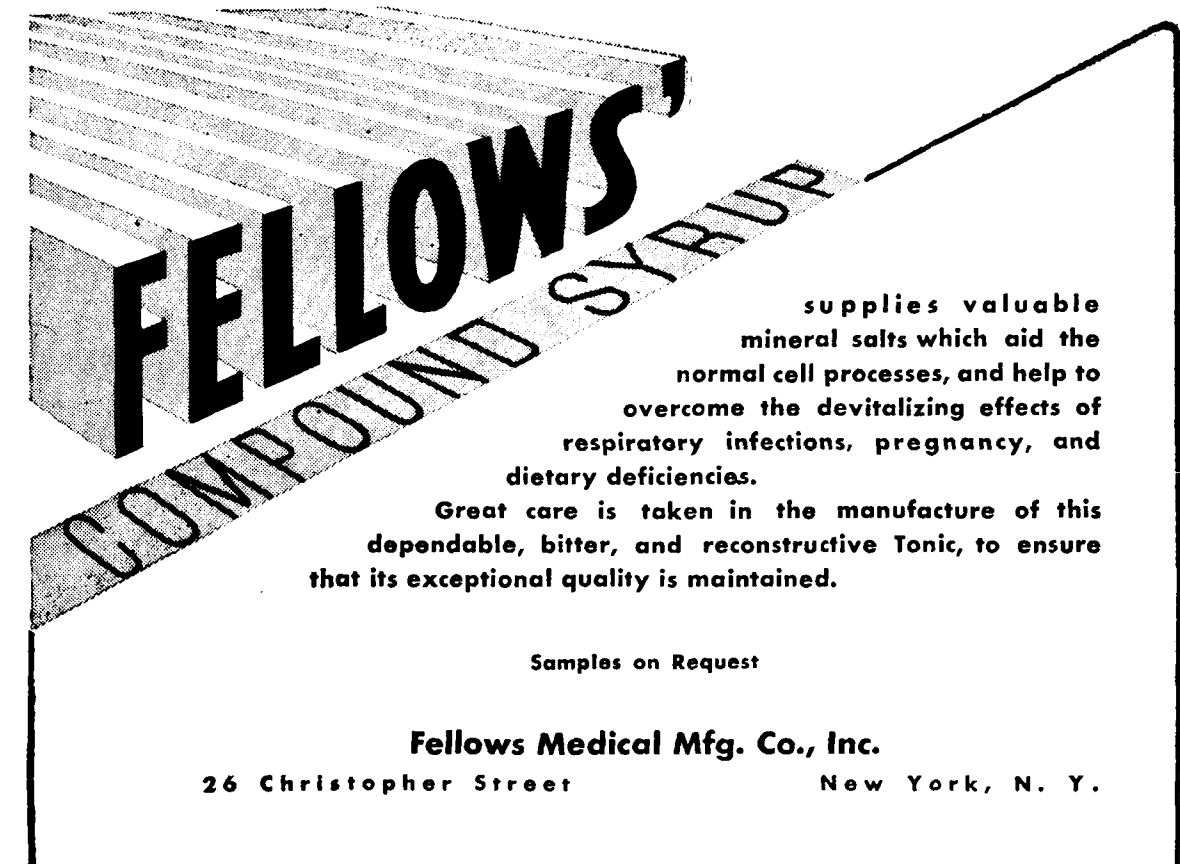
The world-famous Professors of Medicine and Surgery have been also great students of the History of Medicine, and in their writings and teachings have systematically adopted the historic approach to the elucidation of the subject. The last three decades of our century have produced a number of distinguished medical historians, but not one of them belong to India.

The essence of the scientific method should guide the medical historiographer. The History of Medicine is not a mere category of dates and names. It attempts to describe in a scientific manner from the earliest recorded times to the present day, how man reacted to his environments and their unfavourable conditions, how he got over them and in what way his wounds were healed and sufferings relieved and diseases cured or prevented. A mere listing of the herbs or drugs, used in healing the sick, or of instruments, employed in surgery, is of no great value. It will be a catalogue, not history.

The philosophy, underlying medical thought in the successive epochs of man's history, should be properly understood and explained. That the antiquity of disease is co-eval with the antiquity of man has been shown by the examination of human bones, unearthed from the bowels of the earth in archaeological explorations and geological excavations, and in the bodies of Egyptian mummies, preserved from remote times. A special subject like paleo-pathology has been ushered by the careful study of the above materials.

Separate chairs for the History of Medicine have been instituted in all progressive countries, in the Universities and Colleges. In many Universities it is a compulsory subject for a Doctorate in Medicine. In other places there are Institutes for the study of the History of Medicine. The International Society for the study of the History of Medicine has its headquarters in Paris. The Charaka Club flourishes in America and not where Charaka was born. In America and in the Continent, there are many societies for the study of the History of Medicine. Medical history libraries and medical historical museums have come into existence in other countries. Their educative value is immense. The best-known medical historical museum is the Burroughs Wellcome Medical Historical Museum in London.

In India there has been an utter neglect of the study of this important subject. Materials for such study are vast and varied. The History of Indian Medicine, including the



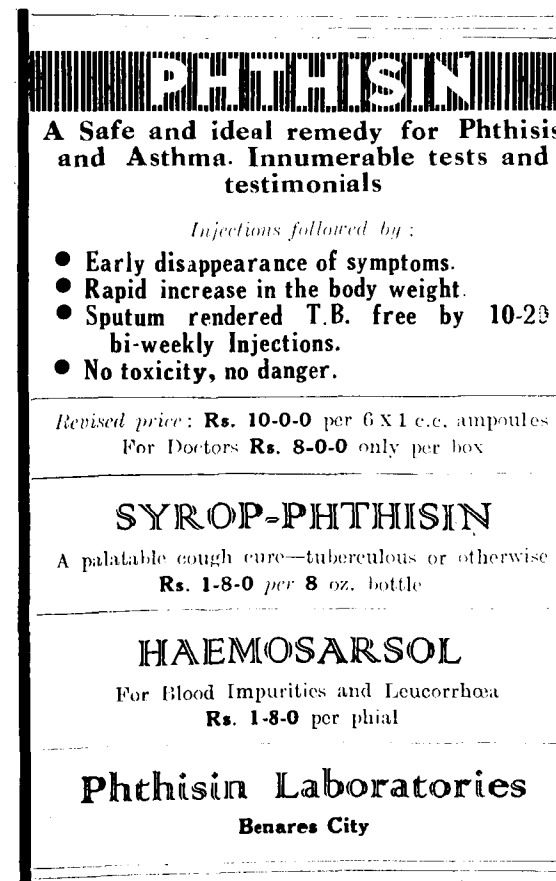
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indigenous systems of medicine, is yet to be written. The Asiatic Society of Bengal has not devoted sufficient attention to Medical historiography. Only three fasciculi of Susruta were published by it, but many of the old books of medicine in this country, written in Sanskrit and other languages, are still sealed books to us. Only the Calcutta University published in 1921 the Tanjore Manuscript of Bhela Samhita. The other Indian Universities have not endowed or encouraged medical historical research. The responsibility for research rests with both the profession and the universities. Rare texts await print: hidden books have to be searched out: old manuscripts require to be copied: palm-leaf bundles of ancient writings need attention from crumbling into powder and from attack by white-ants and moulds. The theories and descriptions of diseases in the Vedas, folk medicine in Jatakas, ancient classics, medicine of aboriginal tribes, nature and naga worship, yoga shastras, tantras, puranas, kayvas, legends, writings of other ancient historians about India, etc., will afford fruitful material for study.

The special study of, or research into the History of Medicine is not undertaken, because there is no employment open for such specialists in the colleges! And it is foolishly thought that such study is derogatory to the reputation of the doctor or is an impediment to the progressive science of medicine. Nothing can be farther from the truth.

I fervently hope that, at least in the future, the medical student will be trained to look at his subject from a historic perspective and that the universities and the medical profession will bestow some attention to the encouragement of this branch of medical science, because, in my opinion, the History of Medicine is largely the History of Pathology, the story of man's conception of the nature of disease and disease processes and his great endeavours for the cure of disease, alleviation of suffering and prevention of disease.

"Nothing gives a better prospective of the subject than an appreciation of the steps, by which it has reached its present state."

A knowledge of the History of Medicine is necessary also for the medical teacher, who wishes to distinguish himself as a really capable teacher or desires to stimulate in his students an interest for research. He should supplement the detailed presentation of his subject, by its historic milestones and landmarks, its triumphs and failures, its pathways and pitfalls.

"History maketh a young man to be old without either wrinkles or grey hairs, privileging him with the experience of age, without either the infirmities or the inconveniences thereof. Yea, it not only maketh things past present, but enableth one to make a rational conjecture of things to come." (Fuller).

The Test of Civilization—The test of civilization is the degree of advancement of the medical science of the people. The benefits conferred by the physical sciences—the train, the telephone, the telegraph, the auto-mobile, the radio, the air-plane, etc., are appreciated by the people, as these benefits are positive contributions to their convenience, comfort or pleasure. But the contributions of medical science are not remembered by the general public, as the benefits, which have accrued from it, are negative in their quality. Even the 20th century man does not appreciate them fully. His appreciation is occasionally expressed in his ardent desire to guard himself from epidemic or communicable diseases. And there are still those who offer active opposition to the progress of modern medicine. Cult healers, faith-curers, antivivisectionists, etc., will deery scientific medicine. Owing to the vast amount of illiteracy and the poverty of the people in this country, primitive ideas continue to be deep-rooted in the minds of the people. Even knowing persons have no objection to enjoy all the material comforts, which physical sciences have provided in modern civilisation, but they will still cling to ancient methods and philosophies of medicine, unable to adapt themselves to changing ideas and altered methods of the modern science and art of medicine.

The Philosophy of Medicine.—The conception of the etiology, pathology and pathogenesis of disease may be called the Philosophy of Medicine. There are two philosophies in medicine: one is the primitive philosophy, which is based on superstition, and the other is the modern philosophy, built on the bed-rock of reason and experiment. According to the primitive philosophy of medicine, disease is caused by supernatural agencies, whereas the rational philosophy of medicine teaches that disease arises from natural causes and that it is only by a knowledge of such causes that disease can be prevented. Primitive peoples continue to believe in their primitive medicine. To them disease is a mystery. But the civilized people seek to unravel by patient research this tangled skein of the thread of mystery. Even modern man's instincts and impulses, and beliefs and mental reactions are seen on analysis to be the same as those of the primitive man, many thousand years ago. Hunger and love were the two great powers to our

ancestors, as they are to us even to-day. Though still a savage in instinct and impulses, the man of the 20th Century is modern in his dress and diet, housing and furnishing, manners and speech. Though under the treatment of the best physician of the modern science of medicine, he cannot abandon his intuitive ingrained belief in the physician practising the primitive medicine of his forefathers. Few educated people have been educated to think or reason logically in matters of health, especially when they are themselves ill. Faith and sentiment are more over-powering than cold reason. We are loathe to give up the philosophies of our ancestors, and therefore willingly seek the aid of the practitioners of primitive medicine, consult astrologers, offer prayers and oblations or pay for the removal of the influence of the evil eye or for driving the evil spirit. How often our outer veneer of conventions hides a primitive savage mind and heart within! Only when civilisation advances, does rational medicine replace primitive medicine.

Origin of the Healing Art.—Ever since the existence of man, diseases have afflicted him and he has attempted to combat them. The primitive man sought medical aid only for external injuries, wounds inflicted mostly by the weapons and the blows of his enemies and the bites of wild animals, burns and bruises, fractures and contusions. It is from the instinct of self-preservation that the noble art of healing has sprung. Primitive man knew how to dress a wound, check bleeding or put up a fractured limb in splints. Archaeological research has revealed that he was fairly conversant with surgical instruments of various sorts. But about internal diseases he knew very little in the pre-historic days. We have to draw only on our imagination about the mind and philosophy of the pre-historic man.

Primitive Medicine and Super-natural Concept of Disease.—Disease has existed from prehistoric times and many geological ages. History tells us that queer and elaborate ideas, regarding the nature of disease, were entertained by man from very early times. Disease was a mystery and super-natural agencies were called to account for the origin of disease. The religious belief, in such super-natural agencies as malicious Gods or malevolent demons or evil enemies, made these primitive people to resort to their priests or witch doctors, to the use of charms or totems, or the performance of ceremonies or sacrifices, with the object of appeasing the wrath of these super-natural agencies.

As the primitive man could offer no rational explanation to the cause of disease, he conceived that super-natural agencies, such as, evil spirits, gods or demons, evil-minded witches, or adepts of the dark or occult arts, brought about disease. The treatment was, therefore, directed against these agencies.

Such belief in supernatural agencies may be seen even now in the belief of a large number of our people in astrology and omens. It is considered possible to cause disease by casting the evil eye. Belief in miracles, in Christian science and in olden days in the 'King's Touch' and in the blessings of the elderly and religious people—all these are evidences of the undoubted psychological influence of the mind over the diseased body. Even to this day, such beliefs are held by the aboriginal tribes and the illiterate and uneducated peoples. Even in many of the civilised and educated men of the 20th century, such beliefs can be exposed by psycho-analysis.

Therefore, treatment of diseases gradually became the specialised occupation with religious cults, and, in course of time, specially qualified persons to practise the art of medicine arose among them. Such were the early professional mendicants, quacks and charlatans, who offered to cure disease by magic, charms, amulets and incantations. To the same category belonged the 'Medicine Men' of the Red Indians, the 'Wise Women' of the ancient Germans and the 'Priest-doctors' of Babylon, Egypt and other countries.

Luther himself believed that some internal diseases were caused by demons. Every disease was ascribed to some demoniacal power or evil spirit. The anger of the offended deity had to be appeased or counteracted. Super-natural causes of disease were believed to be capable of being attacked only by super-natural means and occult practices. From the folk medicine of primitive times, the history of medicine has to be traced. From folk-medicine, modern medicine has developed.

During Homeric times, medicine does not appear to have been dominated by religion. Asclepius (or Aesculapius) plays the role of a king and not a God. But later Asclepius was deified and a temple was built to the "God of Healing." Subsequently, the temple structure and the image remained, but the spirit of the science of healing, enquiry and research had departed.

In the very early times, therefore, apart from the supernatural concept of disease and the collection of clinical descriptions of various diseased conditions, no systematic attempts appear to have been made for the study of

pathology, as we now understand it. Leaving the primitive superstitious and fanciful theories of disease, we next come to the humoral conception of disease in the golden age of Greece. The humoral theory appears to have been prevalent in the old Greek empire, the Roman empire and even during the medieval period. It persisted practically till the establishment of the cellular theory of the nineteenth century. The humoral theory, though of great antiquity, should be regarded as the most important of the early pathological concepts of disease.

The Sources of the Medical Art.—During historical beginnings, primitive man was accumulating facts, derived from observation and experience. In his search for food, he selected edible plants and animals and discarded the rest. He gained experience of poisonous plants and of those which had carminative, purgative, expectorant, diuretic or other therapeutic properties. He experimented with them and made also many accidental discoveries. The drugs were put to test by repeated administration in selected patients. The sources of the medical art were, therefore, accidental discoveries and repeated experiences. Also observations of nature, such as, the behaviour of diseased domesticated animals were carefully recorded. But, in spite of correct interpretation of observed facts, he was superstitious and believed in magic and miracles.

In early medieval times, the medical art had made considerable progress, but during the Dark Ages it sank into superstitious speculations. Reason and enquiry were abandoned.

When monasteries sprang up, they became the custodians of culture. With the renaissance of arts came the revival of medical science. The destiny of the medical science was determined by the standards of civilization and its progress or decay coincided with the advance or regress of civilization.

Surgery occupied a humble position, similar to the handicrafts, and the practice of surgery was regarded as a humble occupation. The name "Surgery", mutilated from "Chirurgia", is derived from the two Greek words: cheir, hand; and ergein to work. With the establishment of universities, where natural sciences and medicine were taught along with the humanistic sciences, scientific medicine branched off from folk medicine and even opposed the latter, exposing all its superstitions, and unfounded beliefs. Surgery developed along with internal medicine, until the two merged together to form the modern scientific medi-

cine. Scientific medicine is barely 400 years old and today surgery claims first rank.

Ancient Hindu Medical Sciences—Chemistry.—It developed from two sources: industry and medicine. As early as the Gupta times, India had attained to high industrial development. India was famous for the tempering of steel and King Porus is said to have asked for 30 lbs. of steel in preference to gold or silver, for being taken as a present to Alexander, the Great. The chemical industries of dyeing, tanning, soap-making etc., had then reached a high degree of perfection. Even in the 6th century, the Hindus had known the various chemical processes of distillation, sublimation, calcination, etc. From India the science of chemistry spread to the Persians and from them to the Arabs, who later were instrumental in spreading that knowledge into Europe.

Anatomy and Physiology.—Even as early as the 6th century B.C., Hindu physicians had made great advance in these sciences. The processes of digestion were well-understood. Atreya anticipated Weismann by 2400 years. Atreya (500 B.C.) held that the parental seed is independent of the parental body and contains in itself, in miniature, the whole parental organism. The development of the foetus was described with much accuracy. It was noted that the sex of the foetus remains undetermined for sometime. It was also held that the sex of the embryo could be influenced by food and drugs.

Ayurveda.—The earliest records of Hindu Medicine are in the Atharva Veda. In this work a list of diseases is found with description of symptoms and magical formula. Medicine arose as an adjunct to magic. That medicine and magic have had a common ancestry is the popular belief but it is not true. The History of Medicine reveals that medicine, though it may have had its early origins in magic, was always the enemy of magic. The oldest system of Hindu Medicine is the Ayurveda (the science of longevity), which is a part of the Atharva Veda. The Rig Veda contains over a thousand herbs, used for the treatment of diseases. Even in Vedic times, physicians and surgeons were differentiated from the magic doctors. Great physicians are said to have lived in houses, surrounded by gardens or herbaria, in which they cultivated medicinal plants.

High Standard of Hindu Medicine in Ancient Times.—The great teachers of Hindu Medicine were Susruta, who lived in the 5th century B.C., and Charaka in the 2nd century A.D. Susruta was the Professor of

Medicine in the then existing famous Benares University. He is stated, according to mythology, to have learnt from Dhanvantri, the Physician of the Gods. His works were in Sanskrit. Charaka composed an Encyclopædia of Medicine, known as "Charaka Samhita", which is still extant. Later, came Vagbhata (625 A. D.) and Bhavanisra (1550 A. D.). The latter produced a voluminous work on anatomy, physiology and medicine. He is said to have described the circulation of the blood a hundred years before Harvey.

That the medical and surgical arts had reached a higher standard earlier in India than in other countries will be evident from a perusal of the ancient works of Susruta and Charaka. Despite brahminical prohibitions, Susruta advocated the dissection of dead bodies as indispensable for the training of a surgeon. Vaccination, unknown to Europe before the 18th century, was known in India as early as 550 A. D. The science of hypnotism and hypnotic therapy appears to have originated among the Hindus. This knowledge spread to Egypt and Greece later.

Pathology in Charaka and Susruta. In both Charaka and Susruta Samhita a separate division, consisting of several chapters, has been reserved for the subject of pathology. The Section on pathology is known as "Nithana Sthanam." Charaka deals with this subject in eight chapters. In the Susruta Samhita, which consists of six divisions, the second one, consisting of 16 chapters, is devoted to the pathology of surgical diseases. The ages of Charaka and Susruta have been variously estimated. It has been stated that they lived during the 2nd and 5th century A. D. respectively. Other historians have fixed the time of Susruta as 500 B. C. In the modern researches into the antiquity and theory of Ayurveda, a new interest in the indigenous systems of medicine has been aroused, not only among Indians but among Western scholars. It has been stated by some medical historians that, owing to the essential affinity, between Ayurveda and the old Greek Medicine of Hippocrates, and owing to the deep gulf in historical knowledge between the age of Hippocrates and the age that witnessed the evolution of Ayurveda, it is difficult to fix how much Ayurveda borrowed its essential features from the Greek medicine.

Indebtedness of Greece to India.—It is, however, generally held that the Hindu Ayurveda was of early antiquity and influenced the Greek concept of disease. Hippocrates is stated to have lived between 460-370 B. C.

and to have propounded the humoral theory, but Ayurveda, as the name suggests, may be as old as the Vedas themselves, and the Vedas have been admitted by European scholars to be the oldest books in the world. It is stated that there are significant passages, which unmistakably point to a well-established system of medical treatment to have been in vogue at the Vedic period. Opinion is, therefore, overwhelmingly in favour of the theory that the Medicine of the Greeks was largely borrowed from India. It can be definitely stated that the fundamentals of Ayurveda, especially, the concept of the Tridoshas was not borrowed from the Greeks or from any other nation. Many facts have been adduced by scholars that ancient Greece, directly or indirectly, owed her medicine and especially the famous Humoral Pathology to the ancient Hindus. Historical researches have shown that the ancient Hindus were a great maritime, highly enterprising and colonial race. Indians had colonised in Greece. The colonists carried the seeds of the Hindu culture, including Hindu Medicine, and sowed them on the virile Greek soil.

It has been stated on high authority that modern Europe owes its system of medicine directly to the Arabs and through them indirectly to India. It is probable that medical science developed for some time by contemporary contact and mutual influence in India, Egypt and Babylon. A general survey of Indian Medicine from the Vedic and Buddhist periods, followed by centuries of slow progress, and later of stagnation, will give the medical student the true historic perspective, which is essential for the culture of a successful physician. It is with a view to stress the importance of a study of the History of Indian Medicine, that I have some what digressed from the main subject of my address.

Sources of Ayurveda—Science, Philosophy and Religion of the Hindus.—The sources of Ayurveda are scattered among such works of philosophy as Nyaya and Samkya, Dharsanas, and such works of religion, as Vedas, Puranas and Itihasas. To the majority of us, of the present day, such a mix-up of science with philosophy and religion must seem unscientific. But, it should be remembered that in Ayurveda, as in Hindu thought generally, all branches of study, science, philosophy and religion are ever associated with one another. If the scope of science is to ascertain the truth in every possible branch of knowledge, no sphere of enquiry is beyond the legitimate field of science. The ancient Hindu thinkers have

evidently been of the same opinion as the scientist, Karl Pearson, that to draw a distinction between science and philosophy is obscurantism. To the ancient Hindu, all branches of knowledge formed one connected whole. The association of philosophy, religion and science is an axiomatic proposition in Hindu thought. To him philosophy is not a pure speculative theoretical study, dissociated from the problems of life. It is considered to be of practical value in regulating his daily life.

The Theory of Tri Dhatus and Tridoshas forms the foundation of Ayurvedic physiology and pathology. It is unfortunate that this theory should be confused with the Hippocratic Humoral Theory.

I am informed by authoritative opinion that the three Dhatus, *Vatha, Pittha Kapha*—are most emphatically not the three humors—wind, bile and phlegm. The Hippocratic humoral theory consisted of four humors. It had nothing to do with the Tridhatu conception of Ayurvedic Medicine. According to the Ayurvedic conception, health and ill-health are the functions of 'Dhatu Equilibrium.' When normally disposed, the 'Dhatus' are in their pure state, fit to be built up into the body; when abnormally disposed, they are in their 'Mala' or impure state, only fit to be rejected and thrown out of the body. When the "Dhatus" become impure, they are known as the 'Dhoshas.' Therefore, the 'Dhatus' and 'Doshas' are only two different states, which stand in the relation of cause and effect.

I am not competent to pass any opinion on this Ayurvedic concept of physiology and pathology. It is enough for me to draw your attention to the fact that we have gone beyond Virchow's cellular pathology. The original simple conception of the cell has given place to the view that there are enormous complexities in the cell, as evidenced by the growing sciences of immunology, endocrinology and psychology. Western scientists have begun to talk of emotional and mental states. When will our daily increasing knowledge of immunology, bio-chemistry, endocrinology, psychology, vitaminology, etc., lead us to a radically changed newer concept of disease, it is not possible for me to prognosticate. The tendency appears to be towards a more rational concept of a humoral theory, modified, though it may be, from the oldest and most famous Ayurvedic concept.

Hindu Conception of the Unity of Life.—The stable quality of the Hindu culture lies in the fundamental belief in the unity of life,

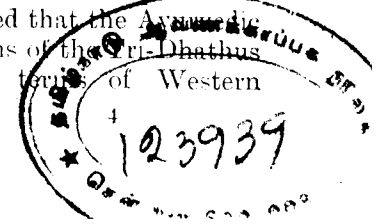
the wholeness of life. To the Hindu, all the three elements of civilisation—religion, morals and science—form an indivisible whole. To him, religion alone is not truth, nor science alone. He conceives that religion and science should balance each other for the maintenance of good morals. It has been said that the most stable period in Indian history was the Hindu period, when religion, morals and science balanced each other, and produced a harmonious whole. But now, science has ascendancy over religion among men but to the Hindu to lack religion is as bad as to lack science. Osler has truly said that "the quest for righteousness is oriental, the quest for knowledge, occidental."

Hindu Concept of the Body, Mind and Soul.—In those golden days of the high water-mark of Ayurveda, religion and medicine always went together. They were inseparable companions. When medicine failed to comfort and solace the sick, the physician resorted to prayer and what specifics failed to do, incantations often achieved.

Religion, faith and hope are the most powerful curative agents in disease to-day, as in the days of yore. Patients will continue to seek such aids for a cure. The infusion of faith and hope has a powerful stimulant action on the mental factor of patients, and the mind plays a very important part in the healing processes. According to the Hindu and the Zoroastrian religions, prayer is the best of all medicines, and it has always been and will ever continue to be the greatest source of solace and comfort to the sick.

In Hindu thought there has never been any isolation of the several branches of study. According to Hindu physiologists, man is divisible into his physical body, plus his mental body, plus his *Athma* (and not merely the physical body, according to the Western conception). The Hindus conceived that both mind and body are equally "matter". Prof. Sherrington has stated that the physical and mental processes are very much alike. To him, the mind is as material as the body. The view of Prof. Sherrington is the accepted view of all Schools of Hindu thought. They have always held that both mind and body are alike "matter", though the "matter" of the mind is subtler than that of the body, which is comparatively gross.

Therefore, according to the Ayurvedic conception, the functions of *Vatha, Pittha, Kapha* included both physical and mental processes. It is, therefore, contended that the Ayurvedic conception of the functions of the Tri-Dhatus cannot be expressed in terms of Western



physiology at the present day. There is no use trying to fit in Ayurvedic conceptions with Western conceptions of medicine, where they refuse to harmonise with each other. According to the advocates of Ayurveda, the basic ideas of Ayurvedic medicine should not be distorted to fit in with those of Western medicine. The Tri-Dhathu Theory is not the Humoral Theory of Hippocrates or its various subsequent modifications.

The Cellular Theory of Virchow has tolled the knell of the Greek Humoral Theory, but the Tri-Dhathu Physiology of Ayurveda is stated to go *beyond* the Cellular Theory. At present, the Tri-Dhathu Theory of Ayurvedic physiology cannot be compared with the existing ideas of Western physiology.

There is, however, this fact, which has to be recognised: whereas the concepts and theories of disease have undergone a large number of variations and alterations in the West, the Theory of the Tri-Dhoshas of Ayurveda has continued to remain the same, ever since the time it was propounded in the pre-historic Vedic period.

To those who question why India did not contribute to any great advance in medical science until recently, I recommend a closer study of Indian history, including the social and religious institutions.

A brief summary of the recent contributions of India to the science of pathology will be given towards the close of my address.

Babylonian Medicine. Babylon in Mesopotamia was the cradle of culture in 300 B. C. We have evidences that the art of healing was far advanced even then. Surgery was subordinate to internal medicine. The proper medical profession was represented by physicians, who were educated in the medical schools. But, the surgeon had to learn his art by a period of apprenticeship under a master-surgeon. Babylonia was a country devoted to astronomy and astrology. Along with mystical conceptions of pathological causes of disease, demoniacal and cosmic influences were considered to be causal agents. That diseases were caused by parasites, gaining entrance into the body from without or originating internally, was known even in those early times. It was thought that actual worms could be about inflammations, suppurations and ulcers. But fevers and chronic diseases were supposed to be caused by a derangement of the body fluids, particularly of the blood and lymph. On this the humoral pathology was based. We know that the old Babylonian physicians used a great many medicines, belonging to the three natural

kingdoms and have used a great many surgical implements. It is very interesting to read the spirit of that age, which considered that the surgeon should be paid high-fees for a successful operation, but should be severely punished for failure.

Egyptian Medicine. The cultures of both ancient Babylon and Egypt appear to be closely allied in many respects. For the History of medicine, Egypt is very important, because it was in Egypt that the Papyrus Ebers, which is considered as the greatest book on the medicine of the age was discovered by the famous German-Egyptologist, Ebers. In addition to priest-doctors, famous medical schools existed. The practice of embalming mummies, which prevailed in ancient Egypt, enabled Egyptian doctors to make a superficial study of anatomy. As dissections were forbidden by the priests, a more accurate knowledge of the human body was not possible. As in Babylonia, so in Egypt. Diseases were attributed to the derangement of the body fluids, though in the diagnosis of diseases, the Egyptians were more advanced. The clinical methods of inspection, palpation and auscultation were known to them. Also the Egyptian medicine was built up on the same humoral pathology. There, as elsewhere, the mixing up of medicine with religion acted as a great hindrance to real progress. The old Egyptians appear to have had advanced views on hygiene and sanitation. The Prophet Moses had drawn up a sanitary code for the Hebrews, but Moses wisely incorporated this code into their religion. As among the Hindus, so among the Jews, Personal hygiene and sanitation were made part of the religious observances.

Greek Medicine. The Greeks were a higher talented and free-thinking people. They preferred unprejudiced observation of Nature to mere reasoning or unreasoning speculation.

The temples of Aesculapius were places of worship and pilgrimage to the Greeks during the pre-Hippocratic ages. The Greeks presented to the God of Healing in these temples their offerings, when they were cured, in the form of oblations, made of stone or terra-cotta, in the shape of some parts of the human body (hands, feet, head or internal organs). Before the time of Hippocrates, the temples were places, where treatment was given by suggestion, often inducing sleep. This is known as the 'temple sleep' of the ancient Greeks. With or without the aid of narcotics, the patient was induced by suggestion into sleep. The hypnotic sleep and suggestion were effective as therapeutic agents

in certain ailments, especially neuroses. It was only during the time of Hippocrates that these temples became the real resorts of the sick, as hospitals or sanatoria.

The members of one family in particular claimed direct descent from Aesculpius, the God of Healing and the family was known as the Aesclepiadae. The monopoly of healing was preserved in the family and the art was handed down from father to son. To this family of Aesclepiadae belonged the famous Hippocrates, the Father of Medicine, whose statue we still possess and whose 'oath' has been handed down to this day.

It is very interesting to note that he kept the most exact records of his observations engraved on wax tablets, which were then in use long before the invention of paper. From his writings we learn that he was a very keen observer and that nothing escaped his attention. Nothing appeared to him too small or insignificant. On perusing his writings we wonder whether they could have been written 2500 years ago.

The Age of Hippocrates—The Father of Medicine.—The greatness of the Greek civilization is seen in the real scientific approach to the study of medicine. They did not worship Aesculapius as a God of Healing, but based their system of medicine on experiment, observation and reason. The first complete separation of medicine from religion was effected by the ancient Greeks. The temples of Aesculapius were converted into hospitals and sanatoria. In 400 B. C. Hippocrates, the greatest of all physicians, brought about this drastic reform of freeing medicine from the obscurantism of priests. The burden of responsibility for disease was taken away from the heads of the Gods and placed on the shoulders of men. He preached that diseases arose on account of man's ignorance and that man's diseases were man's problems and that, therefore, he should find a solution for them by his own reasoning and research. It may be said that the history of medicine really begins from the time of Hippocrates, i.e., from the time of man's acceptance of his personal responsibility for disease. Hippocrates taught that knowledge could be acquired only by observation of the phenomena of nature and by deduction from the observed and ascertained facts and data. The school of Hippocrates was inspired by the true spirit of medical research. They believed that man is capable of discovering the laws of nature by adopting regular scientific methods. Modern medicine is built up on the principles of science, laid down by Hippocrates. They are:

(1) There is no authority except facts.
(2) Facts are obtained by accurate observation.
(3) Deductions are to be made only from facts. Science is opposed to dogma or mere opinion. Hippocrates was the first physician to differentiate diseases. He attempted to divert medical thought away from imaginative speculation and broad-base it on common sense and accurate observation. He has well said:

"To know is one thing; merely to believe one knows is another."

To know is Science, but merely to believe one knows is Ignorance."

The Hippocratic Humoral Theory.—Even though medicine was fairly well advanced during the Hippocratic period, the conception of disease was based on the Humoral Theory. In spite of advanced conception of disease and healing, Hippocrates held that poisonous evaporations from the ground, which he called 'miasmata,' brought about diseases by a derangement of the body humors. According to him, the four cardinal humors, (blood, phlegm, yellow bile and black bile), corresponded to the four temperaments, (sanguine, phlegmatic, choleric and melancholic).

The 'humors' consisted of mixtures of the four 'qualities'—cold, heat, wetness and dryness. "Thus the blood, like air, was hot and wet; the phlegm was cold and wet, like water; the yellow bile was hot and dry, like fire; the black bile was cold and dry, like earth. The blood arose from the heart, the phlegm from the brain, the yellow bile from the liver, the black bile from the spleen." A proper balance and mingling of these 'humors' maintained health; and an imbalance of them produced disease. Faulty mixture or faulty humors, which he called "dyscrasia," brought about disease.

According to this speculative theory of humors, acute diseases were regarded as passing through three natural processes.—

- (1) a prodromal or crude stage;
- (2) a stage of ripening, ('coction' or 'pepsis').
- (3) crisis or resolution: in this stage the diseased material was supposed to be expelled from the body through some natural channel.

But the Science of Pathology did not make any progress among the Greeks, because the post-mortem study of disease was prohibited. In the Alexandrian period, dissection was limited to animals for the study of anatomy only. Though clinical observations on disease had been accumulating, yet for want of proper post-mortem study, much ingenuity was

expended to fit the phenomena of disease into the purely speculative theory of humors.

The Humoral Theory reigned supreme for 2000 years, until it had to give place to Virchow's Cellular Pathology.

The Object of the Physician according to Hippocrates.—The object of the Physician was, therefore, to seek which humors preponderated and how to restore the balance of the humors. In pursuance of this object, he taught that the physician should rely, to a great extent, on the healing powers of nature, *the vis medicatrix naturae*. His humoral theory, however, being the product of deduction from observation, was no barrier to the progress of medical thought, but acted as a stimulus to further observation and collection of facts. More and more observational facts accumulated and helped in testing the soundness of the theory. The theory may be discarded, when it is no longer useful, but the facts will remain. Hippocratic method is the origin of the modern scientific method.

Hippocrates worshipped nature and was learned in the ways of nature. He is called the Father of Medicine but he is also the Father of Physiology.

The Hippocratic conception of the similarity of the process of disease and of healing.—To Hippocrates, the process of illness and the process of healing meant one and the same thing. To him, the symptoms of illness are symptoms of healing. Alas! Very few men of even modern medicine grasp the significance of the above conception of disease and healing. Hippocrates relied on the self-cure of nature—*nature sanat* (nature heals).

Hippocrates lived in the great age of Pericles, a period of the highest achievements of the Greeks in literature, government, arts and sciences. He lived shortly before Plato and Aristotle. The impetus given to the proper scientific study of medicine by Hippocrates lasted only for a period of 300 years. The Greek civilization declined and the progress of medicine was also hindered by unscientific speculations taking the place of observation and logic. Physicians were divided among themselves into different schools, holding different theories as to the causation of disease and adopting different methods of treatment. 300 years after Hippocrates, Corinth was destroyed and Greek Medicine was transplanted into Rome.

Post-Hippocratic Medicine of Alexandria.—

The school of Cos in Greece retained its pre-eminence during the time of Hippocrates and only for a short period after him.

Medicine, from being a hereditary art, became a practice, which anybody might learn. With the degeneracy of the Greek civilisation, there came into being various systems of the Healing Art, in which theoretical speculations preponderated. The two great philosophers, Plato and Aristotle, are to a large extent responsible for the introduction of theoretical considerations into the healing art. Speculative contemplations have often a tendency to replace correct observation and desire for experiment, thus tending to impede the development of scientific knowledge. The Post-Hippocratic period was characterised by subtle theories and dogmatism, which replaced the Hippocratic method of observation, experience and rational inference.

After the decline of Greek medicine, Alexandria in Egypt was destined to inherit it. By the conquest of Alexander, the Great, Greek medicine established itself in the School of Alexandria. Alexander made Alexandria a centre of culture and established the famous library, which is said to have comprised of almost a million volumes. Among them there were 100 works of Hippocrates, indeed a great literary legacy. This famous library was burnt down by order of the Emperor Theodosius. He was a Christian zealot, who considered all heathen culture abominable. His act of vandalism has never been surpassed in history.

We are told that in Alexandria there were libraries and museums, botanical and zoological gardens and clinics and hospitals. Great men thronged to this reputed centre of culture in those days. St. Luke, the Evangelist, is stated to have received medical education in the school of Alexandria. The fame of Alexandria rests largely on the fact that it was in this town that the prejudice against the dissection of the human corpse was broken. As a result, Alexandrian medicine was much advanced in its knowledge of anatomy and physiology. But the Alexandrian doctors preached the Hippocratic theory of disease but forgot that the substance of the Hippocratic teaching was his *method*. Higher value was attached to the Hippocratic theory than to his method of observation, rational thinking and inference. It has always been a human weakness to mistake the shadow for the substance. The two important physicians of the Alexandrian school were Herophilus and Erasistratus. Herophilus was a distinguished anatomist and he was considered the disciple of Hippocrates, because he professed the humoral theory of disease. Erasistratus, on the other hand, opposed the humoral theory

but held fast to the Hippocratic tradition and method. He taught that the science of medicine should be based (1) on experience derived from the histories of disease, (2) from actual observations of sick persons, and (3) from analogies drawn between them. He maintained that these three sources of experience should form the tripod for the practice of medicine. The school of empiricism was built on this. They rejected the Theory of Humors, because it did not square with observed facts.

Roman Medicine.—This was also derived from Greek medicine. The slaves of Greece played an important part in the transport of the Greek knowledge of medicine to Rome. The Greek slaves freed from slavery began to practise among the Roman peoples. Later on, Caesar himself granted the civic right of Rome to every doctor; but the Roman Empire did not leave any marked influence upon the development of medical science, but the Romans improved surgical technique and laid the foundations for specialising in the various branches of medicine. We learn from history that, in Rome, eye-specialists, otologists and obstetricians practised their respective specialties. The outstanding names in Roman medicine are Celsus and Dioscorides, during the 1st Century A. D. and Galen during the 2nd Century A. D.

The Theory of Methodism.—The medicine of Rome, as has already been stated, descended from the Greek and Alexandrian medicines. There, a new theory of disease was evolved, known as the Theory of Methodism. According to this theory, all diseases were due to disorders in the natural arrangement of those "atoms" of which the body was supposed to be composed. Asclepiades held that the "atoms" were united to form 'pores,' through which the fluids of the body were flowing. If these 'pores' were choked, the fluids became dammed up.

His pupil, Themison, carried this idea further. He recognised three states of the "pores": relaxation, contraction, and a mixture of both. He taught that it was necessary to determine the condition of the 'pores' in every disease before proper treatment could be given. Like the theory of humors, the Methodist Theory compelled the physician to observe the symptoms of his patient. It served the purpose of the medical science by increasing the stock of exactly observed facts.

By the time Galen began to practise medicine, the sum-total of observed facts were such that they outstripped hypotheses and would not square with the previous theories as to

the causation of disease. The facts could not be explained in terms of the theory of humors or the theory of the empirics or the theory of the methodists. The Empiricists and the Methodists had rejected the humoral theory.

Claudius Galenus.—(A. D. 103—200).—He was a native of Asia, but a Roman by adoption. His name ranks only second to that of Hippocrates. He is said to have engaged himself in scientific feuds. He was intolerable to any opinion opposed to his own. He settled himself in Rome, the capital of the Roman Empire, and the centre of culture at the time. He was a rich and famous physician. He was an authority on medicine and a dictator to his colleagues in the profession. He was the doctor to the famous philosopher emperor, Marcus Aurelius, (A. D. 121 to 180). Galen's influence continued for nearly 1500 years after him. 400 of his medical treatises have been handed down to posterity. Like Hippocrates, Galen was a prolific writer and his works, therefore, are of great historical interest. His works served as the "Doctor's Bible" for many centuries.

According to him, nature does not act without a purpose. Disease consequently is a deliberate action, not an unwarranted by-effect. The symptoms of disease are not the expressions of hostile but of friendly healing forces. According to his theory, the symptoms of disease should not be suppressed but, on the contrary, should be furthered or even aggravated, if necessary.

Galen had a good knowledge of the physical and chemical processes of digestion and nutrition. Though he thought that the brain was the seat of the soul, he recognised that it was the centre of all sensations and body-functions. He laid more emphasis upon treatment than on other branches of medicine. To him the main purpose of the physician was to cure, to make people healthy and keep them healthy. He taught that the physician should abstain from interfering with nature, when nature itself sufficed to bring about a cure. Galen recognised that every illness had a beginning, a period of aggravation and a stage of crisis, before abatement. He also differentiated between accidental causes of disease and direct causes of disease. Only Galen's name and his ideas continued to receive great admiration, until the time of Paracelsus, the famous physician of the middle ages. It has been said of Galen that he was not only the summit but also the terminus of the medical science of antiquity.

The Theory of Pneuma.—Galen built his hypothesis of the 'spirit' or 'pneuma,' which he imagined penetrated every part of the body and was mingled in different proportions with each of the four humors. He taught that the 'pneuma' was subjected to four influences, or 'elements'—heat, cold, wetness and dryness. According to him, health could be adversely affected by faulty combinations of these four influences. Distempers arose owing to the altered 'pneuma' and such distempers were communicated to the humors. He recognised abnormal states of humors as "dyscrasias." He traced these to climatic and other influences, existing outside the body. This theory led him to take a new view as to the nature and action of drugs.

Galen's theory of pneuma also compelled the physician to observe disease processes and symptoms, as he had to determine the state of the 'pneuma' and of the 'humors' and of the external elements, such as, heat, cold and the like, in order to adopt a rational line of treatment. In so far as Galen's theory served as a stimulus to observation and experiment, it was in the tradition of medical progress.

Unfortunately after Galen's time, his 'pneuma' came to be identified with conceptions of religion and acquired a religious sanctity, which was never meant by Galen. With the re-invasion of religion into science, the progress of medical science was hindered. Any criticism of the theory was considered an act of impiety. Observation and experiment were discouraged. Galen, who was trained in the Hippocratic method, would have, if he had been alive, resisted all such attempt to substitute the authority of tradition for that of ascertained fact.

With the fall of the Roman Empire, the Catholic Church rose to power and the Moslem power led to the creation of the Mahomedan Empire. The rise of the power of the Church created the "Age of Faith" and the spirit of the age was against science. The Church taught that disease was an expression of divine displeasure, and that it could be cured, ameliorated or prevented, only through the intermediation of priests. Attempts were made to suppress scientific ideas in medicine. The 'pneuma' of Galen became associated with the religious doctrine of the soul.

Arabian Medicine.—Schools of Medicine arose in many cities of Arabia. There, Hippocratic and Galenic medicines were taught. The Baghdad School became famous, because there the culture of the East, especially from India, mingled with the culture of the West, of the Greeks and the Romans. The Arabian

medicine is characterised by its contributions to materia medica. Pharmacopœas and apothecaries' shops arose during this period. The Arab doctor enriched knowledge with many contributions to epidemic diseases, such as, small-pox and measles, and to the pharmacopœa. The rapid conquest of Europe by the Arabs contributed to the spread of their medicine as far as Spain. Rhazes' name is famous among the Arabian physicians. As the medicine of the Arabs did not challenge the teachings of the Church and as the treatment of the Arab physicians was more effective, the doctrine of Galen, as expounded by the Moorish and Jewish physicians, did not offend religion or challenge the teachings of the Church. The spread of the Arab medicine gave Europe access once more to Greek culture. The school founded by Jewish teachers at Montpellier was the most famous.

A Brief History of the Early Post-Hippocratic Theories of the Nature of Disease.—As has been already stated, the tendency to speculate and formulate theories without sufficient observation or proper experimental evidence, resulted in the origin of many schools among the followers of the humoral Theory of Hippocrates.

The 'Dogmatists' (Diocles, Praxagoras) emphasised theory. The 'Empiricists' laid stress on previous experience and did not care much for logic or anatomy.

The Theory of Plethora.—Erasistratus (330 B. C.), a prominent member of the Alexandrian school attributed all diseases to a state of plethora. To him plethora meant a stuffing of organs and vessels with an over supply of nutritive material. To him pneumonia meant plethora of the lungs; arthritis, plethora of joints; dropsy, plethora of the liver etc. He attributed the results as the causes of the conditions. It was like putting the cart before the horse.

Theory of Solidism.—After the decline of the Alexandrian school, the school of Asia-Minor became prominent. Here Asclepiades (124 to 56 B. C.) propounded the theory of Solidism against the Humoral Doctrine. According to Solidism, diseases were caused by 'contracted' or 'relaxed' condition of the solid parts. This theory assumed that there was a flow of vital fluids through an infinity of minute tubes or pores between the particles or atoms that made up the body. A constriction of the tubes caused acute disease, whereas relaxation resulted in chronic illnesses.

School of Methodism.—After the school of Solidism came the followers of Methodism. The theory of Methodism laid stress on the

increased or decreased excretion from the body, but disregarded local symptoms and associated anatomical changes.

The Theory of Pneuma.—The school of Pneumatists came into existence about the year 70 B. C. and lasted for nearly six centuries of the early Christian era. According to them, the Pneuma or 'vital air,' taken in by the lungs 'to cool the inner heat of the heart' was supreme. Disease resulted, if the Pneuma was disordered in quality.

School of Eclectics—Theory of Dyscrasia.—The School of Eclectics, who flourished in the first few centuries of the Christian era, appreciated the value of observation and experiment and accepted all the best knowledge in their time, without regard to their source. Among them was Galen (130-200 A.D.). Though he appreciated the value of observation and experiment and was the greatest medical man of his time, his theory of disease was an extension of the humoral theory, combined with a dominance of the Pneuma. To the four humors, he added the three spirits, the natural spirits (supposed to flow from the liver to the body by the veins); the vital spirit (from the heart by the arteries); the animal spirit (from the brain by the nerves). He divided diseases into three classes: (1) Diseases affecting similar parts or simpler tissues; (2) Organic disease (inflammations and hypertrophies affecting compound tissues); (3) General diseases (Dyscrasias due to an upset of the equilibrium of the 'Humor.' According to Galen, health depended on the presentation in proper proportions of the humor to the various organs and their proper adhesion to them.

The Galenic concept of disease held sway for over a thousand five hundred years. Like Hippocrates, Galen was the most important figure in medical history. The dark and middle ages were bereft of scientific progress and medical thought. The authority of Galen suppressed everything which did not conform to his theory.

But with the renaissance, came the spirit of revolt. Paracelsus is said to have burnt the works of Galen and Avicenna in the market place of Basel.

The Arabs did not add anything new to the pathological concept of disease. They merely accepted the Greek theory of the four humors, made of the four elements, and influenced by the three spirits.

Fracastorius (1478-1583) should be considered as the Father of Modern Pathology. He entertained remarkable views on contagion. He compared the virus of transmissible disease

to the fermentation of wine. He anticipated Pasteur in the conception of the microbic origin of infectious disease. He recognised eight contagious diseases: plague, phthisis, epilepsy, scabies, erysepelas, anthrax, trachoma and leprosy. Typhus fever, Foot and Mouth disease and syphilis were recognised by him.

The Theory of Archeus.—Paracelsus (1493 to 1541) was the first to openly oppose Galen. He furthered the use of chemicals in therapy, but he did not further the concept of disease. He promulgated the theory of 'vital principle' or the 'essence of life.' He held that this principle was enclosed in an invisible Mumia. What he meant by Mumia is not very clear. The important influence of Paracelsus on his contemporaries was in the revolt against blind authority. He prepared the way for scientific advance through independent observation.

The Iatro-Chemical School—Theory of Vital Forces.—The Iatro-Chemical School was founded by Vonhelfmont. He tried to explain all diseased phenomena as chemical changes. Every bodily process was controlled by a blas. The chemical processes were brought about by a special ferment of 'gas.' The word 'gas' was used in the general sense of air. He conceived of a vital body force, which he called 'Archeus Insitus,' and a divine force, 'Archeus Infleus.' These two forces regulated both physical and psychical activities. When these forces were upset by the idea morbosa, diseases resulted. He, therefore, conceived of disease, not as imbalance of humor, but as an actual, though an invisible principle.

Franciscus Sylvius (1614-1672) of Leyden was a staunch supporter of the Iatro-Chemical School. He propounded chemical theories of body function and recognised the importance of the blood in health and disease. Sylvius contributed to advance in the science of anatomy and in our knowledge of tuberculosis, as he had many opportunities to perform autopsies.

Thomas Willis (1621-1675) advanced our knowledge of anatomy and of the pathology of the nervous system. He was the first to observe that the urine in diabetes was sweetish.

Iatro-Physical School.—Opposed to Iatro-Chemical School was the Iatro-Physical School that sought to explain all vital phenomena on the basis of physics.

Thomas Sydenham (1624-1689) emphasised the value of observation and placed chemical experience above theory. He held the humoral theory and conceived of disease as nature's effort to throw off the *materis*

morbi (the morbid material). Each disease was thought of as an independent natural process, following a natural course. He believed acute diseases to be due to inflammation of the blood. He attributed chronic diseases to humors disordered by diet or habits of life. To him, man's disease was due to his own fault.

Hermann Boerhave (1668-1738) was a follower of Hippocrates and an Eclectic. To him the teachings of the Iatro-physicists and Iatro-chemists were both welcome. He recognised the value of post-mortem examinations and published many important descriptions of them.

The Animistic Theory.—The 18th century was characterised by many speculative theories of disease. George Ernest Stall advocated the animistic theory. He conceived of the *anima* as the life force, which governed the activities of the living body and protected it from degeneration. The *anima* normally produced a series of movements in the body to keep the body healthy. These movements took place in the circulatory system and therefore special attention was paid to the increased pulse rate in febrile diseases. When the *anima* was disorganised, disease resulted and when the *anima* left the body or any of its parts, putrefaction resulted.

Theory of Motion and Tonus.—Friedrich Hoffmann (1660-1742) propounded a new theory that life consisted of 'motion' and death resulted from cessation of 'motion' and that the body was made up of fibres, having different 'tonuses,' which made them contract and dilate. This 'tonus' was supposed to be maintained and regulated by an imaginary 'etherial matter,' which had its centre in the brain, from where it sent pulsating messages throughout the body. Disease was supposed to be caused by changes of 'tonus,' acute disease being due to spasm and chronic disease to atony. He, therefore, advocated sedatives in the one case and tonics in the other. He also believed in disordered humors and excretions. Hoffmann is the greatest of the Iatro-Physicists and is credited with being the first person to perceive that pathology is an aspect of physiology.

Theory of Cohesion.—Jerome David Gaub, (1705-1780) clearly laid down that pathology should treat of "disorder of function as well as of structure." He divided Pathology into General and Special Pathology. Causes of disease were divided into 'predisposing' and 'active,' 'remote' and 'proximal'. In spite of the growing accumulation of know-

ledge in pathological anatomy, he was expounding a modified humoral theory. He considered the body to be composed of a wet mobile substance, an inflammable material and saline and earthy substances. According to him, disease was produced by an improper mixture of these substances. He attributed debility to a deficiency of the natural 'cohesion' between these body matters and stated that excessive 'cohesion' of these matters caused stagnation, obstruction, infarction, etc.

Theory of Stimuli.—John Brown (1735-1788) postulated the theory that health consisted "in a constant succession of balanced stimuli from the exterior, which, if excessive, produces 'sthenic' diseases; if insufficient, asthenic diseases." To him, opium and alcohol were the panaceas.

A BRIEF HISTORY OF PATHOLOGICAL ANATOMY

Anatomical Concept of Pathology.—Antonio Benivieni (1440-1502) is considered the Father of Pathological Anatomy. Garrison regards him as the Founder of Pathology, before Morgagni. He performed many post-mortem examinations to determine the cause of death and explain symptoms. Alessandro Benedetti (1460-1525) was another Italian who gave a stimulus to the anatomical point of view in disease. He built the Anatomy Theatre at Padua, which was a centre of learning for such illustrious medical men, as, Vessalius, Columbus, Fabricius, Harvey and Morgagni.

The sixteenth century laid the foundation of the science of anatomy. Those were the days of 'universalism' and not 'specialisation'. The same men contributed to different branches of medicine—medicine, surgery, obstetrics, pathology etc.

Jean Fernel (1497-1558) published in 1554 his "Universe Medicina." This work included physiology, pathology, and therapeutics. He emphasised a rational pathological view point in the treatment of disease. His "Pathologica Liebri XCII" is considered the first medical work on pathology. Fernel subscribed to the theory of the four humors and to the other implications of that theory.

In the 14th, 15th and 16th centuries, surgeons contributed to our knowledge of pathology, which may be called the 'living pathology' of the present-day surgical operations.

Marco Aurelio Severino (1580-1656) wrote the first text of surgical pathology. He was also the first to include illustrations of pathological lesions in his book.

Thomas Bartholin (1616-1680) was a Dane. He wrote his *Anatomia Practica*, in which he collected many pathological findings in all organs, but unfortunately, all his papers were destroyed when his house was burnt down.

Johanne Jakob Wepfer (1620-'95) made many observations including those on apoplexy, abscess and tumors of the brain. He was a famous physician who recognised the great value of necropsies.

Thus by the seventeenth century, the anatomical concept of disease and the study of diseased organs was fairly well advanced.

Systematised gross pathological anatomy may be considered to have begun with Bionvini at the end of the fifteenth century. But no collection of systematised morbid anatomical facts was made until Theophilus Benetus of Geneva (1620-89) published his great work—*Sepulchretum Anatomicum Anatomica Practica* (1679). This work contained clinical and pathological descriptions of 3000 cases, collected from the literature, since the earliest times.

Steven Blankaart's (1650-1702) *Anatomia Practica* was a record of 200 autopsies. Frederick Ruysch (1638-1731) published his *Thesauri Anatomica*, which contained not only pathological observations but also anatomical illustrations. He collected for his museum a large number of normal as well as morbid anatomical specimens. His famous museum at Leyden is said to have been purchased by Peter the Great for 30,000 florins and taken to Leningrad.

Joseph Lieutaud (1703-'80) published his *Historia Anatomica-medica*, which was based on 1200 autopsies, performed at the Versailles Hospital.

The Anatomic Concept in Nosology.—Giovanni Battista Morgagni (1682-1771) is one of the greatest figures in the whole history of pathology. He initiated the scientific study of gross morbid anatomy. He collected a vast amount of pathological material, which he always closely correlated with clinical findings and arranged and analysed it in a systematic manner. By doing so, he was able to draw logical and far-reaching deductions as to the nature of the diseases in question and of disease in general. To Morgagni should be given the credit of having established the anatomic concept in Nosology and for placing pathologic anatomy on a scientific basis as a branch of modern medicine.

Morgagni taught at Padua, which was the Mecca for medical men in those days. Morgagni was the "last of the great Italians",

to be a medical focus for the whole world. A regular autopsy technique was drawn up by him.

Antonio Scarpa (1747-1832) made many anatomical discoveries, which he illustrated very artistically. He also made many pathological observations on hernia, aneurysms, diseases of bones, etc.

William Hunter (1718-'83) was a great anatomist and obstetrician. His collection of specimens is preserved in the Hunterian Museum at Glasgow.

John Hunter (1728-'93)—the younger brother but a more celebrated person than his brother William Hunter—collected 13,000 specimens, which are now placed in the Hunterian Museum of the College of Physicians and Surgeons, London.

Mathew Bailey (1761-1823) was the nephew of the Hunters. His contribution to pathologic anatomy was his book entitled "The anatomy of some of the most important parts of the human body." By his time, the science of pathology had begun to be taught as an independent science.

He published an *Atlas of Pathologic Anatomy*, the first of its kind, in which he put in artistic illustrations from steel plate engravings. Bailey's work was translated into a number of languages.

Though theoretical speculations continued to be kept up in academic pedagogy, by the end of the 18th century gross pathologic anatomy was established on a firm basis, as an independent branch of medical science.

Marie-Francois-Xavier Bichat (1771-1802) is to be ranked as one of the founders of modern pathology, along with Morgagni and Virchow.

Tissue Concept of Bichat.—It was Bichat, who gave a new concept to morbid anatomy by his presentation of the various tissues as units—hence the word "Histology" (histos, a tissue). Histology gradually acquired the connotation of microscopic anatomy. Bichat's work was done without the aid of the microscope. He relied on dissection and treatment of dissected tissues with various physical agents and chemical reagents. Bichat's tissue concepts established tissues rather than organs as the important biological units. His tissue concept ranks only second to that of the cellular concept of Virchow. Bichat distinguished twenty-one kinds of tissues. He described the tissues as the elementary structures, which combine to make up organs and described the organs as units of specific functions. He divided morbid anatomy into two parts (1) general pathology which dealt with chan-

ges common to each system, wherever located and (2) special pathology which dealt with pathology peculiar to each region. It was he who laid stress on this important fact that *disease of a tissue is essentially the same, no matter in what organ the involved tissue may be*. Bichat's tissue concept was furthered by Cruveilhier in France and Johannes Muller and Jacob Henle in Germany.

After the French Revolution, French medicine led the world. The French School of Medicine was dominant, until superseded by the German school of pathologists and bacteriologists. Bichat's work brought out the important fact that there was *similarity in disorders of similar tissues*.

Corvisart who wrote a famous book on Heart Diseases in 1806 did great service in establishing frequent post-mortem examinations as a means of tracing the development of disease, as well as its end changes.

Rene Theophile Hyacinthe Laennec (1781-1826) was the discoverer of percussion and mediate auscultation. His pathologic studies unravelled the many mysteries of pulmonary pathology. He was the founder of the art of physical diagnosis. He stated that diseases could be distinguished definitely only by their anatomical characters.

P. C. A. Louis (1787-1872) made careful studies in the wards and mortuaries of the great Paris hospitals. He was a master of objective observation and statistical analysis. He agreed with Rousseau, that "truth is in the facts and not in my opinion that estimates them." He placed the statistical method of enquiry as one of the exact instruments of medical investigation.

Andral was the pioneer to emphasise the chemical study of the blood in disease.

J. F. Lobstein (1777-1835) published his "Traite Anatomie Pathologique" in 1829. He pointed out that there was *no use trying to look into the dead organ for a rational concept of disease* but that it is necessary to learn the workings of the living organ, exercising the functions peculiar to it. The term 'pathogenesis' was first introduced by him. He emphasised the importance of correlating morbid anatomy with symptoms and pointed out the need for animal experimentation.

Jean Cruveilhier (1791-1873) published his atlas, "Anatomie d'Pathologie", containing beautiful lithograph illustrations. This is considered as the greatest work ever published of its kind.

Richard Bright (1789-1858) who is well remembered in connection with the disease to which his name has been given, "Bright's

Disease", was also among the pioneers in England to *correlate bedside observations with autopsy findings* without the aid of the microscope. But even with the poor histological methods of his day, he accomplished much by his contributions on kidney disease and other pathological conditions. It is of interest to know that Bright understood the importance of determining blood urea in conditions of uræmia, long before the birth of the new science of biochemistry.

Thomas Addison (1793-1860) is well remembered in connection with the two diseases to which his name has been given—Addison's Disease and Addison's Anæmia. Claude Bernard discovered the glycogenic function of the liver. Both Addison and Claude Bernard may be considered as the founders of the science of endocrinology.

Johann Frederich Meckel (1781-1833) established that most *malformations are not the result of mysterious supernatural influence* but represent certain stages in the development of the embryo and of its organs, where growth has stopped or continued abnormally.

Carl Rokitansky (1804-'78) is regarded with Morgagni as "the greatest of all gross descriptive pathologists." He made pathological contributions of greatest importance. But, it is curious to learn that he promulgated an anachronistic humoral theory of disease. He and his successors, Skoda and Hebra, made Vienna a great centre for medicine. Rokitansky, in his fifty years, is said to have performed over 30,030 autopsies himself. He had accumulated specimens from over 60,000 dead bodies, many of the specimens are still preserved in the museum in Vienna.

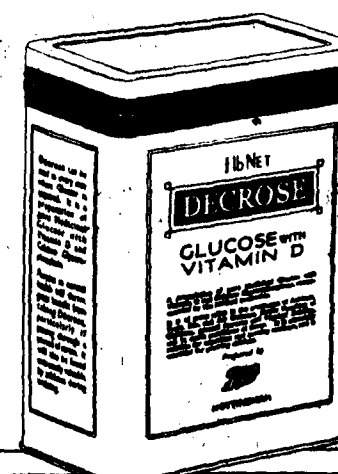
The Theory of Dyscrases.—Rokitansky's theory of dyscrases for every disease or group of diseases was blown up, when Virchow formulated his cell theory. It should be said to the credit of Rokitansky that he accepted the truth of Virchow's criticisms of his theory and gave up his concept of 'crases'. Virchow has written as follows recognizing the greatness of the soul of Rokitansky: "how highly must we esteem the man who could forget and learn so much; for whom it was not sufficient to recognise his mistakes but who took the trouble to correct them in the light of the more painstaking, methodical researches of his own pupils?" Rokitansky's contribution to pathology is great. He developed a method of performing autopsies. He emphasised the necessity for viewing diseases from the underlying structural changes in the organs. He was firmly convin-

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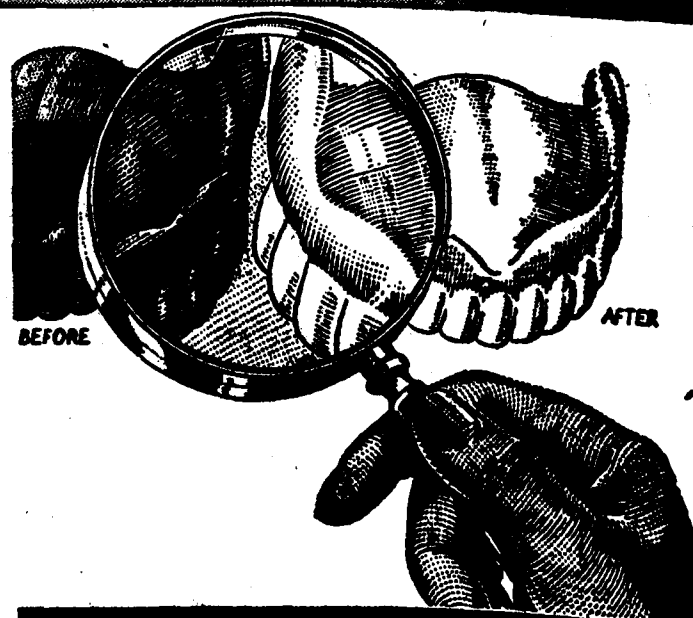
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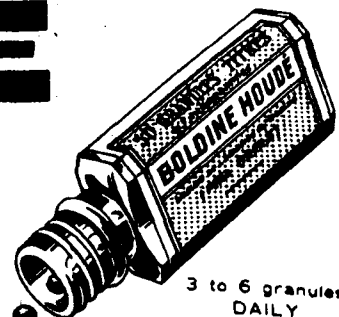
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ced of the great importance of pathologic anatomy, both to the art of medicine and the science of biology.

Hans Chiar (1851-1916) made Prague the leading centre in Europe for the study of pathology. Theodore Billroth (1829-94) contributed to scientific surgery, by emphasising the need for the study of surgical pathology and general pathological principles to the surgeon. He based surgical procedures on proper pathologic knowledge.

It is a curious fact that though the microscope was invented over a century earlier to its use for the study of biology and botany, it was yet not until well in the 19th century that it was so used. M. J. Schleiden (1804-87) demonstrated that plants were made up of cells, in which the nuclei were important structures.

Theodore Schwann (1810-82) established the "doctrine of the cell structure of animal tissue". He showed the similarity of animal and plant tissues and the basic importance of cells in structure and function. New facts about microscopic anatomy were accumulated in rapid succession. Henley discovered various types of epithelia. In 1843, Julius Vogel wrote a book on pathological histology, the first book to be written on the subject.

Rudolph Ludwig Karl Virchow (1821-1905) has been regarded as the greatest pathologist of all time. He founded the "Archives of pathological anatomy and physiology and of clinical medicine" which has continued ever since as the leading pathological journal. He did not confine pathology to pure morphology, but emphasised the proper understanding of pathological physiology and the relation of pathology to clinical medicine. Virchow established the doctrine of the continuity of cell life by his well-known axiom, *omnis cellula a cellula*. On this he based a rational concept of disease mechanism. He demolished Rokitansky's theories of "crases" and "blastema". He also demolished Cruveillier's doctrine that phlebitis was the all important cause of disease. He distinguished between the two leukemias and explained the phenomenon of thrombosis, embolism and pyæmia. He established the theory of the cellular nature of vital processes, as opposed to the humoral and other theories of such processes. He maintained that the most important symptom of inflammation was *functio laesa* (or damaged function). This was a dynamic concept. Virchow's contributions to pathological anatomy and pathologic morphology are very many. He believed in metaplasia. But he

was wrong in his concept of 'metastasis.' He did not accept the migration of leucocytes from capillaries in inflammation. He denied Darwin's theory of evolution and was impervious to the discoveries in bacteriology and immunology.

In spite of the above facts, it must be said that it was Virchow's genius which established the principles of cellular pathology, which is the greatest advance which scientific medicine has made since its beginning. It is to him that we owe the establishment of pathology as a basic science on which the science of medicine should be built up.

Carl Weigert (1845-1904) was a student of both Virchow and Cohnheim. He discovered the differential stains which enlarged our knowledge of normal and pathologic histology. His another important contribution to pathology was his demonstration that destroyed parenchyma was replaced by an overgrowth of connective tissue.

I have thus traced the history of pathology from Morgagni's early observations in morbid anatomy, through Rokitansky's large collections of pathological material and important contributions to morbid anatomy, to the tissue concept of Bichat, and later to the cellular pathology of Virchow which placed pathology on a firm basis. Organ pathology became tissue pathology and tissue pathology again cellular pathology.

But the attention which was successively and profitably focussed on diseased organs, diseased tissues, and diseased cells should in future be bestowed on the still mysterious ferments, fluids, colloidal emulsion etc., present within the cell itself. The future of pathology perhaps lies in the advance of bio-chemistry.

I propose very briefly to trace the history of experimental pathology in this address. The greatest of experimental biologists was John Hunter (1728-93). Francois Magendie (1783-1855) of the French School proved that diseased processes as well as normal function could be subject to experimental investigation. His famous pupil, Claude Bernard (1813-'78) inaugurated a new era in pathology by establishing by systematic experiments that *diseased phenomena could be produced in the living*. Julius Cohnheim (1839-'84) was the greatest experimental pathologist of the last century. He was the most distinguished pupil of Virchow. Cohnheim emphasised the need for the functional and experimental study of disease and made many important contributions to pathology. He established the phenomena of

diapedesis in inflammation. Metchnikoff discovered in 1884 the macrophage and 'microphage.' Cohnheim propounded the theory that cancer was due to misplaced embryonal rests.

William Welch (1850-1934) was a pupil of Cohnheim. The present-day prominence of American medicine and Johns Hopkins Institute is due to Welch. He correlated clinical and pathologic observations. Von Merring and Minkowski produced experimental diabetes in the dog. Opie and McCallum contributed to the pathological histology of the pancreas in human diabetes. The chemical studies were conducted by Naunyn and others. In 1921, Banting and Best isolated Insulin from the pancreas. Exophthalmic goitre and myxedema are being investigated in a similar manner by the co-operation of physicians, surgeons, pathologists, bio-chemists, etc.

Rokitansky foresaw that chemical pathology will be the pathology of the future. Andral applied blood chemistry to pathology. Leibig was the father of the science of organic chemistry. Wohler broke the barriers between organic chemistry and bio-chemistry by the discovery that urea can be obtained from ammonium cyanate. Felix Hoppe-Seyler advanced the science of physiological chemistry. Emil Fisher (1852 to 1919), the leading physiological chemist of recent times, has enlarged our knowledge of carbohydrate and protein chemistry. The age old problems of inflammation and oedema have been attacked by bio-chemists and bio-physicists with profitable results. The formation of concretions and the mechanism of calcification are being studied. Fruitful results have been obtained by the application of bio-chemistry to ureamia, diabetes, acidosis, metabolic diseases etc.

PATHOLOGY IN GENERAL

The word, Pathology, is derived from *Pathos*, suffering or disease, and *Logos*, a discourse or study. Pathology is thus the science of disease. The real name of medical science should therefore have been pathology rather than medicine, but the idea in men's minds that the work of the physician is mainly the administration of medicine for purposes of healing has resulted in our science being called the science of medicine.

Though originally pathology meant a study of disease, in all its aspects, the meaning had become restricted to the study of the cause of disease and the attendant structural alterations and functional changes.

Pathology should not be confused with merely pathological anatomy, which is only a branch of pathology, though only this branch of study was considered important until recently.

The anatomical side of pathology has loomed large, since the middle of the last century. At the present day, we may consider that our knowledge of pathological anatomy is fairly complete. The contributory branches of pathology, such as, bacteriology and bio-chemistry, have begun to claim greater attention now than mere pathological anatomy. The wider definition of pathology is not bounded by any circumscribed limits, because it means the study of the nature of disease in its functional as well as structural changes. The scientific clinician is almost identical with the pathologist. The student of disease has to learn at the bedside, in the mortuary, by the application of physical and chemical methods, by the mathematical or statistical method, and also by the experimental method.

It is a pity that, in most of the teaching institutions and hospitals, the pathologist should be denied the opportunity of being also a clinician. In most cases, the pathologist is a whole-time officer, whose duties are confined only to the laboratory. In many instances, the departments of pathology, bacteriology and bio-chemistry are made to function as isolated departments under independent heads. The pathological, bacteriological and bio-chemical laboratories should, in my opinion, be under one unified control and that the persons, who are working in these laboratories, should have a living interest in their subject by constant association with patients in the hospital wards. The modern spirit of pathology is in 'organization'.

Integrated Pathology: Call for Co-operative Effort in Research.—Integrated pathology is a distinct advance in the progress of medical science in the 20th century. The nature and manifestations of disease should be studied by every possible method of approach—structural, (anatomical and microscopic); the functional, (including chemical, bacteriological and clinical), and, whenever possible, experimental. Such a combined attack on the problems of disease, yet awaiting elucidation, has now become the accepted method of approach. Co-operation of specialists in all the above branches of medicine has, therefore, become very necessary in these days.

The story of the investigation into the parathyroids in relation to tetany and calcium metabolism and osteitis fibrosa cystica, and the story of the pituitary in relation to acro-

megaly, Frolich's syndrome, dwarfism and Cushing's syndrome etc., are all of recent date and well known to all of you.

So is the story of the vitamins and the avitaminoses—pellagra, rickets, scurvy etc. The combined contributions of clinicians, bio-chemists and pathologists are already voluminous. The advantage of correlated study (integrated pathology) has been well demonstrated in the above important enquiries into the problems of the endocrines and the vitamins.

We may all agree that the day of the philosophic speculative concepts of disease, which are unsupported by evidence, is definitely past. Whatever theories or conclusions are worthy of publication, they should, as far as possible, be based on facts. When such facts are insufficient, the publication should wait for a longer period for more observation and experiment. There can be no system of medicine which is not based on the well-established principles of pathology and on the scientific methods of pathological investigation.

THE HISTORY OF BACTERIOLOGY

The Theory of Spontaneous Generation of Disease.—Compared to the history of pathology, the history of bacteriology and preventive medicine is merely one of yesterday. In the olden times, surgery was attended by great risks, and plagues and pestilences swept over every part of the world in periodic succession. Flocks and herds were similarly destroyed. The nature of such epidemic diseases was obscure and mysterious. It was supposed to be due to a 'spontaneous generation depending on cosmic influences.'

The first person to lift this veil of mystery was Louis Pasteur. He was born in the year 1822. Though he was a chemist, learning crystallography as his special subject, he later applied himself to the study of the processes of fermentation. He was requested by the manufacturers of beet-root alcohol to help them in their difficulties in its manufacture. This led him to the study of alcoholic fermentation. In 1857, he published his great discovery that fermentation is the result of growth of an organic life, and not due to any action of inorganic matter. Pasteur concluded that 'fermentation is a phenomenon of life.' The discovery of living "globules" as the cause of fermentation, and that, in their absence, there was no fermentation, was a very great discovery, which led later investigators to peep into the world of the infinitely small. As in fermentation, so in the souring of wine, the souring of milk, the decomposition

of butter and in the processes, in general, of decay and putrefaction, a vast underworld of life was shown to be the cause.

Pasteur promulgated the doctrine of the immortality of the infinitely small in the face of severe opposition. He stated that if the processes of change and decay are indeed processes of life, their must exist in nature innumerable tribes of living things, eternally active, capable of limitless reproduction. He gave the quietus to the doctrine of spontaneous generation.

Bacterial Concept of Disease.—His discovery led to the trailing of the 'foes of disease,' hidden during all the previous ages. Pasteur, like a Crusader, entered the citadel of disease and tracked the causes, one after the other, of the silk worm plague, fowl cholera, anthrax, hydrophobia etc. Just as he conferred the greatest benefit to the wine growers of his country, his contribution to the success of silk industry was equally great.

After discovering the bacillus, which is the cause of anthrax, Pasteur observed that his cultures of the anthrax germ, if kept exposed to the air, lost their virulence. He seized on this knowledge, prepared a vaccine, and injected healthy sheep and oxen and found that these vaccinated animals became immune to the disease. This was the beginning of the history of preventive medicine.

Pasteur should, therefore, be considered as not only the father of bacteriology but also of preventive medicine. Pasteur saved France also from loss of the wool industry by the preventive inoculation against anthrax.

The discovery of the causes of anthrax and fowl cholera and also the discovery of their prevention by preventive inoculation made Pasteur realise the great possibilities of his discovery for the protection of man from infectious diseases. Pasteur's work on hydrophobia, therefore, followed naturally on his work on anthrax. He used emulsions of the spinal cords of rabbits, infected with the virus of hydrophobia, for the treatment of hydrophobia. He was led from the world of the infinitesimally small (micro-organisms) into the world of the infinitesimally smaller (ultra-microscopic viruses). He showed that there were but two ways of offering resistance to pathogenic bacteria, namely, the destruction of the bacteria and the increase of the body resistance against them. Pasteur discovered both these ways and applied both the methods to fight disease in man and beast. The sciences of bacteriology, immunology and preventive medicine, which were founded by him, have changed the face of the world at the present

day. To Pasteur must be given the whole credit of relating bacteria to the phenomena of disease, though micro-organisms had been observed long before his time by Leeuwenhoek in the 17th century.

In the meantime, Jenner had discovered the effect of vaccination as protection against the attack of small-pox. These wonderful discoveries of Pasteur and Jenner formed the basis of all subsequent development in preventive medicine. The greatest benefactor to humanity in the 19th century was the greatest Frenchman, Pasteur. He will be remembered to be so for ever more.

Joseph Lister, Professor of Surgery at the Glasgow University, wondered what the cause might be for wounds becoming septic, and for blood-poisoning. He first accused the air, which was polluted with smoke and stench, and the site of the hospitals. By an accident, he read an article of Pasteur in a journal and began to wonder what possible connection could exist between wine and wound. He wondered why ordinarily a simple fracture healed up, without septic complications, whereas the average compound fracture invariably became septic, often resulting in the death of the patient. He started using carbolic acid spray for killing germs. This was the birth of antiseptic surgery. Pasteur's discoveries helped Lister to effect a complete 'conquest of wound fever.' Antisepsis was later superseded by asepsis. Surgery has, therefore, now become bold and fearless in its methods.

The Hungarian physician, Semmelweis, was ignorant of the microbic origin of disease but has anticipated its application in midwifery.

The discoveries of Pasteur and Lister made their followers seek the cause of every disease in a microbe. The body was looked upon as a fortress, surrounded by microbic enemies all around. Jenner and Pasteur had also pointed the way towards strengthening the defence. Thus, between 1818 and 1890, the causative organisms of a large number of diseases were discovered. The greatest bacteriologist of the time was Robert Koch.

The discovery of many of the most important pathogenic bacteria was made by Koch. He was the discoverer of the tubercle bacillus and the cholera vibrio. This enlarged the foundations of modern bacteriology. Not only did he identify the causative organisms but also described their biological properties and the properties of their toxins. He discovered the tuberculin and made use of it for diagnostic and therapeutic purposes. He was the

first to prepare transparent solid culture media. He made researches on rinderpest, plague and trypanosomiasis. His discovery of the causative organisms of many dangerous diseases earned him the Nobel Prize in 1905 and 1906.

To von Behring and Kitasato belongs the credit of the discovery of the antitoxic sera. The serum, that has afforded the most excellent results, is the antidiphtheritic serum. The prophylactic use of anti-tetanic serum was later well established. A further application of this serum therapy is seen in the recent attempts to treat measles by injecting the blood from a patient, newly recovered from the disease. Only, in this disease the supply of serum available is limited to the amount which can be available from human sources. The value of protective vaccination against typhoid and para-typhoid has now been well established.

The preparation of a vaccine for bacillary diseases was comparatively an easy matter, but it is not so for the virus diseases. But the work done on dog's distemper justifies the belief that the vaccine treatment for virus diseases is possible. It is now known that influenza, measles whooping-cough, mumps, chicken-pox, and small-pox in man and many similar diseases among animals and plants are due to viruses. We are beginning to get just a glimpse into the world of the infinitesimally smaller.

Metchnikoff (1845-1916) is the father of one of the most important theories of immunity. He was the discoverer of phagocytosis. He was also the recipient of the Nobel Prize in 1908. Almroth Wright gave a new orientation to scientific thought. He showed that curative vaccination in acute diseases, as opposed to preventive vaccination, will lead to disappointment.

Wright's studies, by directing attention to the mechanism of bodily reactions, have served a valuable purpose. The discoveries of Metchnikoff and Wright have shown us that the body is armed with formidable weapons against diseases. Schaudinn in 1906 discovered the organism of syphilis and a year later Wassermann (1866-1925) discovered the serodiagnostic method for syphilis.

Bio-chemical Theory of Disease.—Paul Ehrlich is the founder of haematology. He discovered his tri-acid stain, diazo reaction of urine, intra-vital staining etc. His monumental works are on dye stuffs and on the chemical explanation of immunity (the side-chain theory) and in the discovery of salvarsan in collaboration with Hata, his Japanese assistant. The works of Ehrlich have changed the direc-

tion of modern medicine from the bacterial to the bio-chemical theory of disease. Ehrlich's discovery of salvarsan obscured for a time the importance of the mechanism of bodily reaction in disease. It was vaunted that salvarsan could kill the spirochæte without inflicting any injury upon or causing any distress to the patient. Nature was thought to be a mere spectator to the rout of the spirochætes by the drug. The truth has now become clear that the drug acts, in the first instance not on the spirochæte but on the body itself. It is the body, thus stimulated and not the drug, which effects the cure. The impression that quinine in malaria tracks out the malarial parasites and kills them has been shown to be wrong. It is by its power to stimulate the body that quinine helps to kill the malarial parasite. A similar process appears to exist in the action of antiseptics, such as favine. We thus see that the body mechanisms of defence are of great complexity many of which are but little understood. Our attempts in the treatment of diseases should be only to summon and help the powers of nature, never to replace them.

In 1880, Laveran observed the parasite in the blood of patients suffering from malaria. Laveran's discovery was not noticed, because it was not known how the parasite gained entry into the human body. Wucherer, Lewis and Bancroft described filariasis and the small worms in the blood of patients, suffering from the disease. Sir Patrick Manson ingeniously suggested the probable association of mosquitoes with filariasis, as he argued that the agent of infection must operate at night. His conjecture proved true. He showed that the embryos were imbibed with the blood by the mosquito and that they reached full development in its body. G. C. Low showed that the embryo filariae passed into the proboscis of the mosquito and he suggested that the mosquito carries the disease from one human being to another directly and without the intervention of water, as believed by Manson. The discovery by Manson and Low of the mosquito transmission of filaria was the foundation stone of the edifice of tropical medicine. The importance of their work lay in the demonstration that insects act as carriers of disease.

Manson also suggested that a mosquito might prove to be the carrier of malaria and was the inspirer of Ronald Ross in his great discovery. The proof of the mosquito-malarial theory by Sir Ronald Ross is one of the most inspiring records of human endeavour. The discovery of the particular species of mosquito as the carrier of malaria laid the foundation

for the whole subsequent development of tropical hygiene.

The Reed Commission demonstrated in 1900 that yellow fever could be induced in healthy men by the bite of certain species of mosquito. The infected mosquito remained infective during the rest of its life of nearly two months. The discovery of the cause of malaria and yellow fever led to a remarkable development in the detection of the carriers of other diseases. Bruce discovered micrococcus melitensis as the cause of Mediterranean fever and traced it to infected goat's milk. He also discovered trypanosomes in the blood of domestic animals infected with the disease, known as 'Nagana'. He suggested a similar cause for Sleeping Sickness. In 1902, Dutton discovered trypanasoma gambiense and in 1910, Stephens and Fantham discovered trypanasoma rhodhesiense and incriminated the tse-tse fly, Glossina Palpalis.

Kitasato and Yersin discovered the causative organism of plague, the bacillus pestis. In 1908, the Indian Plague Research Commission disclosed that bubonic plague in man is entirely dependent on the disease in the rat. They showed that sanitary conditions have no direct relation to plague, except in so far as they favour infestation by rats. The recent work of Martin of the Lister Institute has shown that the method of infection by the Flea is a 'contaminative method' and that the vomit of the infected flea, containing bacilli, infects the area of the flea bite.

In 1907, it was discovered that relapsing fever was conveyed by lice. In 1909, typhus was proved to be a louse-borne disease. During the last war, Byam proved that trench fever is also carried by lice.

Leiper in 1916 showed that the parasite of Bilharziasis passed a period of its development in the body of a water snail.

Hideo Noguchi was the most brilliant Japanese research worker of this century. His researches on original lines were enormous. He made many serological studies. He was the first to culture the organism of syphilis. He demonstrated the presence of these organisms in the spinal cord in patients suffering from tabes and in the brain of patients in general paralysis of the insane. He proved the syphilitic nature of both these affections. He discovered the organism of yellow fever and of Weil's disease. The volume of his researches has given him a place in the forefront among the great scientists of the world.

The technique of tissue culture, originally formulated by Harrison and Carrel, has greatly facilitated the study of the growth of different

types of cells and tissues and the effect of various chemical, physical and other influences on them.

The researches into immunity reactions began from the discoveries of Pasteur, Koch, Ehrlich and Metchnikoff. The chemical and physico-chemical reactions in the immunological processes were studied by Ehrlich, Bordet, Madsen, Arrhenius and others. The practical application of these studies is seen in the employment for diagnostic purposes of the Widal Test, Wassermann Test etc.

A Brief Summary of Contributions to Medical Research in Pathology in India.—As the field over which medical research has extended in India is very wide, I shall only very briefly mention the important contributions made to pathology including its branches of bacteriology, parasitology, helminthology etc.

Among the earlier classical studies may be mentioned those of Lewis on typanosomiasis; Vandyke Carter on spirilla, leprosy and mycetoma; Macnamara on cholera and Fayrer on snakes and snake venoms. Organized medical research dates from 1894, when the Indian Medical Congress moved the Government of India to establish and endow a research institute.

In India research work is mainly conducted in the following Government institutions. The Plague Research Laboratory (later called The Haffkine Institute) was established in 1899. The Bacteriological Department was formed in 1905. In 1906, the Central Research Institute was established at Kasauli, and the Pasteur Institute at Coonoor in 1907, Rangoon in 1915 and Shillong in 1917. In 1920 the School of Tropical Medicine and in 1932 the All-India Institute of Hygiene and Public Health were opened. An important milestone in Medical Research in India is the creation of the Indian Research Fund Association.

Malaria.—Malaria, being the major health and social problem in India, received naturally a large amount of attention from medical research workers. It was in India that the mosquito was incriminated as the carrier of malaria by Sir Ronald Ross at the close of the last century. But earlier in 1845, Dempster introduced the spleen rate as a measure of malarial endemicity. Giles, James and Liston studied the mosquitoes. Christophers enunciated the principle of "species sanitation." Much work has been done on entomology by subsequent workers—Adie, Donovan, Patton, Turkhud, Barraud, Senior White, Stickland, Iyengar, Sinton and others. The epidemiological studies of Christophers and Bentley

showed that the causative factors in the production of malaria were very diverse.

The Central Malaria Bureau and then in 1926 the Malarial Institute of India were established. Much work has been accomplished in epidemiology, control of rural malaria and on the bionomics of various anopheline vectors. Among other workers on Malaria may be mentioned Bentley, Gill, Acton, Knowles, Krishnan, Das Gupta, Rao, Iyengar, etc., and also Sweet and Russell of the International Health Division of the Rockefeller Foundation. Krishnan's researches on monkey malaria and black-water fever will throw a new light on malarial immunity. Shortt's studies on protozoal immunity are worth recording. Tirumurti has shown that malaria is not one of the causes of cirrhosis of the liver, as it was believed to be for a long time.

Cholera.—India is the main endemic home of cholera. It has been, therefore, a subject of considerable attention and study. Koch confirmed in India his discovery of the comma bacillus in 1884. Since then, much work has been done on the epidemiological, preventive, clinical and treatment aspects of the disease.

Greig studied the pathology and bacteriology of cholera. He found that there were many vibrios resembling vibrio cholera, but non-pathogenic. Tomb and Maitra studied the bacteriology of cholera and the carrier problem.

In 1928 de-Herelle studied the bacteriophage in relation to cholera. Malone, Morison, and Asheshov took up the bacteriophage question in relation to the vibrio and the prophylactic value of cholera bacteriophage.

Rogers and Russell and Sundararajan made epidemiological studies to forecast epidemics of cholera. Other workers produced a prophylactic anti-cholera vaccine.

At present work is in progress on the chemical constitution of vibrios, the metabolism, bio-chemical reaction, variations in vibrios etc. Different serological types of vibrios have been isolated. Vibrios have been isolated from healthy persons and external sources. Agglutinable and non-agglutinable vibrios have been differentiated. It has been shown that, by the use of suitable methods, vibrios can be isolated from practically all open water sources in India. These studies will show the possible origin of vibrios which can be isolated from man, in health and disease. Pasricha, de-Monte, Lahiri, Chatterjee and many others are engaged in the Cholera Enquiry.

Plague.—Plague was introduced from China into India in 1829, though India had been free from plague for 2 centuries previously.

Bombay was the first city to be affected, from where it spread to other parts of the country. It was at first supposed that the disease was transmitted from man to man. On this theory of transmission, preventive measures were applied. Naturally, they were completely ineffective and gave rise to considerable amount of suffering to the people and to protests and agitation in the country.

The Plague Research Commission was formed in Bombay in 1905 and worked until 1913. It is to this commission that we owe our exact knowledge of the epidemiology of plague.

Hankin had suggested the possibilities of insect transmission of plague from rat to man but to Liston belongs the credit of proving the flea transmission of plague. Subsequent work showed a flea species factor influencing the epidemiology. Haffkine produced the prophylactic vaccine. This is one of the first prophylactic vaccines to be used on a large scale in man.

Attempts are now made to improve the vaccine and produce a potent anti-plague serum. In this connection the names of Naidu and Sokhey may be mentioned. The carry-over problem of plague is being investigated in the Cumbum Valley. It has been shown that meteorological conditions do not affect the fleas in the rat burrows and that hydrogen cyanide gas is the best lethal agent for the rats and fleas in the burrows. Epidemiological studies have shown that the immunity of the rats for plague is roughly proportionate to the degree of incidence of plague in the areas, from which they were collected.

Kala-Azar.—In 1903 Leishman recorded the discovery of the parasite in a spleen smear. So had done also Ross. But, independently of them, Donovan found the parasite in the spleen puncture smears of deceased individuals and also in the peripheral blood smears. Christopher gave a classical description of the pathology of Kala-Azar in 1904 and 1905. In 1904, Rogers cultivated the parasite and showed that it was a flagellate. In 1907, Patton discovered that the parasite assumed the flagellate form in the bed-bug. In 1913, Mackie suggested the genus phlebotomus as the possible vector. In 1915 the tartar emetic treatment for Kala-Azar was introduced by Rogers.

In 1917, Brahmachari discovered the globulin precipitation test; in 1921, Spackman introduced the formal-gel test for Kala-Azar. It was popularised by Napier. In 1922, Brahmachari introduced Urea Stibamine, as a specific for the disease. From that time the

modern treatment for Kala-Azar may be said to have begun. Chopra's serum antimony test made the diagnosis easier.

In 1922, Brahmachari discovered dermal leishmaniasis. In 1923, Shroff and Brahmachari described the pathology of the disease. In the same year Shroff demonstrated L. D. bodies in the urine of Kala-Azar patients. Shroff was the first to suggest P. Argentipes as the vector. Knowles, Napier and Smith in 1924 showed that L. D. bodies flagellated in the insect's gut. Shroff, Smith and Krishnan discovered the technique of giving sand flies a second and subsequent feeds. In 1926 Shroff and his colleagues found massive natural infection in the buccal cavity of P. Argentipes. In 1927, they infected a mouse with the gut contents of the infected sand-flies. In 1923, they infected hamsters by the oral and conjunctival routes. In 1928, they described the presence of L. D. bodies in the faeces. In 1930, they showed that the disease was transmitted from infected hamsters to healthy hamsters by close contact.

Lloyd and Paul described the serum changes. De Silva and Swaminath confirmed the identity of the parasites of K. A. and dermal leishmaniasis.

In 1931 Shroff, Smith, Swaminath and Krishnan recorded the first successful transmission of K. A. to a hamster by the bite of an infected P. argentipes. In 1935 Shroff and Swaminath recorded the finding of L. D. bodies in the nasal mucus of K. A. patients. With the infected mucus they successfully infected a hamster.

Leprosy.—Until 1920, no attention was paid to research in leprosy. Rogers made a clinical study of the disease and tried various preparations of chaulmoogra oil in treatment. Muir and his co-workers took up later the epidemiological, clinical, pathological and bacteriological studies on leprosy. The types of leprosy were clearly defined. The self-limiting character of the disease was pointed out. The view that leprosy is a highly infectious, always progressive and fatal disease was proved to be wrong. It was shown that children have poorly developed immunity to leprosy and that the solution of the problem of prevention lies in the removal of the children from their diseased parents; in the segregation of the infected parents in institutions for their care and treatment; and in their sterilisation, if possible. Much work is being done on rat leprosy, though neither human nor rat leprosy bacillus has so far been cultured, in spite of repeated attempts on new lines.

Rabies.—Semple in 1911 first introduced the dead carbolised antirabic vaccine. Harvey

and Acton showed that the results from this carbolised vaccine were better than from the use of the original Pasteur vaccine, made from the dried cord. The introduction of the carbolised vaccine made possible its preparation also in the plains and the decentralisation of treatment. Anti-rabic treatment is now given in most of the important cities. Mc Kendrick and Cornwall did research on the pathology of rabies and the accidents in treatment. Cunningham in 1927 introduced the carbolised vaccine made from fixed virus brain substance. Studies are in progress on the value of anti-rabic serum and the combined use of serum and vaccine.

Nutrition Research.—In 1912 McCay published his book on the 'Protein Element in Nutrition,' when he was the Professor of Physiology in the Medical College, Calcutta. This was the first work to draw attention to the relation between diet and physique. McCarrison (1913 and 1914) showed the effect of faulty food on the thyroid gland. Later, he studied the pathological changes, caused by defective diet, in most of the organs of the body. The nutritive value of food-stuffs is being investigated. Aykroyd has succeeded McCarrison as the Director of the Nutrition Research Laboratories, Coonoor. It is at present one of the largest institutions in the world, devoted solely for Nutrition Research. Keratomalacia, stomatitis, and epidemic dropsy are under investigation.

Other Subjects.—Many contributions have been made on general protozoology, medical entomology, helminthology, snake venom and indigenous drugs. It is not possible in this address to cover all the ground. Col. Chopra has founded pharmacological research in India in the School of Tropical Medicine, Calcutta, and has made very many important contributions.

No research on cancer was undertaken until recently. We owe to Vishwanath much of our knowledge regarding the prevalence, age distribution, the sex incidence, order of frequency as regards site etc., in India. He has exploded the dogmatic statements of foreign medical men about the rarity of the disease in India. He has shown that the age of maximum incidence of cancer in India is at least ten years earlier than in the Western countries and that the incidence of cancer of the cervix falls heaviest on Hindu women, and buccal cancer is more in the male than in the female and in Muslims than in Hindus.

For much of the information in this brief review, I am greatly indebted to the recent publication of *The Indian Medical Review* by Major General E. W. C. Bradfield, D. G.,

I. M. S. A reference may be made to it for fuller details on the subject of research in India. The book is a mine of information to medical men in India and elsewhere.

THE NEED FOR HISTORICAL APPROACH TO THE STUDY OF MEDICINE

Having been a teacher of pathology for some years, I have become increasingly convinced that a historical approach to the handling of the subject is very necessary, and that every teacher should know the history of medicine and also the history of his special branch of medicine. I am not a medical historiographer. Neither have I made any special study or research on the history of medicine. I had only to depend for this address on the information which I could obtain from various sources. I have drawn liberally from Krumbharr's Pathology in the series *clio Medica*. I should prescribe this little handbook to every medical student, who comes into the third year of his studies. Having now become acquainted superficially with the history of pathology, I wish I could begin my career as a teacher now; but I am old and shall have to retire from office soon. Nothing will give me greater pleasure than to find that this address of mine has pointed the way, in however poor a manner, to medical students and teachers to the rich storehouse of knowledge, garnered in books on the history of medicine and its branches and to the still unexplored field for research in this country.

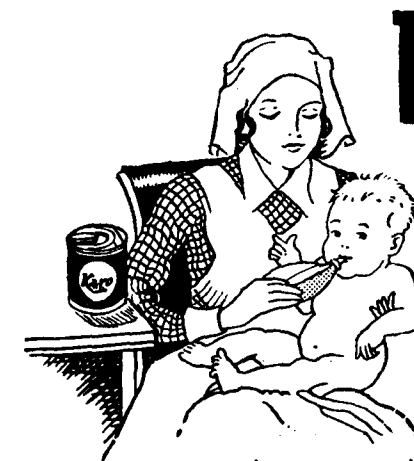
THE FUTURE PROGRESS OF MEDICAL SCIENCE

The brightest chapter in the history of pathology is the period which began with Pasteur. It is glorious and fortunate to live in these days when exact knowledge in the science of pathology, (including bacteriology, protozoology, etc.) has placed weapons of great power in our hands for the prevention and cure of a large number of preventable diseases. No progress is possible without exact knowledge.

Medical science can progress only so long as the scientific spirit survives. The test of civilization may well be the standard of its scientific spirit. Research is the watchword of modern medicine. Empiricism is the refuge of ignorance.

"Medicine and civilization advance and progress together. The conditions essential for advance are intellectual courage and a true love for humanity. It is as true to-day, as it has been in the past, that further advance or even the holding of what has been won depends upon the extent, to which intellectual courage and humanity prevail against bigotry and obscurantism.

We stand upon the intellectual shoulders of those medical giants of bygone days and because of the help they afford us, we are able to see a little more clearly than they were able to do." (Claude Bernard).



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Makers of Modern Bacteriology

• Anil Kumar Maitra, L. M. F., Calcutta

Throughout the middle ages when authority and dogma ruled supreme, an accurate study of clinical medicine was unknown. Renaissance first saw the progress in medical science, specially in the domain of internal medicine, where the spirit of independence brought forward a series of observations which contributed largely to the knowledge about diseases.

Renaissance bequeathed to its successors a spirit which enabled the human mind to investigate into the cause of diseases, and experimental study formed the nucleus of their scientific investigations in the seventeenth century. During this century the application of magnifying glasses and microscopes to the study of clinical medicine, specially in relation to the cause of diseases, opened to the medical science a new world, the existence of which was completely unknown hitherto. The unknown world thus brought to light created the Science of Bacteriology.

Athanasius Kircher, the foremost German scholar of the age, was a pioneer microscopist. He was first to cast a suspicious eye upon the activities of the recently revealed micro-organisms already regarding them as the cause of infectious diseases.

But actual detection of micro-organisms which are now known to be associated with certain diseases and the possibility of their study were beyond the scope of his low power microscopes and hence his teachings were destined to wait only to receive a greater impetus from the discoveries of Antony Von Leewenhock, the father of microscopy.

He possessed the best microscope of his time constructed by himself. It magnified 160-270 times, whereas instruments used by other investigators magnified at most 143 times. Leewenhock's findings through his own microscope created an epoch in bacteriology. His researches were published in a series of letters to the Royal Society.

In 1675, he described extremely minute organisms in rain water, well water and in other vegetable and animal substances. Further he was able to differentiate these minute living things by their size, their form and the character of their movements. In 1685, these discoveries were illustrated by means of woodcuts, and there can be little doubt from the drawings of these micro-organisms that they were intended to represent leptothrix filaments, vibrios and spirilla.

As soon as Leewenhock had brought the bacteria into light, the theoretical physicians were not wanting who at once attributed various maladies to their agency.

The spirit of active investigation in the development of clinical medicine in the first half of the 18th century ceased to manifest itself to a certain extent on account of the fact that the attention of

scientists were engaged during this period mainly in the discussion regarding the nature of contagium and its relation to putrefaction and disease. Very few of them cared to study the natural history of these micro-organisms till at least in 1786 Muller took into account the form of the micro-organisms, their mode of progress and other biological characters, and on such data based a classification. Thus the scientific knowledge of the microcosm was considerably advanced by his writings and illustrations.

In 1862 Marcus Antonius Plenciz of Vienna opened a new avenue to scientists by maintaining that "all infectious diseases are caused by living micro-organisms and a special germ is responsible for each specific disease, hence period of incubation varies in different infections." But the germ theory was in travail, and another century had to pass before it was born.

The ravaging scourge of small-pox went unchecked from time immemorial till it was left to the genius of Edward Jenner to inflict a fatal blow to this "never-absent plague". This fatal malady alone took a toll of sixty-millions of human lives in the eighteenth century. It was on the 14th May 1796, that he first vaccinated his son and thus at the point of Jenner's ivory lancet the science moved a step forward to a diseaseless future.

The onset of the 19th century witnessed a change in the line of thought so long followed by the scientists. This century is characterised as an age of biology. The subject which eclipsed all others in interest was the origin of the micro-organisms. Two rival theories held the ground at this period—spontaneous generation and development from pre-existing germ. The researches that were made in the course of this discussion and the discoveries which resulted therefrom, materially advanced the germ theory of diseases. Theory of spontaneous generation found favour at first with the scientists till the rise of Henle and Schwann who gave a death blow to the mirage of this theory.

Henle, in the year 1840, had published in *Pathological Researches* the essay on "Miasma and Contagia" which contained the first clear statement that infectious diseases were due to specific micro-organisms. He himself searched for these microbes without technique and searched in vain. On his dictum, "before microscopic forms can be regarded as the cause of contagion in man, they must be found in the contagious material and they must be isolated from it", has grown up the science of bacteriology.

A generation later, when Robert Koch demonstrated bacillus after bacillus, the old Henle was hailed as a prophet.

The researches of Louis Pasteur, Joseph Lister and Robert Koch completely revolutionized our conception of bacteriology and placed it on a more accurate scientific basis in the latter part of the 19th century.

Pasteur (1822-1895) who began his scientific career as a chemist gradually moved onward from chemistry to the inner recesses of biology. Before

Pasteur the entire knowledge about fermentation was surrounded in darkness. It was he who after unassailable experiments established that micro-organisms cannot arise anew but arise from former micro-organisms and thus the last nail was added to the coffin of the theory of spontaneous generation. During his study of the putrefactive phenomena the famous process of pasteurisation was born. His observations on lactic acid fermentation in 1857 convinced him that in the world of 'infinitely small' lay buried the secret of contagious diseases, and later on it was Pasteur who forced the germ theory down the throat of medical world. Pasteur, the father of preventive medicine, first proved his genius by preventing a malady which terrorised France throughout its length and breadth. During a period when anthrax broke out in France in an epidemic form, it was Pasteur who faced the problem boldly, and after years of strenuous work announced to the world that by an attenuated virus, anthrax could be prevented. Thus Jennerian vaccination was surpassed.

Hydrophobia was his next target and a little rabid marrow in his syringe ward off an attack of this fatal disease in Joseph Meister, his first patient, with success. Pasteur's antirabic treatment is one of those ineffaceable landmarks which stand out clear against the background of time.

His discovery about the role played by the microbe in the processes of putrefaction and disease waited only to receive a better appreciation by the world at large by their application in the study of clinical medicine as carried out by his successors. No one appreciated the significance of Pasteur's great discovery better than Lister who against heavy odds established the principles of antiseptics in surgery (1827-1912). Listerism is simply applied Pasteurism. He published a series of epoch-making articles in the *Lancet* between March—July, 1867 bearing the title "On a new method of treating compound fractures, abscesses etc. with observation in the condition of suppuration". His brilliant achievement in antiseptic surgery gained for him honours at home and abroad. He was created a baron in 1897, being the first medical man ever raised to the peerage.

Robert Koch (1843-1910) loomed large in the horizon of bacteriology in the latter part of the 19th century. His contribution to the science of medicine in general and bacteriology in particular, had gained for him a place which very few scientists prior to him was allowed to enjoy. It is interesting to note that he began his scientific career in an ill-equipped district dispensary in the province of Posen in Germany. With his microscope, Koch built up an institute of research and by his 10 years of silent service in an out of the way place he was the first to work out the complete life history and sporulation of a bacterium.

As early as 1876, he obtained a pure culture of anthrax bacillus and soon after he was able to devise method of inoculation which had proved to be very valuable.

In the following year Koch described his procedure for the examination, preservation and photography of bacteria.

In 1878 he published his investigation into the cause of infective diseases, demonstrating the various bacteria responsible, breeding them for generations and reproducing the diseases artificially.

In 1881 Koch dwarfed all his associates by his scheme of spreading liquid gelatin with meat infusion on glass plates, thus producing for the first time a transparent solid media for pure culture.

With these enormous gains in the technique at his command, supplemented by the improved staining methods which he devised, Koch was prepared to continue the quest of specific organisms and on the evening of the 24th May 1882, he started the whole scientific world by announcing his discovery of tubercle bacillus. In this paper he erected four postulates that stand like four pillars of bacteriology.

- (1) Micro-organisms must be present in all cases of diseases.
- (2) It must be cultivated in pure culture.
- (3) Its inoculation must produce disease.
- (4) It must, when injected into healthy animals, produce the same disease.

Between August 1883 and May 1884 while Koch had been in Egypt and India studying cholera, he not only discovered the cholera vibrio (*Comma Bacillus*) but was able to cultivate it from drinking water, food and clothing. These investigations opened a new era in Public Health.

At London Tuberculosis Congress (1901) Koch set in motion unlimited arguments by his contention that human and bovine types of tubercle bacilli were not identical.

In the year 1902, Koch made important observations upon Recurrent Fever and Trypanosomiasis and in the same year he established the principles for the control of typhoid fever which has since become standard.

The researches of this immortal scientist as to the discovery of 'Tuberculin', as a curative measure in tuberculosis, did not reach that hallmark of excellence which characterised his other findings.

Every nation owes an immeasurable debt to this great scientist, who gained victories over typhoid and sleeping sickness, uncovered the sources of tuberculosis and cholera, and invaded continents not for his own conquest but to lead physicians only to bring relief to millions of families.

People flocked to him to learn science and no one gave him a more sincere gratification than Kitasato, who carried Koch technique to Japan and by its application first cultivated the germ of tetanus and discovered the bacillus of bubonic plague.

The doctrine of bacterial origin of infectious diseases as laid down by Pasteur is medicine's greatest discovery, and this bacterial theory shed light on many obscure pathological conditions. It was on this doctrine that the subsequent scientists laid the foundation of their researches and established their findings.

The morbid history of leprosy stretches across humanity's trail for thousand years. In the modern era this disease was studied internationally but by none more assiduously than Armauer Hansen who discovered the short slender rod that had caused leprosy in the world.

The study of infectious nature of pneumonia dates back to the observation of Jurgensen in 1874. Though he assumed it to be due to a specific microbe yet it was not until 1884 that Sternberg's 'Micrococcus Pasteur', or Pasteur's diplococcus was shown by Frankel to have a definite relation with pneumonia, and thus Frankel's pneumococcus came to light.

Earliest records of epidemic cerebrospinal fever are those of Viennese of Geneva (1805). Meningococcus kept itself concealed until it was discovered by Marchiafava and Celli in 1887. It was identified to be the cause of meningococcus meningitis by Weichselbaum in 1887.

Hippocrates (460-370 B. C.), the father of medicine, not only created rational medicine by demonstrating that disease is not dependent upon supernatural causes but also had left behind him case-notes which proved beyond doubt the prevalence of diphtheria even in those days. The cause of this cruellest disease of the nursery was first isolated by Klebs in 1883 and Löffler cultivated this club-shaped bacillus in 1884.

Dysentery is as old as the father of medicine himself, and it was Hippocrates who first differentiated this clinical condition from diarrhoea.

Recognition of bacillary dysentery as a separate entity dates back from the discovery of bacillus dysenteriae from the stool of dysenteric patients by Shiga in the year 1898.

In 1899 Flexner also isolated similar bacilli from dysentery cases in Philippines.

The cause of typhoid fever, one of the most widespread of the infectious diseases from which no country or race is known to be immune, was brought to the knowledge of medicine by Eberth in 1880.

Without bacterial theory it was difficult to understand gonorrhoea and syphilis. Albert Neisser at his 24th year first saw the gonococcus in the secretion from purulent cases of urethritis, and thus the cause of the most prevalent malady of adolescence made its appearance before the scientific world in 1879.

The twisted parasite of syphilis lay coiled and concealed until the twentieth century when Fritz Schaudinn, whose researches brought *entamoeba histolytica* within the domain of medicine, exposed this scourge of mankind (*spiroceta pallida*) in the year 1905.

With Laveran's discovery of malarial parasites in Algeria in 1880 came the recognition of the importance of this protozoa and it was through Ross's energy and devotion for finding out a vector of this parasite that a fresh and effective avenue has been opened to the modern clinicians.

The most startling contribution made to the science during the past 40 years are by Paul Ehrlich and Elie Metchnikoff. They have made a

threadbare scrutiny of the problem of immunity". It was their learned contribution on this subject which won for them Nobel Prize in 1908.

Ehrlich made in his early twenties sensational discoveries with stains which is now used by all bacteriologists. His "vital staining" laid the foundation of chemotherapy. The famous 'side chain theory' as formulated by him still stands immortal.

August Von Wassermann discovered the diagnostic test for syphilis, known as 'complement-fixation test', which has since been a feature of many laboratory methods.

Medical dream of a diseaseless future had been materialised to a certain extent by Pasteur by his injection of attenuated virus and thus Ehrlich's principle of artificial active immunization against diseases of known microbic cause was made known to medical science.

In the year 1890, Army surgeon Emil Von Behring first demonstrated the possibility of passive immunity (artificial) and he received warmest congratulations from each and every corner of the globe when he saved the first child from an attack of diphtheria by diphtheria antitoxin in 1891.

At the period when science was on the verge of accepting 'Humoral Theory' as enunciated by Ehrlich to be the only explanation of immunity, Elie Metchnikoff was observing the changes in the star fish larva following a pin-prick under his microscope at Messina. He, by his immortal experiments, brought to light many important facts in connection with the action of bacteria upon cellular elements of the body. It was Metchnikoff who made known to the intellectual world that phagocytosis was the essential principle in immunity and thus formulated his cellular theory.

He recognised the specific antibodies elaborated in the serum, as the derivatives of leucocytes, and termed the immune substance as 'Stimulin'.

Metchnikoff's 'Stimulin' met with opposition. Researches of Wright and Douglas brought forth 'Opsonin' in its place in the year 1904.

Wright observed wide variation in the opsonic index of an individual, specially during an infection, and to achieve practically a maximum positive phase during the period of infection, he elaborated the principles of vaccine therapy.

In 1896, Widal in conceiving sero-diagnosis generalised the idea of antibodies, the study of which constitutes, to-day, a real science of serology.

Blood culture introduced by Schottmuller in 1901 for clinical purposes caused a revolution in our ideas on the pathogenesis of many unknown maladies.

Lysis in bacterial cultures was observed by bacteriologists for years, but Twort first thought of a separate lytic principle responsible for this lysis and discussed the possibility of an ultra-microscopic virus being responsible.

It was D'Herelle who carried out important researches and maintained that the lysis was due to an ultra-microscopic virus to which he gave the name "Bacteriophage" in 1917.

No survey of the makers of bacteriology is complete without reference to Hideyo Naguchi. This young son of Japan had brought to her international reputation by his original contributions in serological study at his early age of 25. He took the world by surprise by achieving a successful culture of the spirochaete of syphilis. It was he who exposed the secret of Weil's disease (*Leptospira ictero-haemorrhagica*).

He fell a victim to an attack of yellow fever while he was investigating the cause of this disease and succumbed to this illness. His name will go down to posterity and will be placed among those who are regarded as martyrs at the altar of science.

Discoveries of centuries have thus placed the science of medicine on a more or less scientific basis. Innumerable problems of this vast subject are yet to be solved. Maladies of unknown origin where death is the final conclusion still roam on the surface of the earth defying completely the efforts of science.

To enable the mortals to live the normal cycle of years—free from infection, safe from disease—the scientists have yet to take a bolder plunge into the unknown world. In our country where maladies are of diverse nature and of peculiar character, a regular systematic investigation is required to be carried out by those scientists, who are conversant with the peculiarities of this soil, to unveil the mysteries that are still to be solved. The workers, therefore, should join, to undertake this campaign to explore the great unknown. Their span of life may not be sufficient to answer all the problems but undoubtedly they shall continue to infuse inspiration in the younger generation for the realisation of the dream of a diseaseless future.

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"The patient may have suffered from chronic headaches", suggests the archaeologist, or acted oddly, and his people thought the only thing to do was to let out the devil that was worrying him, so they made a hole in his skull."

The exhibit will soon be on view at the Royal College of Surgeons.

History of Human Anatomy

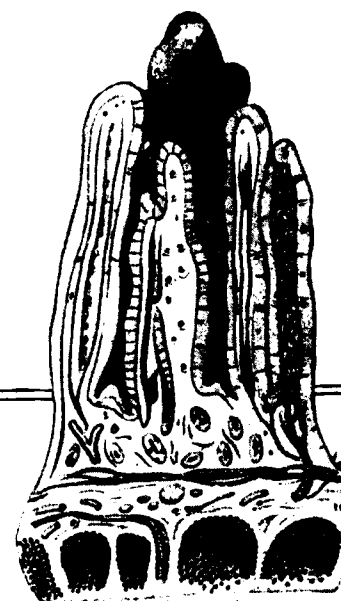
● Santi Lal Roy, L. M. F., Calcutta

The history of human anatomy is intertwined with that of medicine, and the history of medicine is as old as the history of man and his civilisation. The tree of civilisation had its root in three places: on the plains of Egypt; on the banks of Ganges and the valley of Indus; and the sea-girt of Greece where science flourished in ancient times and attained remarkable development.

There is but little record of the real anatomical knowledge in the remote ancient Chinese civilisation, but the writings of Andreas Clayer show that earliest anatomical knowledge in China date from 3,000 years before Christ during the time of Emperor Hon-Aug-Ti. The early Chinese anatomists held that three tubes passed through the heart: one leading to kidney; second to alimentary canal and the third to gall bladder. The rest of the body was thought to be supplied by a system of independent tubes. This will appear curious in the light of modern knowledge.

Closely running on the heels of Chinese comes the story of Egyptian civilisation which dates from 2,000 years before Christ. The anatomical knowledge of Egyptian priest-physicians was not of any high order. From the famous works of M. Champollion on "Egyptian Antiquities" it may be gleaned that anatomical teaching in Egypt was theological in nature. They assigned different parts of their body to the subjection of different planets and divided the human body into thirty-six parts, each under the control of a separate "aerial demon". But Maspero records that Egyptian priest-doctors declared the existence of thirty two vessels. They knew the heart to be the seat of origin of blood vessels and hence the significant importance of pulse which was not generally understood and recognised even a thousand years later except by the ancient Indians. It is interesting to note that Memphis, first king of Egypt and himself a physician, wrote some treatises on anatomy. Archaeological excavations of the tombs of different pharaohs at Thebes have revealed astounding chemical knowledge of the Egyptians as laid down in the papyrus manuscripts recovered from those tombs. That possibly is the reason why the process of embalming reached to such a high degree of perfection as to remain unparalleled even up to the present times.

Linked to the Egyptian comes the Hebrew civilisation aptly described as "the daughter of Egypt". As to the extent of anatomical knowledge of the ancient Jewish priest-doctors, we possess a very meagre account. It is only during the later period of Jewish medicine, referred to as the period of Talmud, that we get some idea of "Talmudic Anatomy" of the Jewish Rabbis, viz., Rabbi Ismael Ben Elisha. The anatomical descriptions in Talmud were chiefly based on those of Greek physicians.



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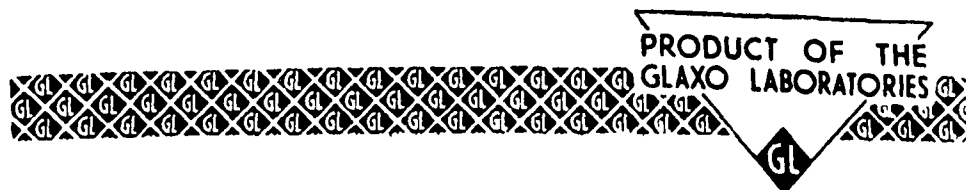


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This brings us to the history of achievement by the ancient Indians. The knowledge of anatomy known to ancient Indians is at present extremely limited. Earliest Indian medical schools were that of Atreya in Taxila on the Jhelum river and that of Susruta at Kasi (Benares) in 6th century B. C. Among the famous Indian trio, Charaka was more a physician, Susruta more a surgeon, and Vagbhata a prolific writer on Indian medicine. There can be no doubt as to dissection being known and practised in the school of Susruta, for, his compendium contains a passage which gives a detailed account of the procedure to be adopted in preparing a dead body for anatomical examinations. In spite of a few irregularities and incongruities their description of human body in general is fairly accurate. Thus Susruta describes the body (*Anga*) as consisting of following parts: "the two arms (*Bahu*); two legs (*Sakthi*); head and neck (*Siro-tribha*) and the trunk (*Antardhi*). Inclusive of tooth and nails, the body has 360 bones of which there are 32 teeth (*Danta*), 32 sockets (*Ulukhala*) for the teeth and 20 nails (*Nakha*)".

It is interesting to note that Bhaskardatta and Bhabadatta wrote a treatise on anatomy on the basis of Susruta as late as 9th century A. D. under the caption, *Sarira Palmini*. But due to early ascendancy of neo-brahmanism which abhorred all contacts with the dead, the practice and knowledge of anatomy declined very rapidly, and concurrently anatomical manuscripts fell into great disorder and decay. These originals, later on, were replaced by falsified and ill-considered substitutes under the name of some famous authority on Indian medicine.

It must be realised that in ancient times considerable interchange of thought and culture took place between the ancient Chinese and Indians. Throughout the ages, there has been a route from China through Central Asia across the legendary oxus, now termed as River Amu Dariya (Mother of Rivers) through Afghanistan into India.

Similarly between the periods of 4th and 3rd century B.C. Indian and Greek cultures were inter-linked, interdependent and intermingled. This was rendered possible by opening up of the route between Greece and India by the conquering army of Alexander the Great along the "Silk road", i. e., crossing the Caspian Sea along the shores of Persian gulf; through western Turkestan, crossing the same Amu Dariya River, through the city of Balk and Valley of Barmyan into Afghanistan—the gate of India.

This brings us to the history of Greeks. Greek history of anatomy can be divided into two stages.

The Pre-hippocratic or Pythagorean period: During this period, in 4th century B. C., Pythagoras was the first physician to evince interest and concern himself with the structure of the body. Among his disciples Alkmaeon was the first to undertake dissection of animals and discovered the origin of optic nerves. Diogenes of Apollonia, another of his pupils, noticed the lateral ventricles of brain in animals.

Next follows the Hippocratic Era, (460-377 B.C.). He was the first physician to relieve medicine from the trammels of superstitions and theological delusions of philosophy. Hippocrates developed a school of his own at the Island of Kos to impart medical teaching of which a poet spoke thus:

"A ray of glory fell on her, its glow
Did straightway immortality bestow".

Though clinical medicine reached a high degree of attainment, anatomy remained in a stagnant state.

Next comes Aristotle, (384-322 B.C.), the immortal philosopher-disciple of Plato, who may be considered as the father of comparative anatomy. He performed certain experiments on the development of chick by opening the eggs at different stages, and their description even today arouses the admiration of embryologists. He also made some observations on genetics and raised some modern problems of heredity. He finally compared the structural variation between the bodies of different animals, and thus laid the foundation stone in the study of comparative anatomy.

But the centre of Greek learning at Athens was soon transferred to Alexandria, named after Alexander the Great, who wanted to make it the political capital of his world-empire. It became an intellectual capital instead. Alexandria catered to the intellectual needs of all the nations, because it was the meeting place of all different civilisations of that time, rendered effectively possible by the amazing conquest of Alexander who had very soon brought under his sway greater part of Europe, Africa, Asia, Palestine, Egypt, Persia and Northern India. After the death of Alexander in 323 B. C., Alexandria flourished under the helpful patronage of earlier Ptolemy Kings of Egypt (from Ptolemy I, the reputed general of Alexander who settled in Egypt). Academies, libraries, museums and *serapeums* (i.e., institute for free accommodation and maintenance of learned men for scientific studies) were established leading to progressive conquest of knowledge and refinement of Greek culture.

Anatomy made some rapid strides of advance in the Alexandrian schools of Herophilus and Erasistratos. There are indubitable evidences that practice of human dissection was resorted to in these two institutions in the early part of 3rd century B. C.

Herophilus is the father of anatomy. He confined his eminent services to anatomy only, and that specially to nervous system. Thus he gave descriptions of the membranes of brain, chorioid plexus, cerebral lateral ventricles, calamus scriptorius of 4th ventricle and the venous sinuses of the brain. The torcular of Herophile or confluence of sinuses still carries his name up to the present day. He further traced the origins of cranial and spinal nerves and furnished an account of the vitreous body, chorioid coat and the retina. He noticed the difference in thickness between the coats of arteries and veins and was the first to notice the opening of left testicular veins into the left renal vein.

Next to Herophilus comes Erasistratus who described the convolutions of brain; distinguished motor from sensory nerves but thought that "former originate from the membranes and the latter from brain substance". He gave the first account of the valves of heart.

Later on anatomy continued its step-ladder ascent through the efforts of Rufus, Mazinus, Quintus and their pupils Lykus and Pelots.

The progress continued even after the disintegration and dissolution of Greek empire and its subsequent occupation and reorganisation by the Romans. Development of anatomy was continued by the Greeks under the Roman rule but the Greek language was gradually replaced by the Latin script.

In Rome anatomy was highly enriched by the gifted works of Clarrisimus Galen (131-201 A.D.). Galen described fairly accurately the position and form of various bones of the body, articular cartilages, periosteum, and most important groups of muscles in the body. He traced the origin of 3rd, 4th, 5th nerves with its branches and the 7th, 8th, 9th and 10th cranial nerves. He furnished an account of the nerves of pharynx and larynx and "the sympathetic ganglia even to the last". He further suggested the possible anastomosis between the arteries and veins. Discovery of Vena Magna Galeni or Great cerebral vein and the internal cerebral veins or the veins of Galen has immortalised his name in anatomical terminology.

But soon the glory of Roman empire began to fade and the grandeur of Rome soon ended in pomp of power and lust, of show rather than the real light of thought. Even this outward grandeur too decayed, even that little light also went almost out, and for a thousand years darkness brooded over the face of Europe. Medical science, and anatomy in particular, awaited its resurrection.

After the death of Mohammed, the Prophet in 632 A. D., all the lands conquered by Alexander which were later annexed to and extended by the Roman and the Byzantine emperors fell into the hands of conquering Arabs. Fired with a patriotic faith and burning fervour of a new religion, the crescent flag became invincible from Egypt to Spain, and extended even up to the Atlantic ocean. As a result, celebrated libraries of Alexandria and other centres of learning were partly destroyed by fire, partly by plunder and only a remnant was captured and taken away by the Arabs which formed a very suitable nidus for the growth of Arabic medicine. During the early part of the Middle ages, under the influence of Arabs, various teaching institutions after the models of Athens and Alexandria began to grow up throughout the Islamic Empire. Those on the eastern side of the Empire were at Constantinople, Bagdad and Jemmia in Smyrna during 5th century A.D. Later on several medical institutions were built at Damascus, Haran, Bokhara, Basra and Samarkand during 9th century. There are no details of the particular phases through which the study of anatomy passed from the time of Galen up to the mediæval times.

One fact, however, stands out prominently that in 9th century, the period of Arabic renaissance, Arabs had a good grounding of anatomical knowledge. It is, therefore, not surprising to learn that during the period of Mohammedan conquest in Spain the Arabian medical school at Cordova became so famous that it attracted people from different parts of the empire including even the Christians desirous of hearing the new teaching of anatomy.

Yuhanna Ibn Masiwah, (777-857), and Hunum Ibn Ishaq, (809-877), were important workers in anatomy. But Abdel Latiff of Cordova (9th century) surpassed them all by his keen and observant methods. Thus he corrected some of the osteological mistakes of Galen, discovered olfactory nerves and decussation of the optic nerves and furnished the idea that the formation of vertebral column and cranium depended upon the manner of development of the brain and cord.

Similarly, Abou el Kassim Ben Abbas, better known as Albucasis, was a foremost anatomist at Cordeva in 10th century. Although no particular discovery can be definitely attributed to him his clear expositions of surgery leave no room for doubt as to his thorough grasp of the topographical anatomy. So Cordeva, and later on Murica and Melaga in Spain in the West, and Constantinople in the East of the Islamic kingdom formed important centres of learning during the early period of middle ages.

During this mediæval period conception of anatomy in Christian Europe was appallingly ignorant and hopelessly inaccurate. This was mostly due to ecclesiastical anathemas, social persecutions, brutal political edicts and finally taking over of the office of teachers by the church as the sole representative of all knowledge. To quote some of the phantasmagoric ideas on anatomy from the drawings during this "dark age" of Christian Europe:

"The veins radiate from a circular stomach to all parts of the body which in head and arms develop into feathered formations. Intestines were separated into "stomachus inferior" rectum and "circum intestine". Medulla and spinal cord were considered to be formed in the vertebrae and divided into slices. The brain was given a strange quasitubular formation whilst main nerves were purely imaginary in conception."

Osteological descriptions exhibit extreme paucity of their knowledge in bones. These and similar other primitiveness of conception need no elaboration as imagination alone can have played the greatest part in those drawings.

It was only during the later part of the Middle ages that the Catholic world was brought into intimate contact with the Islamic world by what was known as the *Crusades*. Moslem dominion and culture were steadily but systematically invaded by the crusaders from 1097 (1st crusade); the intensity of these crusades was heightened during the later period, chiefly with the object of recovering Jerusalem, their holy land, which was subjugated by Saladin in 1187. As a result of the 4th crusade Constantinople fell in the year 1204 where the Latin emperors ruled from 1204 to

1261. But from the time of 1st crusade, Egyptian, Indian, Greek, Roman, Persian and Arabic works on medicine were transferred to Europe by the crusaders who were composed of warriors from all the races of Christian Europe, i. e., Celts, Basques, Gælic, Gothic and Anglo-Saxon races. Thus the collected and stored up knowledge of the past was snatched away from the Arabs and infiltrated into the different parts of Europe. The tide of events turned. From 11th century onwards we find everywhere in Europe signs of great intellectual upheaval leading to loosening of old habits and customs, breaking down of ancient traditions, dogmas and superstitions and an awakening and revival of a new spirit of intellectual enquiry. Thus after a thousand years of tillage the soil bloomed again. Several medical institutions grew up at Salerno, Naples, Montpellier in Spain; Bologna, Padua, Pisa and Florence in Italy; Orleans, Rheims and Angers in France, and a host of others from 12th century onwards were constructed throughout the length and breadth of Europe. To name a few of them; Oxford and Cambridge in 13th century, Glasgow in 1385 and Aberdeen in 1494, Prague in 1348, Vienna in 1385 and Heidelberg in 1386 and Poland in 1400.

Physicians ceased to rely on the infallibility of their ancestors and began to make independent investigations of the dead body.

Anatomica partium corporis humani of Mondini in the beginning of the 14th century was the first compendium of human anatomy composed from actual dissections, but anatomy owes its scientific development to the hands of Bergner of Carpi. Guido da Vigevano of Italy made some independent investigations in 1330. Gabrielle Zerbi dealt extensively with the bones, muscles and blood vessels, each in separate chapters. He alluded to puncta lachrymalis and ligaments of the uterus. Cannani discovered the palmaris brevis muscle and was the first to observe the presence of valves in veins. Al Achillini noticed the bile duct with its opening into duodenum and the ileocaecal valve.

During the sixteenth century the child of renaissance was born. It must be realised that renaissance did not mean a brighter and better world at once, but it brought about a complete change in the outlook of the world. The crusades opened up the routes to the East, and let in a stream of new knowledge bringing in reformation of ideas that doomed scholasticism and dogma. Paper now came chiefly from Egypt and Arabic world replacing the costly parchment. Printing of movable type, which long awaited an inexpensive medium, broke out like a liberated explosive and spread its destructive but clarifying influence everywhere. Man's ignorance of earth was conquered by the discovery of America, and circum navigation of the globe by rounding Africa. So also ignorance of the sky by invention of telescopes. As knowledge grew fear decreased. Every vital subject was lifted up with new confidence, barriers were broken down, and there was no limit to what man might do or know. It was an age of achievement, hope and vigour; of new beginnings and enterprises in every field; an

age that waited for a voice of some synthetic soul to sum up its spirit and resolve and act. It was the great triumvirate, Vesalins, Fallopius and Eustachius who "rang the bell that called the wits together" and announced that Europe had come of age in anatomy.

Andreas Vesalius (1514-1564) is the reformer of anatomy whose work embraced all sections of the subject. To him we owe the knowledge of nutrition of bones by vessels; of the position and movement of heart muscles; seminal vesicles, ejaculatory ducts and corpus cavernosa. He described the difference between the grey and white matter of brain and the arrangement of fibres in corpus callosum. He furnished us with a true account of pineal body; septum lucidum and the quadrigeminal bodies.

Bartholomew Eustachius (1520-1574) described the structure of kidney and course of ureter; located the valve of inferior vena cava (named after him). His special work was confined to the organs of hearing. He described the tympanic muscles; the spiral form of cochlea; the semi-circular canals and the auditory tube named after him, the Eustachian tube. He also gave an excellent description of the base of the brain.

Gabriel Fallopius (1523-1562) gave a detailed information upon the mode of development of bones and teeth; enriched the chapter on myology by describing the muscles of external ear, face, palate and tongue; followed the course of carotid and vertebral arteries; gave most valuable informations about the lens, ciliary body and the hyaloid membrane. To him we owe the terms, hard and soft palate, vagina and placenta. He discovered the chorda tympani nerve and sphenoidal air sinus. Finally he gave an original account of the facial canal (aqueductus fallopi) and last but not the least the Fallopian tube which has immortalised his name in anatomical terminology.

It is absolutely necessary to mention the valuable debt which stands to the credit of anatomical development to famous painters of that age. They are Leonardo Da Vinci "whose work on mechanism and dynamics of the body in surface anatomy and morphological relationship was unparalleled"; Michael Angelo and Parrhasios whose paintings depicted an accurate study of muscles; and Rafel for his skeleton studies in figures. All these produced a very powerful effect by their essential truth and the fidelity of their expression in enhancing the growth of anatomy.

With the discovery of microscope by Leeuwenhock (1632-1723) foundation of microscopical anatomy was soon laid which made advances in rapid strides towards perfection. To mention some of the champion workers in this branch we have the works of Malphigi on the internal structure of skin and spleen; Clopton Havers on bones; Bellini and Henle on kidney and papillae of the tongue; Du Hamel on the process of ossification from the cartilage cells; Peyer and Brunner on intestinal glands; Henri Meibom (Meibomian glands) and Du Petit on eye (canal of Petit) and Jean Picquet on lymphatic system.

The development of microscopical knowledge of anatomy also went *pari passu*. Thus Nathaniel Highmore described maxillary air sinus; Olosworm the sutural bones (wormian bones); Ruysch the coronary vessels; Kerering the portal vein; Douglas, Glisson and Winslow the relative positions and relations of the viscera and the peritoneum. Anatomical terminology still bears their name by the terms "Pouch of Douglas"; "Foramen of Winslow" and the "Capsule of Glisson". Wirsung traced and followed the pancreatic duct; Santorini that of accessory pancreatic duct; Steno the parotid duct; Wharton the sub-maxillary duct and Rivinus the sub-lingual duct.

Nuck, Bartholin and Cowper clarified the remaining obscurities in the knowledge of generative organs. Willis described the cerebral arteries (circle of Willis). Sylvius gave us an account of some of the cerebral veins, third ventricle and cerebral or Sylvian aqueduct. Vieussens gave an original account of the medulla with its pyramid, olive and the superior medullary velum (Vieussen's valve), and also handed down to us the description of Ansa subclavii. Adri Auvan Spiegel gave intimate information about the liver (Spigelian Lobe or Caudate Lobe) and Varoli that of Pons named after him, the Pons Varolini. Zinn has cleared the conception of lens, its capsule and ligament (Zonule of Zinn). Dauverney detailed the mechanism of foetal circulation. Mullerian and Wolf have clarified the intricacies of embryology.

In fine it can be said that Herophilus and Erasistratus had cleared the ground, Galen and Daubenton dug out and laid the foundation stone, Vesalins, Fallopius and Eustachius had raised the edifice, while innumerable other artists by finishing decorations and embellishments had signally contributed not only to the commodiousness and comfort but to the general effect of knowledge as a whole.

The spirit of renaissance continued and the knowledge of anatomy was most zealously cultivated during the 18th century when most of the great anatomical facts were found out which by unveiling the hidden springs and movements of the human machine have furnished accurate principles on which modern rational physiology, pathology, applied medicine and surgery have been established.

In conclusion I beg to be excused for not tracing the history of growth and development of modern anatomy as the life history of modern masters of the subject is possibly known to all, and as such of less absorbing interest. Granted an opportunity and the will I reserve that for another occasion in future.

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History of Surgery

● C. P. Viswanatha Menon, M. S. (Madras),
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Surgery is probably as old as the human race itself. Our knowledge of the early activities of man are obtained from what remnants he has left buried and has been brought to light by excavations at the sites of ancient civilisations. The Babylonians, skilled in mechanical arts and possessing a literature, probably practised surgery and a lucky find at Ur may give us some details of their art. At present the main sources of our knowledge are the Medical Papyri. There are indications however that the Ancient Egyptians as early as 2500 B.C. practised surgery as seen by certain pictures engraved on the doors of a tomb discovered by W. Max Muller. Splints have been found on mummies of all periods, and there is evidence that surgery of the extremities was practised.

The Edwin Smith Papyrus, discovered in 1872, deciphered in 1922 and published in 1930, gives details regarding surgery in Egypt about 2000 B.C. Written by a skilled surgeon and probably based on earlier writings, this Papyrus gives details of the management of many surgical conditions, sensible and practical. Nothing further is known about this period.

The next great advance in surgery is seen among the ancient Hindus. The Vedas show traces of experimental surgery, but, as with medicine at all times, charms and invocations introduced themselves and checked progress. Later, it was considered pollution to touch a corpse and this prevented study of anatomy. Operative surgery was however taught on fruits, lotus stalks etc. The writings of Charaka and later Sushruta give us an insight into the very advanced state of surgery which existed in India during the early years of the Christian era. Couching for cataract operations, for stone in the bladder and various plastic operations were practised with success. They used catgut and had methods of sterilising it very similar to modern methods.

It is of interest to note that the earliest hospitals originated in India in the 6th century B.C. and flourished throughout the Buddhist period after which they gradually disappeared.

The early Greeks headed by Hippocrates practised medicine and surgery and were skilled in clinical methods. The Hippocratic writings are classical and well known.

The variety and number of surgical instruments discovered at Herculaneum and Pompeii and the writings of Celsus, of Galen and of Antyllus among others are indications of the surgery practised by Romans at this period. Operations were undertaken, and anatomy and clinical methods were

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taught. Following the Saracen invasion of Byzantium, surgery along with other branches of culture declined and remained in eclipse. The Arabs were more interested in medicine than in surgery, but they left Arabic versions of Hippocratic and other writings.

The renaissance brought with it a re-awakening of surgery which started in the monastery at Monte Cassino in Southern Italy and thereafter schools of medicine came into being. Of these the most important was the one at Salerno. This first independent medical school, with its teachings and traditions established a world-wide reputation. The writings of this school show descriptions of many surgical procedures.

In Italy, Flanders and France, surgeons flourished and left their teachings recorded. Henry de Mondeville and Gui de Chauliac ranked high among the French surgeons of this period. The latter was the first to write a text-book on surgery. John Arderne, 14th century, is the earliest known of English surgeons. He left many treatises and was well known as an operating surgeon.

About the middle of the 14th century surgery occupied a position inferior to medicine. Surgeons were looked down upon and universities did not confer degrees in surgery. Surgeons therefore realised the need for fraternising with each other to protect their interests and add dignity to the profession. The College of St. Come in Paris came into being; courses of studies were prescribed and members admitted. They adopted as their distinctive costume a long robe to distinguish them from the barber surgeons who wore a short robe. A fraternity of surgeons existed in London about this time. This fraternity had a very struggling sort of existence until 1540 when an Act of Parliament united it with the Company of Barbers and thus laid the foundations of the Royal College of Surgeons of England. The union with medicine which in the early middle ages was widely separated from surgery was brought about only in the latter part of the 19th century, when surgery became an essential part of the medical curriculum.

The wars which flourished in Europe during the 15th and 16th centuries kept surgeons busy and a number of army surgeons practised and left records of their experiences. Of these the most outstanding name is that of Ambroise Pare in Paris: an observant and practical surgeon his encyclopædia of surgery was held in great esteem. In England also a few surgeons of the Stuart period have left records of their experiences.

Hospitals and infirmaries came into being in the 17th and 18th centuries and with the increase in their number surgery took on a new lease of life. Civil surgery was practised more and more by trained surgeons and operations like lithotomy were perfected by men like Frere Jacques in France and Cheseldon in London. Cheseldon was the first representative of the new type of surgeon, educated and on terms of equality with the higher social circles. Following him came Percival Pott (1713-1788) of high social position, a good teacher and surgeon—one whom we all remember by the

fracture associated with his name and by his classical description of caries of the spine.

Scientific surgery of which the foundations were laid early in the 17th century in Italy and later in France, began in England only in the middle of the 18th century and was mostly due to the efforts of William and John Hunter, who founded the Hunterian School. John Hunter was responsible for much of the success of the school and he may rightly be called the father of Scientific Surgery. A brilliant teacher and a good surgeon, he awakened in his pupils a desire to advance surgery along rational lines, that of anatomy—normal, morbid and comparative. He put his theories to the test of experiment and studied the structure of the bodies of animals as well as of men in health and disease. His work has been handed down to us in the Hunterian Museum of Human and Comparative Anatomy of the Royal College of Surgeons of England. William Hunter has left his collection of books, pictures and anatomical specimens to the University of Glasgow.

Following John Hunter and his pupils came generations of brilliant surgeons who carried on the Hunterian tradition. Among them are such names as Cline, Abernethy, Astley Cooper, and Hey and later Paget. In the 4th generation of the Hunterian school came Joseph, Lord Lister, who, also learning by experiment, constitute with John Hunter the pillars on which modern surgery is founded.

With the improvements in the microscope, and in the preparation and staining of tissues and the work of men like Paget, Cohnheim and Billroth, surgical pathology came into prominence and shed new light on many surgical problems.

The Listerian era marks the period of the greatest advance in surgical history when surgery became safe by the elimination of sepsis. Lister was the first to put to practical use Pasteur's discovery that putrefactive fermentations were due to the access of micro-organisms from outside. The appalling mortality of compound fractures set Lister thinking, and he tried to destroy these organisms by operating under a carbolic spray and using carbolic dressings. The apparatus and instruments used originally by Lister are to be seen in the Museum of the Royal College of Surgeons of England. Thus were laid the foundations of antiseptic surgery which later gave place to aseptic surgery. Though severely criticised by the orthodox surgical opinion of the day, Lister's principles became more and more generally accepted and the rigid asepsis that is now the rule in all operations is the natural outcome of Lister's work.

Simpler methods of keeping away organisms were evolved notably by Neuber at Keel who boiled his instruments and dressings. Later, methods of sterilising by steam came into vogue. The latest advances in this direction were made when Halstead of Baltimore in 1891 introduced the use of rubber gloves and Dr. William Hunter of Charing Cross Hospital advised the use of gauze masks by surgeons.

TUBERCULOSIS

The fifth major eye infection is tuberculosis. It is difficult to diagnose and more difficult to treat. It has a tendency to recur, is progressively destructive, and produces considerable loss of vision. The most favourable lines of treatment are complete rest in bed during the active phase, high vitamin, high caloric diet, and later some tuberculin vaccine—the best in my experience being AO vaccine. The diagnosis is as important as the removal of foci, and fever therapy during an acute phase may stimulate the attack.

HEREDITARY DEFECTS

In these conditions where we can give advice for their prevention we should do so. The transmission of known hereditary defects, of which we have our full share, is fairly common. For this reason, people who have known transmissible defects should be controlled. There are now very good maternity centres and it may be advisable to instruct those in charge regarding the ocular defects that are transmissible. To-day, we are still in the dark so far as control of hereditary defects is concerned, but we may advise the patient and hope that it will be followed.

DETACHMENT OF THE RETINA

There has been a real advance in the treatment of separation of the retina (detached retina). The use of diathermy or cauterization of the choroid is successful in nearly 50% of the cases if it is well done. Most of the cures are accomplished in the early cases. Surgery for the detached retina should be attempted and re-attempted. Very few eyes are lost through good surgery. The technique is constantly being improved, and more patients are being operated upon with the result that an increasing number of patients get back their sight and more patients are willing to have something done for this previously hopeless eye condition.

INJURIES

Year after year there are thousands of deaths and more than thousands of injuries in our country due to automobile accidents. I think about nearly 20% of the injured suffer from some visual defect. Most of the accidents are preventable and if the law and medical examination are strict in issuing licenses and G permits, and sentencing indifferent and reckless drivers, accidents will be reduced to a minimum. What has to be done for the ever-increasing mass of derelicts produced by injuries? These individuals are a tremendous economic burden—the majority cannot afford the initial cost of medical care, to say nothing of after-maintenance. There will always be accidents and most of them are caused by carelessness, stupidity and poor eye-sight. The law that requires a railway engineer to have a definite standard of vision and to maintain it should be strictly applied to motor drivers. We, of the medical profession, should support measures to regulate driving, and help to protect the public from themselves.

ALLERGY AND DEFICIENCY DISEASES

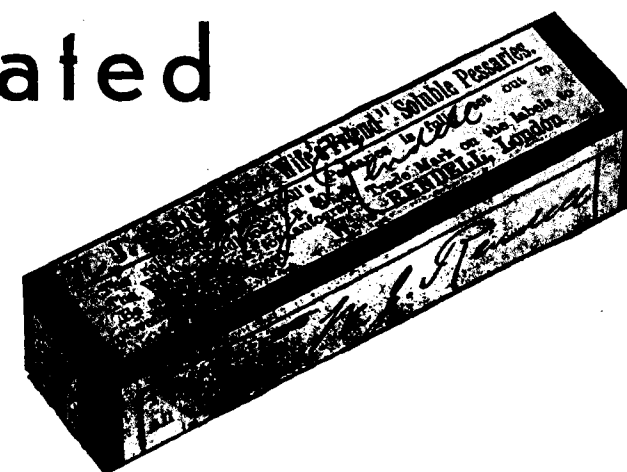
Allergy and deficiency diseases have recently been given an important place in ophthalmology. Allergic changes have long been recognised in other parts of the body but only recently we have come to realise that the eye, in as many ways, is also involved. Chronic low-grade recurring ulcers, chalazia, uveitis and involvement of the discs are not uncommon. Acute flare-ups are numerous during the hot season and some patients have a peculiar individual sensitivity of chemicals, dust, smoke, glare, etc. The important thing to remember is that these low-grade recurring ulcers and irritative processes in themselves may produce economic blindness and may so alter the condition of the eye that the way is paved for other conditions which will produce further loss of vision. Of the drugs, the chief offender among women and actresses and cinema stars, is face powder which contains orris root. Among men, the chief offender is either alcohol or tobacco and it usually affects the individual who has a special sensitivity to the grain from which alcohol is made and to the tobacco itself. In the treatment of eye lesions, in patients suspected of having allergy, it is well to remember that the drugs used, including the cotton bandages, must be tested on the patient. This is especially true with the drugs used in the treatment of chronic recurring ulcers. Several drugs are quite common irritants. They are: atropine, mercurochrome, argyrol, dionine and the mercury ointments. When in doubt, a substitute drug should be found.

Dietary deficiency is common because many people lack the knowledge of a balanced diet and others lack the funds. There may be a deficiency of vitamin A, B, or anyone or all of the others. We are now making a greater number of diagnoses of deficiency diseases than before. Some of the eye conditions heretofore considered as idiopathic will fall in this group—rapid retinal fatigue, photophobia, nyctalopia and keratomalacia. A point of interest in this connection is that a high percentage of patients with cataract are said to have a definite vitamin A deficiency. This may now be evaluated by an excellent apparatus, called the Bio-Photometer, invented by Mr. Frohring of Cleveland. With this we can measure the light threshold, and as such can measure also retinal fatigue and recovery which is a function of the visual purple. Since visual purple is derived from vitamin A this is obviously a good clinical test for this deficiency.

EYE PROBLEMS OF THE SCHOOL CHILD

There are several new angles to the problems of the school child. First, it is becoming more and more evident that the school children should be refracted and their ocular muscle balance tested before they enter school. This should be part of the pre-school requirements and much time and worry could be saved for both the parents and the teachers if the youngsters were grouped according to their visual rating, and this record followed in the instruction. The number of special study

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The Art of Medicine

● A. Viswanathan, L. M. P., Medical Practitioner, Madras

It is a healthy diversion at times to draw back a little from the exactions of medical science and the bewildering recent advances in medicine, and sit down to contemplate on the art of medicine: how far and how much this art is practised by the modern physician?

Each mail brings in a number of first-class medical journals to a doctor who is fond of reading and whose purse permits him to enjoy this pastime. He reads them, takes down notes and tries to remember some new things which he may usefully apply in the diagnosis and treatment of his patients. But the moment he is face to face with a serious case all his stored-up knowledge evaporates and he is forced to adopt the method of trial and error.

He has no other choice, because medicine is not an exact science and, perhaps, can never be. The history of medicine which Prof. Tirumurthy has recorded elsewhere shows that it has followed the tracks of civilisation from India to Egypt and Babylon, from there to Greece, and then to Rome, and back again to the modern world with accretions of worn-out theories and with newer knowledge at the epoch of every new civilisation.

In fact, the concept of the science of medicine has been changing as imperceptibly as the changing civilisations in the infinity of time, and this eternal change shows the intrinsic impossibility of making the science of medicine exact like the three angles of an equilateral triangle. When we talk of exactness of medical science, we only mean that it is more exact than in the previous age. This would be true of to-day and to-morrow as of yesterday.

Let me assume for the moment that the science of medicine would one day or other become exact. What would be the result? Then medical science would not be medical practice. Any aspect of medicine that has been reduced to an exact science needs only medical technicians and not physicians for its accomplishment. Examples: mass application of preventive medicine is not within the legitimate province of medical practice to-day; the various laboratory diagnostic tests, such as the Wasserman and the Widal, biochemical estimation of blood and bacteriological methods are the works of the medical technician and not of the medical practitioner. In other words, when medicine becomes an exact science it may no longer need the practising physician as he is to-day.

that muscle errors can be cured by simply snapping the fingers.

Unless the educational authorities in our country take up the responsibility of the care of the eyes of their young ones at school, they would be depriving their charge of the benefits of modern ophthalmology.

classes could be increased and intermediate groups could be arranged between those requiring sight-saving classes and those with normal vision. To me, as well as to other ophthalmologists, this seems to be one of the most important problems in our educational system. We realise that you cannot depend on the individual or his parent for good preventive measures but supervision must be directed in order to save waste of time in school. These visually handicapped youngsters must be protected against nervousness and unhappiness in school. Definite progress is seen in the field of eye muscle training, but there is still room for tremendous improvement especially in the handling of the manifest squints and the prevention of blindness in the one eye that squints. Much could and should be said in regard to this group of patients. First our method of handling them is inadequate. If paralysis of an arm or leg were to develop, immediately there would be half a dozen institutions ready to receive the youngster. This is excellent, but a youngster with two functioning eyes is allowed to lose the use of one, because we have not been able to evolve a system of hospitalisation which provides for the continuance of education and treatment to prevent so-called "amblyopia ex anopsia" which is just another way of saying, one is blind in one eye. Our failure is due to two main factors: first the lack of co-operation by the patient or his mother, either because of lack of time, funds, intelligence or just plain indifference; the second is the lack of medical direction throughout the period necessary to secure good results. It is a complex problem but the end-result, which is eye-sight, is a most valuable one. Just now I have a poor man with a retinal detachment which is inoperable. The other eye is amblyopic and refuses to make any return to sight. He is unable to read, unable to carry on and now must be cared for, with half a dozen children depending on him. Is it not pitiable?

Eye muscle surgery is an adjunct to the training of ocular muscles, but it is not the method of cure of "amblyopia ex anopsia". It is rarely possible to eliminate training exercises and the type and time of surgery must be incorporated in the muscle training routine as the procedure necessary to carry the patient forward. The handling of the youngster with a muscle problem requires serious consideration. More rigid, and certainly more constant attention, must be given to muscle training. Much can be accomplished. We are all desirous of getting a good result but good results require time, effort, apparatus, intelligence and co-operation. Half-way measures are worthless and present a further problem in that those patients, if not carried through to muscular stability, represent in later life the large number of the group of nervous, irritable and high-strung people.

The amblyopic patient is, as a rule, at least comfortable. This is a particularly promising special field of endeavour for people interested in eye work. This requires patience, firstly, with the child and secondly, with the mother who believes

It is hard to say whether medicine would ever become an exact science. More exact sciences than medicine have proven to be less exact to-day. The atom which was once considered as the least indivisible unit of matter has revealed an amazing complexity of composition. It is now proved to be made up of protons and electrons revolving and changing positions with unimaginable speed within the microcosm of an atom. One proton more, or one electron less, the element changes its weight, form and composition. Carbon becomes diamond, and *vice-versa*. The noble metal becomes base and *vice-versa*. So on with all the elements.

The age in which we live at present has been acclaimed on all hands as the scientific age. The exactness of modern sciences has become greater than ever before, but it has not yet become, nor ever will it be absolutely exact. The scientist tries to be exact, thinks for a moment he has become exact but only to be told by later ages that he was not so.

This scientific age has made its footprints in the sand of time. It has annihilated distance. It has killed the insularity of countries and nations. It has removed the partitions between different civilisations and cultures. It has made one humanity and one world.

Tennyson's vision was: *Federation of man and parliament of nations*. This was the poet's hope of this age.

Jagadish Chandra Bose's vision was: *They who see but one in all the changing manifoldness of this Universe, unto them belongs the eternal truth unto none else, unto none else*. This was the scientist's vision of this age. Not only was this his dream or vision but he proved also with an unchallenged scientific accuracy before the astonished audience of great scientists at the Royal Society of England that there was not even a border-line of difference or distinction between the animate and the inanimate and between the articulate and the inarticulate creations in this world.

But the war-lords of to-day have no such vision. They are using the exactness of science to destroy science itself. Science can have no useful career without humanity and human endeavour. There can be no humanity or human endeavour when poison gas and bombs, products of exactness of modern science, threaten to engulf or envelop a whole country and nation.

Therefore, from the very beginnings of time, science never had an uninterrupted career, and never was it given the chance to redeem humanity. Church religions and aggressive nations strangled it at every turn of a new order of force and ferocity.

The future of science is uncertain. Obviously it has progressed beyond, far beyond, the social forms which created it. As we see it with our own naked eyes, the society of to-day is going to use it for its own ruin.

The science of pre-war Germany, for which it was so famous, has been smothered by the philosophy of Nazism. The authors of the

quantum theory, of the theory of relativity and theory new quantum mechanics have been driven out of Germany for their anti-Nazi heresies. Great masters of the science of medicine have been driven out of Vienna and Berlin.

It is so, but in a different form, even in democratic England. There the Government, while carrying on the talks for peace, spends more on poison-gas research than on researches for the whole of medical science. Her minister of health hopes to provide both guns and butter*. But the truth remains that half the money spent on scientific research in England is for researches in military science. The fascist Mussolini and the imperial Arita follow the same policy in Italy and Japan. United States: the same story.

Thus the most favoured nations of the world to-day are prostituting science for their insular ends, Inscrutable are the ways of God!

But let us hope to live in peaceful times.

It was during this post-war period of peace science made its gigantic strides, as if with a vengeance to make up for the lost time. It was during this period, within our own living memory, that exact sciences were introduced into medicine.

Thus began the modern medical researches, and these have yielded some of the most beneficial knowledge that human race has ever acquired. The science of medicine has been lifted and rescued from the quagmires of ineffectual formalism, from the tiresome exigencies of scriptures and from the jejune imaginings of medical philosophers. The humoral, cellular and tri-dosha theories, the theories of solidism, plethora and pneuma, of animism, cohesion and motion, have been pulverised by the sledge hammer blows of scientific medicine.

So far it is good, but it has not been all for the good. The emphasis on medical research has resulted in the development of an aura of sanctity about research. It has been raised almost to a point of veneration—to my mind out of all proportion to the results of research. The practice of medicine has been, obviously without any such intention, subordinated to the science of medicine.

Medical science is not medical practice, though the latter has to depend for its nutrition on the former. Medical schools and colleges of today have unfortunately forgotten this great truth, and the students when they cross over from the scholastic threshold to the market place find themselves in a fix, and a majority of them prove a failure as medical practitioners. Because, they were taught merely medical science and not medical practice.

Medicine has always been defined from time immemorial as both a science and an art. What then is the difference between the science of medicine and the art of medicine?

Osler, that prolific and enchanting chronicler of modern medicine, gives the answer: "Treat the man first, and then his disease." The first is the art of medicine, the second is the science of medicine.

* Our London Letter, *I.M.J.*, Feb. 38, p. 48.

He has stated further: "To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all."

The physician and the surgeon do not deal with the controlled and limited matters of the laboratory. They deal with human beings. Unless and until the human mind with all its subtle impulses and innings is evaluated with scientific precision, medicine must remain an art first and science next.

Medicine cannot, and should not, be treated like the science of engineering, or of chemistry, or of physics. Because there is a definite tendency to treat it like that, there is a divergence between medical science and medical art. This is not at all good for the suffering humanity.

It is ridiculous to blame the young doctors in this connection. They are after all the products of medical education received by them. My indictment is against the current system of medical education. Everything of medical science is taught; everything of medical art is left to the student himself. The result is what it is today: the young doctor makes a fetish of science, but finds himself worshipping alone. He may acquire the art in the school of bitter experience, but his teachers whom he paid for teaching him has not taught him the secret of medical practice. To that extent the present system of medical education in this country, and perhaps in other countries also, is a terrible failure. This must be retrieved.

Psychology and social science must be taught to the medical students, even at the sacrifice of some other subjects, if need be. The medical students should know the motif of family life; the social and sociological forces that imperceptibly affect the material and cultural standards of each society or community or nation; and the hopes and fears, the desires and delusions that surge within the human breast.

In one word, he must be regularly and religiously taught to identify himself with the supreme interest of his patients. He must weep with those who weep and laugh with those who laugh—not in the literal sense but in the spiritual sense of these words. This is indeed a big lesson, but it can be learnt and practised.

This is medical art. This is medical practice. It is this which indelibly links the doctor to his patient, and *vice-versa*. If the doctor complains against his patient, or the patient against his doctor one may take it for granted, as a rule, that here there has been a failure of the right practice of medical art. The doctor may say that he has cured his patient but that he is ungrateful. Yes, the doctor has cured him by applying medical science, but has failed to win his respect and confidence. And if the doctor, patiently and without prejudice, introspects himself he would surely recollect some harsh treatment, some unkind words against his patient or his relatives in his moments of hurry or overwork or stupidity. This art itself is a science, which must be learnt and cultivated as methodically as medical science. If

medical science subjugates or subordinates medical art it will be an useless commodity for human application.

The physicians of the previous generation were popular more as medical artists than as medical scientists. They had a fascinating hold on their patients. I have heard elderly men and women who have lived through the part of the previous and the present generation tell me: what sort of men these modern medical men are? Why do you say so—I asked. They said: these men are self-centred and egotistical, high-browed and fashionable, unsocial and unsteady.

Who can say that this indictment of our young Indian doctors is unjust? They pretend beyond their worth. They live beyond their means. They do not respect their own culture and their own men. They have a scorn for the superstition of the people. They have a contempt for the susceptibilities and sentiments of their own kith and kin. They dress unlike our people? They think modern medical science has brought a new heaven and a new earth. They ride in a motor car and demand their practice. They certainly ride for a fall!

That is not the way or the method of medical art. It is the indelible imprint of the doctor's personality over his patients, men, women and children alike, that constitutes the essence of the art of medicine. Wherever and whenever there is a failure in this respect, the patient changes his doctor. And every senior is well aware of the chronic complaint of the young doctor that the patients change their doctors too frequently, and, of course according to him, unjustly. But the basic cause, I consider, is the failure of the doctor's personality.

I had visited almost all the important cities of our country and tried to study both the successful and the unsuccessful practitioners at their clinics.

I found the successful practitioners humble and social in their attitude towards their patients; affable, kind and solicitous of their welfare; never worried about fees; and never refusing the night calls. Every patient was sent back with a pat of encouragement and words of hope.

One patient asked: Would this bottle of medicine cure me, doctor?

The doctor replied: I hope so, and I am quite sure you will be alright very soon.

I saw the glimmer of profound satisfaction in the patient's face.

Another patient, one suffering from advanced pulmonary tuberculosis and who had read all the alarming lay literature about it, asked: Do you really believe, doctor, that I will be cured, or at any rate, restored to a condition which would enable me to work for and feed my unhappy wife and children?

I saw the unhappiness in the face of the doctor. He remained quiet for a moment as if engrossed in deep thought, and said:

"The less you worry yourself about this disease, the better for you. You may after all be alright by the grace of God. Do follow my instructions and take these medicines regularly. And whenever you need my medical assistance, do not feel shy to send for me even though it may be night."

The patient replied: I know my death is near, but I am determined to die in your hands.

Such are the successful practitioners. They are the practitioners of the art of medicine.

I found the unsuccessful practitioner dressed in a tip-top style; motor-car, bought out of borrowed money, standing at the gate of his clinic; pretending that he is fully engaged and making the patient wait at the parlour room; and finally exchanging formal courtesies with his patient. I would give below the exact conversation.

Doctor: What are you suffering from?

Patient: I do not know, doctor, that is why I have come to you.

Doctor: What a peculiar man you are? Let me examine you then?

Patient: Do not make the mixture very bitter, doctor, I cannot swallow it.

Doctor: I say, take this medicine and you will be alright.

Patient: Doctor, will it be bitter, will it make me alright?

Doctor: I say you take it and you would be alright. I have done what modern medical science is capable of. More I do not know. The rest depends upon your fate.

I do not know whether this patient continued his treatment or not, but I enquired of the doctor about his practice and income, somewhat in an indirect manner.

"Oh! no," he said, "practice is impossible in this town. The patients do not pay the doctor properly. The senior man, who is only a L. M. P., is knocking away all my cases, and this old donkey treats his patients with words and not with medicine. In fact they are paying him more for his sweet words than for his medicine. He never asks his fees, but money flows into his pocket. So long as this man is practising in this town, we, juniors, would never be able to make a decent living."

I parted company, a sadder but wiser man. He was a first-class graduate in medicine of the Lucknow University, but he was not taught nor did he learn himself the art of medicine.

I was once working as a surgical assistant to a senior private practitioner at Bassein in Burma. I was then a sub-assistant surgeon in service and was only helping him in my off-hours. He was the most successful practitioner in that town. Many practitioners have come and gone before and during his time. They never made their mark and this man continues even today as the most popular doctor in that town. I dared to ask him once:

"Doctor, what is the secret of your success? You, yourself, have told me sometime ago that you do not know much about medicine or surgery, and yet I find you the most successful practitioner in this town."

He replied without a moment's hesitation:

"Not that I do not read, but I do it in my too brief moments of leisure. Still I feel I do not know much. We must have medical skill, but that alone has not given me success. The secrets are: good personality, sweet words and a pleasant smile. These three factors alone, I think, have made me what I am."

There was another Rajput physician in the Burma Subordinate Medical Service. I was under

him as a junior. He was the very exemplar of medical art.

I learnt my medical practice at the feet of these two masters. Their example and precept, more their example than their precept, carried me successfully through life, and never did I once fail in my practice although exigencies of Government Service subjected me to too frequent transfers from one station to another.

Complete identity of interests with those of the patients is the very essence of medical art. Even the worst of men are responsive to this token of affection.

Once I was a subordinate medical officer in one of the central jails in Burma and had under my care a condemned prisoner. His day of execution was nearing. He was praying that a dire disease may overtake and kill him rather than the shameful death from a hangman's noose. He confessed his guilt to me and he was repentant to the core. I sympathised with him but I was powerless to help. As if God had heard his prayers, he was suddenly attacked with hæmorrhagic small-pox, although, at that time, there was no epidemic either in the jail or in the town. His day of execution was postponed. It was one of the severest cases of small-pox I had ever seen, and none expected he would recover. The patient himself was cheerfully inviting death. But it would not come. He passed through the fire of suffering for over a month. Strangely enough he recovered.

"Doctor," he said with tears in his eyes, "God is cruel. I submit to His will."

"Yes," I said, "you prayed for disease and He gave you. Now pray for your release. He would give it too. There is nothing impossible for God. If you like, I shall draft a petition of mercy to His Excellency the Governor."

And I did. There was a glimmer of hope in his face. His petition of mercy was granted and he was released. I was more happy than the released prisoner. He was waiting at my residence with a bunch of plantains as the only gift possible for him for the services I rendered him. He fell at my feet. Our hearts met in prayer. And he parted company.

This is what I call identity of interests—the warp and the woof of medical art.

Right practice of medical art can move even the most callous of criminals. On the eve of one of my transfers from one jail to another, a lifer, approached me with a smile and said:

"Doctor, if I am not within the jail, surely I would have presented you with something in token of your kindness."

I burst into laughter and said that he was joking.

"No," he said, "tell me what you would like to have."

If I had asked for a tin of biscuits or a fountain pen I know he would manage to smuggle and give it to me. So I asked for the impossible:

"Could you give me a motor car?"

"Yes, in that case you must release me from jail," he said.

"Even if I could release you," I said, "how would you get a car? You are so poor!"

Preventive Medicine—Past, Present and Future *

• Geoffrey Bewley

"AND God said, Let there be light; and there was light." This may be said to have been the first step in preventive medicine, for foremost amongst the enemies of disease are the light of the sun shed upon dirt and squalor and the light of knowledge stealing into the dark places of ignorance and superstition.

In the earliest stages of Egyptian civilisation certain animals were recognised as sacred, amongst which were the cat, the jackal, the ibis and the dung-beetle. It seems reasonable to suggest that as one factor is common to all of these strangely assorted creatures, it was the basis of the taboo which preserved them from destruction. This factor is the prevention of disease, for the cat kills rats which carry plague, the ibis feeds on water snails which are the intermediate host of the parasites of bilharzia, the dung-beetle eats faecal matter which may contain the organisms of typhoid and dysentery and the jackal is a scavenger. If my supposition is correct, this is the earliest known attempt at preventive medicine.

As we read through the Pentateuch we realise that Moses was more than an historian, a law-giver and a leader of men; he was the first public health administrator, for he recognised three essentials in the prevention of disease, viz., accurate diagnosis, segregation and disinfection.

"When a man shall have in the skin of his flesh a rising, a scab, or bright spot, and it be in the skin of his flesh like the plague of leprosy; then he shall be brought unto Aaron the priest, or unto one of his sons the priests:

"And the priest shall look on the plague in the skin of the flesh: and when the hair in the plague is turned white, and the plague in sight be deeper than the skin of his flesh, it is a plague of leprosy: and the priest shall look on him and pronounce him unclean."

"If the bright spot be white . . . and be not deeper than the skin . . . then the priest shall shut him up . . . seven days."

"And the priest shall look on him the seventh day: and behold if the plague be at a stay . . . then the priest shall shut him up seven days more:

"And the priest shall look on him again the seventh day, and behold if the plague be somewhat dark and spread not in the skin, the priest shall pronounce him clean . . . and he shall wash his clothes and be clean."

Thus Moses directs a methodical inspection of supposed lepers by a priest. With diagnosis goes permanent isolation unless the leper is cured.

"And the leper in whom the plague is, his clothes shall be rent, and his head bare, and he shall put a covering upon his upper lip and shall cry: 'Unclean, unclean.'"

"And all the days wherein the plague shall be in him, he shall be defiled; he is unclean; he shall dwell alone; without the camp shall his habitation be."

* Being the Presidential Address to the Biological Society of the Royal Colleges of Physicians and Surgeons in Ireland, delivered on 22nd October, 1938. By arrangement with and courtesy of The Irish Journal of Medical Science. —Ed., I. M. J.

"Oh, no!" He jumped with enthusiasm. "The moment I am released, I will manage to steal a car, and place it unconditionally at your disposal."

"You would come back to jail again," I protested.

"That doesn't matter," he replied, "I have the satisfaction of having served you in my own way."

I thanked but advised him that unless even the material expression of one's gratitude is based on honesty and truth it was worse than murder. He became grave. That was the last I saw him. Perhaps my words went home.

It has been my fortunate experience that honest services rendered beget their own rewards in a most unexpected manner—even from lifers and condemned criminals, even from the waifs and strays of society, even from the miserly and the haughty.

Medical science is the body. Medical art is the soul. Body without soul or soul without body gives no existence, carries no significance to the human mind.

Medical art is ethical medical practice. Medical ethic is moral science. Moral science is honesty, humility and selflessness. It is the longing to help the poor and the oppressed, to relieve the distress of the poor and the rich alike, to contribute to the sum-total of human happiness. Above all, and never, should medical ethic make any difference between the criminal and the citizen, between the rich and the poor, between the ignorant and the learned—in one word between man and man.

Not like the magistrate in a court of law, nor like the managing director of a firm intent on immediate or ultimate profits, but like the sun, the moon and the rains the medical practitioner should distribute the boons of medical science on the worthy and the unworthy alike in the same unostentatious, silent, methodical and impartial manner as these munificent benefactors of nature.

Anything else is not art of medicine, but commerce of medicine.

Medical commerce may bring success for a time, but not for all times. Like every business it will have its ups and downs.

Medical art can certainly be combined with medical business, but if the latter strangles the former, as in most cases it does, it must be arrested, imprisoned and condemned.

What shall it profiteth a man if he loses his own soul and gains the whole world?

CORRIGENDUM

On page 61, March issue 1939, please read Dr. S. C. Dutta (Assam) for Dr. Misra (Bihar). It was the former who opened the discussion on the paper read by Dr. Alice L. Randall. We regret the error.

Ed., I. M. J.

Panama and the Canal Zone are entirely free from yellow fever.

In spite of these amazing successes, the problem of yellow fever is not yet solved. The recent West Africa Yellow Fever Commission advanced our knowledge of the disease but, like the Havana Commission, it had its martyrs. Noguchi, Young and our own Adrian Stokes—all were accidentally infected during the investigations and all succumbed.

A new danger has now arisen: aircraft pass so rapidly from an area where yellow fever is endemic that infected humans or mosquitoes may be carried and start an epidemic in areas hitherto free from the disease, for the mosquito, *Aedes Aegypti*, is common in many places. Measures are taken under the International Sanitary Convention for Aerial Navigation to destroy any mosquitoes which may find their way into aircraft and in other ways to prevent such a spread of disease.

Time does not permit me to describe these diseases which were once so common in these countries and now, owing to the successful preventive measures, have practically ceased to exist, such as smallpox, typhus, malaria and rabies.

Throughout the ages it has been recognised that the aggregation of people in cities is accompanied by intensification of epidemic disease and by lowering of the standard of health; social history consists largely in a statement of efforts to counteract these maleficent tendencies by regulation and improvement of housing, of sewerage, of water supplies, of ventilation and of food. One of the chief difficulties has been the removal of liquid and solid excreta and other decomposable material from houses. Cities and villages used to stink to heaven. The streets were the receptacles of refuse, human and otherwise. Waste material was thrown and pots emptied from upper windows, with a warning shout into the streets below. Swift, in describing the effects of a city shower, may have alluded to conditions in Dublin or London:

"Now from all parts the swelling kennels flow,
And bear their trophies with them as they go;
Filth of all hues and odours seems to tell
What street they sailed from, by their sight or smell:
Sweepings from butchers' stalls, dung, guts, and blood,
Drowned puppies, stinking sprats, all drenched in mud,
Dead cats and turnip-tops come tumbling down the flood."

Had it not been for the dogs, pigs and other domestic animals that roamed through the streets and devoured the filth, the streets would soon have become impassable.

Sewers have however been in use in very early times: the Cloaca Maxima of Rome was as old as the reign of Tarquinius Superbus and many were the aqueducts built by the Romans to bring them clean water. But sanitation dropped back and for centuries it was behind that of the Romans. As recently as 1844 Rawlinson noted that under the basement of Windsor Castle there were 53 cesspools full and over flowing; and that no window in the royal apartments could be opened at the top. It is really only within the last hundred years that water supply and sewerage have become general, and with them have gone the out-

breaks of enteric, cholera and dysentery which used to recur in this country. A well-designed water supply is not enough; it must be kept pure, and continuous attention to detail is essential, for errors creep in and are signalled by an outbreak of disease as has been seen recently in Croydon, where 311 cases of typhoid occurred with 42 deaths.

In all the diseases I have already mentioned, the application of preventive measures belongs to the past. We have not yet conquered these diseases, but we have at least travelled some way down the road towards our goal. But what of the present? All over the world intensive work is being done on the problems of prevention and treatment of infectious disease, and of recent years it has been shown how to prevent, or at least modify, diphtheria. By Schick-testing those immune to the disease may be distinguished from those susceptible and the latter can then be immunised.

Ireland is practically the only country in the world where the death rate per 100,000 of the population from diphtheria has been steadily rising: in the last fifty years the mortality rate has more than doubled, whilst in England it has dropped to less than one-third. Not only that, but in Dublin and Cork up to three years ago it was rising steadily, whilst in Belfast, Birmingham and Ipswich it was dropping equally steadily. The reasons for this are three fold: parents wait too long before bringing their children to see a doctor, in the hope that the throat condition will improve of itself, the practitioner sometimes waits to get the results of a swab before giving antitoxin and even if he gives it at once, he often gives far too little and the Government does very little to encourage immunisation. In many areas the Medical Officers of Health have started immunising schemes, but their application depends on the consent of the parents. In spite of this, the schemes in Dublin and Cork have been most successful, and a greater proportion of the population of these two cities has been immunised than in any city or town of the British Isles.

Vaccination against small-pox is compulsory; but there is no small-pox in this country and if a case occurs there is still adequate time to vaccinate all contacts and prevent their getting the disease. With diphtheria the very reverse is true; cases abound all over the country, carriers are common, the death rate is high and nothing is done on a national scale to save the lives of those 300 or from diphtheria. Compulsory immunisation would go a long way to save those children, but public opinion, which represents the collective lack of knowledge of the most ignorant of the population, is not yet ripe for such legislation. In a smaller way, however, much might be done by the distribution of antitoxin by the local authority to practitioners, as is done in England, for use in cases and suspected cases of diphtheria and by increasing the fees paid for immunisation; the present remuneration of 3/6 for giving three injections to a child does not encourage doctors to

spend their time on such work. Without enthusiasm on the part of the doctor, it is unlikely that he will gain the approval of the parents.

Another and more serious disease, which could be entirely prevented, is the so-called "surgical tuberculosis." Deaths from tuberculosis of the peritoneum, alimentary tract, spine, bones and joints are due to tuberculous milk and show a mortality rate of 11 per 100,000 of the population, equal to the death rate from diphtheria and double that of appendicitis. Abolish tuberculous milk and surgical tuberculosis disappears.

Not long ago the report of a meeting appeared in the daily press, which is of interest in showing the mentality of those who oppose reform:

"The chairman said that the plea for better and purer milk was only a fictitious and pretentious sham. Since the days of Adam strong men with perfect teeth and good physique had thrived on what was now known as impure milk. It was flying in the face of the Creator to say that milk as it came from the cow should be submitted to any sterilisation process."

Unless it comes from a tuberculin-tested herd of cattle, it should certainly be pasteurised. Even if it does come from such a herd, it should still be pasteurised unless very thorough precautions are taken to prevent the clean milk which comes from the cow being contaminated with every kind of filth and dirt before it reaches the consumer. In this country we have not yet got grading of milk, although such regulations have been in force in England for over 15 years. Up to the present any milk, clean or dirty, can be labelled "Grade A" and sold as such. Pasteurised milk may have been pasteurised efficiently or may have gone through some machine and come out more full of organisms than it went in. There are some tuberculin-tested herds of cattle round Dublin, where the standards set are rigidly maintained by the producers, voluntarily and at their own expense, where the milk is excellent in every way. But what happens to the tuberculous cows they reject? They are sold in the open market, are bought by other dairies and may at any time give rise to milk containing tubercle bacilli. Next year there will be a great change; grading will come into force, herds will be tuberculin-tested by Government officials, pasteurising plants will be inspected and cleanliness will be enforced. All this, however, will not abolish surgical tuberculosis, for many people, quite mistakenly, believe raw milk to be more nutritious than treated milk and that best of all is milk from one's own cow, although that cow may be tuberculous, may be kept in a dark and dirty shed and may be milked by an ignorant yokel whose only washing of the hands is rising them in the first streams of milk so as to carry out wet-milking. Grading of milk will make only a slight difference to the incidence of this disease, as it will do no more than indicate what milk is safe. It is in other directions that it is so important.

The only way to abolish surgical tuberculosis is to abolish the tuberculous cow. A few months ago the United States Department of Agriculture announced that Maryland was the forty-fourth

State to eradicate bovine tuberculosis. Why cannot we do the same here? Because of the expense, for 10 per cent. of cows are tuberculous. When foot and mouth disease breaks out, the cattle are killed and the State pays compensation, for that helps the cattle trade; when cattle had to pay import duties on entering England the State granted bounties on their export and paid compensation for the slaughter of calves so as to keep the number of cattle down, for that too helped the cattle trade; but when children are killed by tuberculous cows the remedy is too expensive. A start, however, has been made. Free milk is given to school-children and this milk must be clean and come from tuberculin-tested herds.

Of far more serious importance to the community is pulmonary tuberculosis, for it kills nearly 3,000 people in this country every year, most of them in the prime of life. Its abolition depends on many factors, better housing, better nutrition, better treatment and better segregation of open cases. The number of beds available is quite insufficient for the needs of the population, and both the buildings and equipment of some of the sanatoria are grossly inadequate. There are sanatoria without x-ray plants where neither diagnosis nor artificial pneumothorax treatment can be carried out, and in some counties cases of phthisis are treated in the county hospitals and not in sanatoria at all.

Preventive medicine should not deal only with the infectious diseases, it could play a part in diminishing the incidence of insanity in this country. The modern treatment of lunacy dates from the end of the eighteenth century when Pinel, the physician in Paris, and Tuke, a Quaker philanthropist in York, abolished the antiquated, unnecessary and cruel restraints which were generally imposed on the insane at that period. For those who cannot afford the luxury of a private mental home, there has been little advance in this country since that time in prevention, although treatment has progressed steadily. We are far behind our neighbours across the water, for there a case can be admitted for treatment as a voluntary boarder or as a temporary patient without certification in the earliest stages of the disease, when treatment is likely to be most beneficial. Here the disease must advance to that stage where the patient can be certified as insane before he can get any treatment, and certification carries the stigma of compulsory detention with the consequent implication in the minds of the relatives of crime and imprisonment.

Another aspect of preventive medicine of which one hears frequently to-day is better housing. But housing conditions cannot be separated from nutrition, as has been clearly shown by McGonigle and Kirby at Stockton-on-Tees. In 1927 an "unhealthy area" in this borough, known as the Housewife Lane area, was demolished and the inhabitants, 710 in number, re-housed on a self-contained municipal housing estate, Mountpleasant, which had been specially built for the purpose, where the houses were soundly construct-

ed and each possessed a bath, an efficient kitchen range, a well-ventilated food store, a wash-boiler and up-to-date sanitary arrangements. The Housewife Lane area originally formed a portion of a much larger area, too large to be dealt with under one scheme. The rest of the area, known as the Riverside areas, with its 1,298 inhabitants was, therefore, left untouched and the line dividing the two areas was arbitrarily drawn along a street called Smithfield. Thus a great opportunity arose to study the changes in health amongst the better-housed as compared with those who remained in their slum dwellings.

The standardised death rates per 1,000 of the population were surprising.

	Stockton-on-Tees as a whole	Housewife Lane Area.	Riverside Area.
1923-27	12.32	22.91	26.10
1928-32	12.07	Mountpleasant. 33.55	22.78

Thus, although the rate in Stockton as a whole fell slightly, and that in the Riverside area rather more, that in the area where it would have been expected to fall dramatically rose instead by 46 per cent. The explanation probably lies in the fact that, while the rents in the Riverside area rose by 3d. from 4/7½ to 4/10½, the population who were transferred had to pay 9/- on the new estate instead of 4/8 in the Housewife Lane area—a rise of 4/4. Other items in their budget suffered accordingly, but it was food that suffered most, not only in quantity but also in quality. Better housing is essential, but if it means higher rents it is useless, in fact it increases the incidence of disease. So better housing means municipal housing schemes and uneconomic rents. This would best be done by charging as rent a fixed proportion of the family income or by having some rent rebate scheme as has been done by more than 100 municipal authorities in England. At present where the amount of rent is regulated by the necessity of making a profit, it absorbs from 20 to 25 per cent. of the net income. In Leeds, however, the Corporation charges no rent but only rates where the income of a man and his wife is less than 19/- together with an allowance of from 4/- to 8/- for each child.

In her book, *Europe Rehoused*, Elizabeth Derby states that "good housing is not the absence of slums any more than good health is just the absence of disease. Slum clearance in Britain is not merely the question of the substitution of a clean box for a dirty one," and she points out that although Great Britain has spent vastly more money per dwelling and far larger sums in total than any other country, yet a great deal of this has been extravagant or wasteful, and if all-round value for money spent on housing is to be the test, then Vienna comes first and Sweden second in order of success in Europe.

In this country housing schemes are progressing well in spite of the fact that building costs are excessive, but rents in general are far too high. Money that should be spent on necessary food is now pouring into the pockets of the slum land-

lords, and until the slum houses have been condemned and municipal houses or flats provided instead, we cannot hope to see much diminution of disease.

There has been no large scale assessment of nutrition in this country. In England there have been several, but so far there is no objective standard by which the general well-being of an individual can be measured. In Cheshire five experienced members of the Cheshire School Medical Staff made two examinations of the same 193 children on dates seven days apart. There were two striking results: firstly, there was an extraordinary difference between the distribution of nutrition of these five doctors. One found three boys subnormal and another 90. Secondly, there was a big difference between the assessment of these children by the same doctor on two occasions. Doubt has been cast on Sir John Orr's report that the average diet of 50 per cent. of the population of Great Britain, and of a considerably larger percentage of the children, is inadequate for perfect health, and that four and a half million of the population subsist on a diet which is inadequate in all its constituents. Neustalter, after a London, found that 37 of these had insufficient money to purchase the minimum requirements of food.

It is not only the scientists who realise how widespread is this undernutrition: Sir William Crawford and H. Broadley estimate from their own enquiries that between twenty and thirty million individuals in Great Britain are subsisting on diets which are inadequate when compared with the B. M. A. standard.

Orr's estimate is to some extent borne out by the report of the British Medical Association's Committee on Nutrition of 1933, which found that the minimum weekly expenditure on food for a family consisting of a man, his wife and three children was 22/6½, a figure which was beyond the means of a large proportion of the population. Today food prices have risen and the minimum expenditure is now 27/4½. From this we may presume that malnutrition is increasing. To improve the nutrition of the whole population is impossible under our present economic system, for industry needs a constant nucleus of unemployed, so as to keep down wages and thereby allow for remunerative profits. If unemployed assistance were raised above starvation levels, wages must rise *pari passu* and profits would vanish with the consequent stoppage of industry and more unemployment.

If we cannot improve adult nutrition, we can easily improve that of the next generation by supplying school children, or better still all children, with free milk and free dinners. Corry Mann's well-known experiment was carried out at an industrial school where the hygienic conditions were good and the diet, which was assumed to be adequate for health, better than in the majority of working-class homes. An addition of one pint of milk a day to the diet of 41 healthy boys between

the ages of 7 and 11 resulted in an average increase during the year of 6.98 lbs. in weight and 2.63 inches in height, compared with 3.85 lbs. and 1.84 inches among 61 boys receiving the same basis diet but not extra milk. The milk group remained relatively free from minor ailments and infections which were common amongst the other children. "A casual visitor entering the dining room would never fail to recognise the table of that house which alone was receiving the extra ration of milk, the boys being obviously more fit than those of any other house." Similar experiments have been done with elementary school children and substantially the same results have been obtained for numbers up to 20,000 children, of whom presumably only a very small proportion would be classified as subnormal or bad as regards nutrition.

I do not suppose that any system of government which has ever existed has been the subject of as much controversy as that of the Soviet Union. From the medical point of view, however, there is much of interest, for at the time of the Revolution medicine was practically non-existent and so the present medical services have been built up from nothing under the various five-year plans and have been entirely directed and co-ordinated by a central Commissariat of Health and financed from the Social Insurance Fund of the paid workers or in somewhat similar ways from the workers on collective farms, who do not directly receive wages. The contributions to the Social Insurance Fund are in a fixed proportion to the amount of the wage bill and are paid by the employer. The Fund not only covers all forms of disability such as illness, old age, orphanage or unemployment, but also pays for medical care, hospitals, sanatoria, creches, housing of workers and stipends to students, and the proportion of the Fund to be allotted to each is fixed by the Commissariat of Health.

The outstanding features of the Soviet health system are:

- (1) Medical service is free and available for all.
- (2) Prevention of disease is in the foreground of all activities.
- (3) All health activities are directed by central bodies, and so.
- (4) Health can be planned on a large scale.

As a result of this hospitals, sanatoria and laboratories are springing up in all directions, although still the numbers are insufficient for the needs of the people.

As prevention of disease is always in the foreground, hours of labour have been reduced to seven and every sixth day is a holiday. This gives increased hours of rest and recreation, and these have been organised on a large scale by the provision of facilities for physical culture and sports in the Parks of Culture and Rest which are found in every city. Anyone who wishes to join a sports club is given a complete medical examination and is re-examined twice a year regularly.

As well as short hours every Soviet worker is entitled to two weeks' holiday with full wages. For those workers who, although not ill, need a rest under medical supervision, rest-houses are

provided where massage, hydrotherapy and phototherapy may be obtained.

For those who are ill there are free hospitals and sanatoria. There is no unemployment in Soviet Russia and work is an asset to the State. It follows therefore that the State endeavours as far as possible to prevent any return of disease after treatment. As an example of this, in tuberculosis night and day sanatoria play an important part. Patients who are able to work, but require some regular treatment and care, are admitted to these sanatoria. They arrive about six o'clock in the evening after working hours, have a hot shower bath, change their clothes and have dinner. Afterwards they rest for an hour or two, if possible on porches; their temperature is taken and they are examined by a physician. They spend the time from eight until ten o'clock in the club of the institution or in undergoing medical treatment. From ten o'clock until six the next morning they are expected to be in bed. They then have physical exercises and breakfast and return to work. Persons on night shifts are admitted to day sanatoria in the same way. A very important function of those part-time sanatoria is the education of patients. They are taught how to live properly in order to improve their condition. Today, more than 11,000 beds are available in such places.

Particular care is taken of mothers and children. Before the Revolution 98 per cent. of all Russian women had no medical aid in child-birth; most of them were not even assisted by a midwife. Now 40 to 50 per cent. of all births take place in hospital, and in the not too distant future it will be possible to deliver all children under excellent medical conditions.

As Sir Arthur Newsholme says, in midwifery the U. S. S. R. has more complete arrangements for institutional treatment than any other country.

After birth the child is supervised and cared for. Whilst the mother is at work, the children can be placed in nurseries where they are under constant medical supervision, are fed, clothed and, in general, given the best possible start in life. The Soviet nursery serves a threefold purpose: it liberates the working-woman, it cares for the child and it educates the child as well as the mother. The director of the nursery is generally a woman physician and the staff consists of doctors, psychologists and nurses. Most nurseries have a capacity of from 50 to 125 children. They are organised in three divisions: one for the infants under one year, one for children in the second year and one for those in the third year. As a result of these measures infant mortality has dropped from 247 per thousand in 1910 to 118 in 1936. The diminution is enormous, but there is still much room for further improvement.

Russia is a poor country, but its Government realises, perhaps more than those of other countries, the importance of preventive medicine and it spends a greater proportion of its income on this. At the time of the Revolution it was the most backward country in Europe, but it is being educated and in time will possibly be in the forefront

in the production and maintenance of health. Sir Arthur Newsholme and John A. Kinsbury in their book *Red Medicine* state that.

"Russia has lagged behind other European countries in medico-social reform: it has remained semi-Asiatic or Eurasian; now with lightning speed it has instituted in its best organised cities provisions for medical care for approximately the entire population which are more complete and freer from inhibitions to ready accessible help than hold good in any country known to us. It is no refutation of this sweeping statement to suggest that in actual practice this completeness is only partially realised. The answer is that the organisation to this end exists; and that in the cities visited by us it is in large measure functioning; and that there is reasonable prospect that, given continued progress on present lines, in a few years a complete medical service for all will be provided in both rural and urban Russia."

There is another aspect of Soviet medicine which results from health activities being directed by a central body, the standardisation of the classification of disease. Grey Turner states that if a uniform classification was adopted by the London hospitals "they could in a few years accumulate a mass of statistics which would be useful in settling a good many problems which still remain unsolved. In the large emergency hospitals in Moscow they are trying out various methods of treatment checked by careful statistical records. It is a mass experiment which is extremely interesting, and may provide valuable guidance for the surgery of the immediate future." (*B. M. J.*, 1938, ii, 691.)

Our knowledge of preventive medicine is considerable, but its application lags very far behind. In many countries campaigns are being started with the object of improving the health and fitness of the community. Now this is excellent, and it is to be regretted that in Eire there is no such campaign, but it will not greatly diminish the incidence of disease for that needs many times the amount of money now spent on health. In a leader in the *Irish Times* of July 13th, 1938, it was stated that

"More money is being spent on armaments to-day than at any previous period in the world's history except during the Great War. Diverted to more profitable purposes, this money could bring universal prosperity, it could abolish starvation, it could provide not only employment but leisure, it could destroy the roots of class hatred."

"More than that—it could abolish most of the common diseases."

"Killing each other in large quantities is an expensive idiosyncrasy of our species. It would probably be startling to know how much per head of the world's population we spend each year on preparing means of killing each other and how much on means of killing the microbes which prey upon us. We can make a rough guess at the probable proportion if we reflect that in England, Lord Nuffield's famous few millions for medical research would scarcely have caused a ripple if dropped into the bottomless ocean of expenditure on armaments."

"Why, if governments find it possible to raise such colossal sums for war, which is notoriously wasteful, should they be unable to raise the comparatively small sums for the profitable purpose of stamping out such diseases as tuberculosis and syphilis, the victims of which cost the community so much every year to maintain?"

The Chinese, that wise and honourable race, have a proverb: There is no economy in going to bed early to save candles, if the result be twins." This applies particularly to preventive medicine, for it has been computed by Sir Leonard Hill that in Great Britain £285,000,000 is being spent annually on ill-health. How much better for the community if some of this was spent on preventing instead of treating disease.

The totalitarian states to-day glorify war, and in self-defence the other nations have had to re-arm. But in the future, perhaps the distant future, sanity will return, for the average man is neither sadist nor blond beast, he does not want war and he well realises that in modern warfare neither victor nor vanquished gains anything, but suffers much.

Since I wrote this paper, a bare month ago, there have been strange and terrible events in Europe. The shadows of the Four Horsemen of the Apocalypse were seen over every land; but peace was preserved at a price, humiliating surrender, and the lights of our civilisation are fading out in the twilight of savagery and brute force. But no matter how dark and clouded the night, no matter how red and stormy the dawn, yet the sun will shine calm and serene again in a clear sky.

When those happy days come to pass, we may well hope that humanity will wage a successful war on the bacteria which prey on us, and in time will forge a new world in which health will be the natural right of every individual and, in the words of the Apocalypse, where "there shall in no wise enter into it anything that defileth, neither whatsoever worketh abomination."

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Hygiene—Old and New*

• E. D. Irvine, M. D., D. P. H., Medical Officer of Health, Shipley, U. D.

That there is nothing new under the sun is a truism all of us have heard from infancy; it can be applied with a good deal of justification to the current interest in health. The art of healthy living, or hygiene, is to us of such recent interest that we are apt to forget how long ago the goddess Hygieia was worshipped in the ancient world. So many things that seem comparatively new to us even now—efficient sanitation, the hospital system, the control of drinking water, food inspection, the study of dietetics, an appreciation of the value of fresh air and exercise, the cult of cleanliness—have such extraordinary parallels in ancient history that it would, I think, be interesting just to glance at what our long-ago ancestors did in this field. Herr Hitler's Youth Campaign, for instance, Signor Mussolini's training for six year olds, Miss Stack's League of Health and Beauty, have all been foreshadowed. Incidentally, even our modern lady doctor is by no means as modern as she possibly imagines. In ancient Egypt of about 2700 B.C. (an era when women played an important part in public life) the mother of a certain high priest was described on her son's tomb as "Chief Physician."

It has often been said that prophylaxis, the prevention and control of disease, was given to the world by Moses, though for centuries the world made scant use of the gift. The great scourge of the ancients was leprosy. Most peoples accepted it as inevitable, but the Jewish laws made vigorous efforts to stamp it out. All suspected persons were examined at weekly intervals and isolated until a sure diagnosis could be made, and then, if found incurable, were permanently segregated from their fellows. Infected garments were washed or burnt, infected houses thoroughly scraped and replastered, and in some cases they were ultimately completely destroyed. It took Europe several centuries to learn this lesson when leprosy, invading it from the East, took toll of thousands of lives. Not until the Edict of Lyons in 583, was any effort made even to limit the wanderings of lepers, but by merely adopting the principles of segregation and disinfection laid down in Leviticus, this continent gradually shook itself free of the disease.

Again, our modern hospital system, of which to-day we are so justly proud, can be traced back to the ancient Romans and Greeks. In the numerous Greek temples of healing, patients were received and treated in long airy wards, completely open to the west; when we consider that up to the middle of the 19th century, the wards of our own Brompton Hospital for lung diseases were fitted with double windows, the more effectively to exclude the outside air, we shall realise that "time" is not always synonymous with "progress." The hospital system of ancient Rome was even more advanced. A number of institutions called Valetudinaria existed from late Republican times, open to wealthy and poor alike, and partly supported out of public funds. Their military hospitals, in particular, were fitted up with extraordinary care, as can be seen from traces found in Austria, Germany, Spain, Switzerland—wherever the Roman Eagle spread its wings. They were equipped with numerous sick wards, opening off corridors, a central

*Part of an address given under the auspices of the Industrial Health Education Society to the Shipley Divisional Labour Party, November 1938. By arrangement with and courtesy of Medical Officer, London.

refectory, kitchens, administration buildings, orderlies' apartments, and an apothecary's shop. No possible expense seems to have been spared. [Similar state prevailed in India during the Buddhist period. Ed., I. M. J.]

As it is my purpose briefly to emphasise what might be called the modernity of those very ancient times, let me quote for you a few of the aphorisms of the Father of Medicine, Hippocrates—a Greek physician born about 400 B.C.

"Spontaneous wearings," he says, "indicates disease."

"Those who are constitutionally very fat have less power to resist severe disease than those who are thin." The modern version is "the fat roll more easily down the hill of life."

"Old men endure fasting easily, then men of middle age, youths very badly, and worst of all children especially those of a liveliness greater than the ordinary."

"Growing bodies have the most innate heat; they therefore require the most nourishment, and if they have it not they waste. In the aged there is little heat, and therefore they require little fuel, for it would be extinguished by much."

"Food or drink which is a little less good, but more palatable, is to be preferred to such that is better but less palatable"; the modern counterpart of which is "a little of what you fancy does you good."

"In winter abundant nourishment is wholesome, in summer a more frugal diet."

Could the modern physician say anything more sensible, or say it more acutely?

Interest in healthy living in its communal and personal aspects, as we know it in England to-day, is of very recent development. The beginnings of state medicine date back only to Queen Victoria's reign; the Ministry of Health or rather its fore-runner, the Local Government Board, was established in the second half of the 19th century. The ancient world had no specified minister of public health, but it did have a very active and enlightened interest in most matters pertaining to this subject. No one would claim that the adage "Cleanliness is next to Godliness" is particularly new, though we are apt to pride ourselves on our pioneer zeal for personal cleanliness, clean food, clean drinking water, the cleansing of our cities, good drainage and efficient sewage disposal. In these matters the Greeks, Romans and to some extent, the Egyptians and Jews were pioneers before us. All these nations carried out a minute ritual inspection of meat, instigated by religious motives, which were also responsible for their cults of personal cleanliness. The Romans, in addition, cared so greatly about the purity of their grain and drinking water, that interest in these became almost a religious duty. Personal cleanliness among all these peoples was carefully fostered, at least among the upper classes. Excavators in the Punjab have brought to light bath-rooms with water-proofed brick floors dating back to 5500 B.C. In Crete, about 2000 years B.C., most of the bigger homes were fitted with bathrooms containing clay pottery hip baths of curiously modern design. Many temple inscriptions in ancient Egypt promised health and long life to the clean and temperate. There were public as well as private baths in Greece, and Aristophanes went so far as to characterise a person unable to get a bath as "poor and dirty." The excellence of the Roman baths is almost too well known to be mentioned. We need seek no further than the still existing ones at Bath, Chester, or the curious little

London one tucked away behind the Stand, which, you will remember from "David Copperfield," was often used by Dickens for a dip, and by the lawyers of the nearby Inns of Court, until it passed out of private hands into the custody of the National Trust.

A pure water supply and efficient sewage disposal are still matters of some anxiety in modern England. It took this country more than twenty centuries to catch up with the water supply system of ancient Rome. Not until the late 19th century did English cities begin to construct aqueducts comparable with those of the Roman Empire, where many private houses had their main service pipes with cisterns and taps. The City of Rome was supplied by fourteen great aqueducts with forty million gallons of drinking water daily, a supply proportionately in excess of that provided by any modern city. The plumbing was excellent. It was even recognised that lead pipes had their disadvantages as water carriers, since they could be connected with diseases suffered by workers in lead. Of Roman sewerage, one need only say that the great sewer, the Cloaca Maxima, that discharges itself through an underground brick tunnel into the Tiber, has never since its completion, 2,400 years ago, been completely out of action, and that it still forms part of the City's sewerage system to-day.

I shall only touch upon one more point of contact between those days and these—interest in physical education and the effort to attain a harmonious and balanced personality by careful co-ordination of all the faculties of man. This time it is chiefly to the Greeks that we must look, for they, with all their inevitable limitations of time and knowledge, made in their best days a most gallant effort to "see life steadily and see it whole." To them we owe an incalculable debt, which only the researches of modern scholars have enabled us to realise. Like modern enthusiasts in physical education they liked to catch their material young, and from earliest youth to maturity, small boys (and in some districts girls also) were carefully trained by professional gymnasts in daily exercises. Dietetics were studied, hours of rest and sleep were regulated, and care of the skin promoted by bathing, swimming and massage. Mere physical health was not their sole objective, but the harmonious development of all the bodily and mental faculties, and the attainment of the "greatest possible measure of strength, dexterity, self-confidence, physical perfection and beauty."

This realisation of the connection between health and a harmonious and balanced personality is at the root of the ancient conception of the science of medicine, odd though some of the consequent deductions may appear to us to-day. Up to medieval days, physicians and philosophers imagined that there existed four elements—earth, air, fire and water; four qualities—hot, cold, moist and dry; four humours—blood, phlegm, black bile and yellow bile; and four temperaments, as they called them—the sanguine, the melancholic, the choleric and the phlegmatic. Harmony of the elements represented health, discord resulted in disease. They believed too, that not only a man's health, but, to some extent, his actual personality depended on the way in which these ingredients, so to speak, were mixed up in him. The phlegmatic individual, for instance, was too cold and moist to be quite normal; the choleric or fiery man too hot and dry; Shakespeare makes Mark Antony say of the dead Brutus:—

"His life was gentle, and the elements"
"So mixed in him that nature might stand up"
"And say to all the world: 'This was a man.'"

To-day science has discarded the theories of elements, humours and temperaments but it has seized gratefully upon the underlying truth that health must march side

FOREIGN MEDICAL NEWS

Our London Letter

(From Our Own Correspondent)

SURGERY IN DIABETICS

John Hunter, in opening the discussion at the Royal Society of Medicine on Feb. 1, said that cases could be divided into two groups: (a) those in which surgery was considered necessary notwithstanding the diabetes and (b) those in which surgery had to be undertaken owing to diabetic complications. The second group could further be sub-divided into cases in which the diabetic condition was aggravated by other metabolic disturbances and those in which local conditions, such as sepsis, were aggravating the disease. Himsworth stressed on the preparation of the patient. The patient should have "diabetic balance" to justify surgical interference, and the clinical sign of this lack of balance was ketonuria. His own method of preparing the diabetic patient for operation was to omit the meal and the insulin immediately before operation but to give 50 gm. of sugar in lemonade 2 or 3 hours beforehand and a subcutaneous injection of 25 units of protamine insulin. The post-operation treatment consisted in preventing dehydration, ketosis and development of gangrene. The best anaesthetic for a diabetic patient was nitrous oxide and oxygen.

MISSED CASES OF SYPHILIS

Dr. Christopher Rolleston, M.O.H., complains that medical practitioners in the country of Rutland make inadequate use of laboratory facilities available for the diagnosis of syphilis. He writes: "The following examples show how neglect of this precaution causes unnecessary suffering and expense. A highly respected lady had suffered from severe eruption on the head for some years and had been treated by ultra-violet light for a year or two. She was losing weight, and was suffering from ill health. She went to a specialist in London who at once sent her to me for treatment for syphilis. She has recovered her health and the lesions have healed. Another lady had been treated for a year or two for an ulcer extending from the knee to the ankle. It seems never to have occurred to the physician in charge that the case might have been syphilitic. She came to me and the large ulcer healed completely. The case illustrates the fact that the younger generation of doctors rarely see late results of syphilis in the hospitals where they are trained. A widow was found by her physician to have a sore throat and diphtheria was suspected. No germs of diphtheria were found and she was discharged from medical care. Apprehensive of the nature of her ailment she consulted me, when definite lesions of syphilis were found in other parts of the body." Dr. Rolleston adds that the danger of contracting syphilis innocently was again demonstrated by a virtuous patient who, having refused to kiss a

by side with balance, and wholesomeness go hand in hand with harmony.

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HORLICKS

IN DIGESTIVE DISORDERS

IN disorders of the gastro-intestinal tract—gastric and duodenal ulceration, acute and chronic gastritis—it is essential that the diet shall contain nothing which will cause irritation of the mucous membrane.

HORLICKS is constantly recommended in these conditions. Composed of fullcream cows' milk combined with the soluble extracts of malted barley and wheat, it is bland and soothing and meets the requirements of both doctor and patient.

It is easily prepared. For ambulant cases of duodenal ulceration HORLICKS TABLETS are also recommended.



[April, 1939]

WHAT ARE THE ADVANTAGES OF BRAN AS A LAXATIVE?

CLINICAL tests show that common constipation is most satisfactorily relieved by increasing the intake of "bulk" in the diet.

Kellogg's All-Bran may with advantage be prescribed in all cases where an increase of "bulk" is indicated. As a laxative food All-Bran has the following good points: (1) Its fibre is absolutely non-irritant, but breaks down less readily than the bulk matter of fruit and vegetables, and is therefore more effective. (2) Its continued use does not reduce its laxative effect. (3) It is a good source of Vitamin B and also contains iron. (4) Patients appreciate the natural action of All-Bran: their knowledge that

it is a food rather than a medicine is psychologically helpful. (5) It exercises the digestive tract gently, and is thus of special value where strain is best avoided.

All-Bran is an attractive, crisp breakfast food, eaten with milk or cream. It may be cooked into appetising scones, bread etc., or be sprinkled over salads and other foods. To ensure maximum effectiveness, plenty of fluids should be taken, preferably between meals. All-Bran is stocked by good stores. A packet will be sent free to any qualified practitioner on request from Messrs. Dodge & Seymour (India) Ltd., P. O. Box No. 144, Bombay.



young person, was bitten by her on the chin. He developed a lesion very suggestive of a rodent ulcer, which rapidly disappeared after the administration of "606." (Medical Officer).

THE MEDICAL PRACTITIONERS' UNION AND THE G.M.C.

The following editorial comment of the Medical Officer, on this subject, is worthy of note and is reproduced below for the information of your readers.

The Medical Practitioners' Union has circulated to its members and to other registered practitioners a memorandum on the constitution and functions of the General Medical Council. Only a small minority of registered practitioners belongs to the Union, so we must presume that the majority does not hold with its principles. But that does not mean that the constitution of the G.M.C. is beyond improvement. We imagine that the council would itself welcome some reform, for though it is not the senile corporation that many suppose it to be, it is itself hampered by a constitution it has no power to alter. This constitution could not be varied without a new Medical Act, so we must consider whether such Parliamentary action is desirable. The Medical Act of 1858, which brought the G.M.C. into existence, was not passed for the benefit of the medical profession, but to protect the people. Hence the privileges it gave to registered practitioners were the price of many exacting requirements, the two chief of which are that nobody shall be registered who has not given proof of adequate training and that nobody shall remain on the Register unless he behaves himself professionally. The business of the G.M.C. is, therefore, not to further the interests of registered practitioners but to see that they carry out their duties to the people. The public has never grasped this, and confusing the G.M.C. with certain professional organisations, especially the B.M.A., criticises its actions as merely concerned for the interests of the medical profession. This error is somewhat similar to confusing the Ministry of Labour with the Trades Unions Council. Medical men know the G.M.C. has no power to give them anything, but is all-powerful in imposing requirements which must be obeyed.

One of the reforms demanded by the Medical Practitioners' Union is that there should be only one portal of entry to medical registration. We doubt if the G.M.C. could achieve this, for the examining bodies have their own rights and charters with which the G.M.C. cannot interfere. All the G.M.C. can do—and that it does do as well as it can in the difficult circumstances—is to insist on a minimum standard of medical education applicable to every examining body. Certainly it can raise this standard to any point which is economically feasible, but we cannot accuse the G.M.C. of not having raised this standard from time to time to the maximum attainable at any given moment. An objection which is more valid is that the curriculum is not what it should be, that it contains much which might be omitted and omits much which should be included. The G.M.C. has full powers to fix the curriculum, but, in justice to it, we must submit that every suggested alteration raises highly contentious points. The Medical Practitioners' Union accuses the G.M.C. of not modifying the curriculum to suit modern conditions of practice, because, in the opinion of the Union, the members of the council are out of touch with present-day practice, either because they are too old to understand the modern world or because they are selected from cloistered bodies. The Union suggests that membership of the G.M.C. shall automatically terminate on attaining the age of 65. If a person over 65 is too old to understand current medicine, he must be too old to practise it—so

a corollary to the Union's suggestion would be that all medical men should retire from practice at the age of 65. The Union would like to see fewer members of the council recruited from the universities, or nominated by the State, and more from the body of general practitioners. Here we agree, but we must not forget that the main function of the G.M.C. is to guard professional education, so teachers must figure largely in its composition. In discussing the educational functions of the council, the Union maintains that too much attention is paid to science and too little to practice, but here we think that the G.M.C. is right, for, if we may so express it, that body is concerned with maintaining a high level of professional training and has nothing to do with the business of medicine.

The objections to the disciplinary functions of the council are equally open to question. The council cannot "punish" anybody, it is not a court of justice. But it can abrogate a privilege, which in effect is a far heavier punishment than imprisonment or a fine. Against its decisions there is no appeal. This is represented as a grievance, for the laws of evidence do not hold in the G.M.C. inquiries and the defendant is debarred from the protection he receives in a court of law. Whether any person who has been struck off the Register has been unfairly treated we do not know. It is extremely improbable that any could complain of misdirection of law, but it is by no means impossible that some could complain of the validity of the facts upon which they were condemned, for witnesses cannot be examined on oath. The way out is not easy. The suggestion of the Union that there shall be a "right of appeal to the appropriate court" sounds all right, but what is the appropriate court? What could it be except a sort of super G.M.C. which would have all the drawbacks of the council with others special to itself? Generally speaking we believe that in matters of professional conduct, most medical men would prefer to be judged by members of their own profession.

Our American Letter

(From Our Own Correspondent)

MEDICINE ON TRIAL

The Special Federal Grand Jury which has been conducting an investigation in Washington, D. C., for more than two months, returned indictments, charging violation of the Anti-Trust Laws against the American Medical Association (AMA), the Medical Society of the District of Columbia, the Harris County (Texas) Medical Society, the Washington Academy of Surgery, and 21 individuals, including Dr. Olin West, secretary and general manager of the AMA, Dr. Morris Fishbein, editor of The Journal of the AMA, Dr. Rosco G. Leland, director of the Bureau of Medical Economics, Dr. William C. Woodward, Director of the Bureau of Legal Medicine and Legislation, and Dr. William D. Cutter, secretary of the Council on Medical Education and Hospitals, all from the head-quarters of the Association in Chicago.

The Department of Justice intervened after the Group Health Association of Washington clashed with the local medical society. The Group Association was organized in 1937 with the aid of sh. 40,000 granted by the Federal Home Loan Bank Board. To this co-operative some 2,500 government employees, earning for the most part less than sh. 2,500 a year, have been paying sh. 2'20 to sh. 4'50 a month for the medical attention of a staff of salaried specialists. The District of Columbia Supreme Court held the activities of the Association to be legal.

The process now begun under the anti-trust law attacks the AMA and the local medical societies on purely economic grounds. The Government charges that, prompted by the officers of the AMA, the local medical bodies instituted an active boycott; that hospitals were closed to the co-operative's staff; that members of this staff who were also members of the local medical societies were either expelled or forced to resign their salaried positions; that specialists were forbidden to consult with the co-operative's physicians, and that "white lists" of approved medical institutions were published, on which the co-operative's name did not appear.

AMA leaders assert that the activities complained of are designed solely to maintain the high standards of medical practice deemed necessary to protect the health of the American people. They declare that they will fight the indictment to the Supreme Court if necessary, holding that they cannot be charged with conspiracy to restrain trade because they are not in trade but in a learned profession.

From the other side, however, it is argued that operation of a hospital is not a "learned profession," that in many cases it is entirely a private business and that in the alleged coercion of these hospitals the medical association has clearly acted in restraint of trade and free competition. Back of the action, in the opinions voiced by members of the medical society, according to *The New York Times*—is an effort by the Administration to force acceptance by the medical profession of so-called "socialized medicine," and particularly of compulsory health insurance. At the National Health Conference in Washington, labour unions, farmers' organizations and women's clubs, all politically powerful, endorsed the Inter Departmental Committee's health programme. The AMA insisted that medicine was evolving satisfactorily with the times but expressed a willingness to aid the Government in drafting a medical policy which would be acceptable to organized medicine.

THE BURDEN OF MATERNITY

A new publication of the Metropolitan Life Insurance Company shows some interesting relations between maternity and mortality. As to age, maternal mortality is lowest among American women in the age group 20-24, in which years occur almost one-third of all births. Very young mothers run a considerably higher risk, and above 20-24 years the risk increases with age. In the age group 35-39, the maternal mortality rate is more than twice that of the most favourable age group, and in the age group 40-44, it is 3 times that minimum. A particularly high risk attaches to the birth of a first child. Mortality of mothers is lowest for the second or third child, and increases irregularly for higher orders of children. There is also a close connection between the mortality of the mother and the viability of the child born. The maternal mortality associated with still-births is of the order of 16 times that accompanying live births.

According to an estimate, within the United States from 8,000 to 10,000 deaths arise from abortions annually. The maternal mortality accompanying illegitimate live births is more than double that accompanying legitimate births. 52 per cent of the unmarried mothers who died from puerperal causes, were under 20 years of age, while only 10 per cent of the married women bearing children were in this age group. Undoubtedly one reason for the higher mortality as the greater prevalence of abortions among the unmarried mothers.

There is a marked improvement in maternal mortality in the United States. Intensified prenatal and subsequent care is necessary, if further progress is to be

made. It has, however, been estimated, that the lives of two out of three American women who die each year during pregnancy, in childbirth, or shortly after childbirth, could be saved if these women received medical and nursing care of the type given by certain public health organizations concerned with this problem. But of equal and perhaps of greater importance will be the improvement which must be brought about in obstetrical practice. There are already indications that these improvements in obstetrical care are becoming more available, but it will be some time before maternal mortality is brought down to the irreducible minimum obtainable under the best modern medical practice.

CORONARY OCCLUSION WITHOUT PAIN

In a recent communication Gorham and Martin point out that the incidence of coronary occlusion and cardiac infarction without pain is much higher than has been heretofore appreciated. They have analyzed 100 cases in which necropsy was performed 42 of these patients suffered a fatal attack which was not accompanied by pain, while 58 complained of pain of varying location, intensity and duration. 19% of the patients in the group without pain gave a history of definite anginal pain previous to the final attack. A comparison of the two groups brought out that patients in the group without pain tended to be older than those in the group with pain, that the peak of mortality for the males is a decade earlier than for the females, that a history of preceding attacks of anginal pain and of hypertension is less common, that dyspnea is a prominent symptom and that a pericardial friction rub is rarely heard.

According to the Journal of the American Medical Association, other investigators found 58%, 40%, 61% and 88% of cases in which there was coronary occlusion and infarction without a preceding attack of pain, while another investigator found in cases of myocardial infarction that classic pain was present in 91% of the recent and 64% of the old cases; obviously all discussion of cardiac pain must, at least for the present, remain somewhat speculative, in view of the fact that the mechanisms of the production of pain are as yet but little understood.

Our German Letter

(From Our Own Correspondent)

NUMBER OF PHYSICIANS, PHARMACISTS AND NURSES

The National Health Bureau has published a summary of the number of physicians, dentists, pharmacists, nurses, lay practitioners and other persons engaged in care of German health. The day of the summary was January 1, 1937. The following table shows a comparison with 1934.

	Number of Persons.	
	1934	1937
Physicians	47275	48948
Dental Physicians	11247	18966
Pharmacists	10845	11549
Assistant pharmacists	5269	4647
Midwives	25911	25148
Dentists (without University training)	19098	21085
Masseurs etc.	11410	12682
Trained nurses, male and female	120216	131407
Nurses trained to take care of infants	5747	9787
Confinement Assistants	1197	1517
Disinfectors	4972	5842
Lay Practitioners	14268	12417
Altogether	278853	298840
Male	129019	189376
Female	149834	16

(From Our Own Correspondent)

FACTORS IN SPREAD OF MALARIA

A detailed survey has been undertaken of the factors influencing spread of malaria in rural and urban areas in Delhi Province. Special attention is being paid to the part played by *Anopheles stephensi* in the transmission of malaria in Delhi. An intensive study of wells in congested urban areas in relation to the sources of *stephensi* breeding, of the resting places of adults, and of the infectivity of this species as compared with *Anopheles culicifacies* has been carried out.

Three hundred selected wells were examined every week for about three months. Chemical analyses have been made of water samples from numerous wells. A large amount of data has been collected, but has not so far been subjected to detailed analysis.

Prior to the commencement of the anti-malaria campaign in Delhi, very little was known either in India or in any other country about the distance over which culicine mosquitoes could fly, although much experimental work in this direction had been done on anophelines. Experiments carried out in the spring of 1937 with insects marked with coloured powders proved conclusively that culicine mosquitoes could infiltrate into Delhi from a distance of at least three miles.

CURE FOR SNAKE-BITE

The anti-snake bite serum prepared by the Central Research Institute at Kasauli is now in demand in Burma, Iraq, Ceylon and Iran which amongst themselves bought 698 tubes in 1937. The general demand for the product continues to rise.

The product is a bi-valent serum prepared against the venoms of the Indian cobra and Russell's viper, which are the snakes probably responsible for the majority of deaths occurring from snake bite in this country. The increase in annual issues is shown by the following figures:—

	Tubes
1933	4,342
1934	5,973
1935	5,983
1936	7,170
1937	7,773

Further studies have been made on the methods of concentration designed to eliminate fractions which are not of neutralizing value and which tend to produce a deterioration in the physical characters of the serum when kept in the plains for prolonged periods during the hot weather.

Besides cobra and Russell's viper, the venoms of which are neutralised by the anti-venom serum, a snake which is responsible for a large number of deaths annually is the common krait. There would be no difference in principle in preparing an anti-venene for the venom of the snake but practical difficulties exist in immunizing the horses used for the present bi-valent serum.

The chief difficulty is in obtaining a sufficient and constant supply of krait venom. The snake is difficult to keep in captivity and to feed, and so far no reliable source of supply of venom has been found.

MATERNAL MORTALITY ENQUIRY IN CALCUTTA

That in 96.3 per cent of maternal deaths investigated there was an avoidable factor present is one of the findings which has been put forward, as the result of a statistical inquiry into the causes of maternal mortality lately carried out in Calcutta for a period of one year by the All-India Institute of Hygiene and Public Health with a grant from the Indian Research Fund Association.

Cases of maternal deaths were collected from all female deaths between 10 and 50 years registered in the area under the control of the Health Officer, Corporation of Calcutta. Duplicate registration cards were supplied in the case of all female deaths between these ages and on these duplicates information was provided regarding the existence of pregnancy or the puerperal state. Considerable care was taken to ensure that duplicate registration cards were received in all cases, but questions relating to pregnancy were not answered in every case. Complete accuracy is not, therefore, claimed for the series of maternal death.

CAUSES OF DEATH.—Each maternal death was followed up by home visits, interviews with the doctor, midwife or dai who attended at the time of delivery, or visits to the institutions in which treatment had been given. The information collected was in most cases sufficient to make it possible to reach a conclusion regarding the probable cause of death and the contributory factors, and also regarding the preventability of the death. But in some cases, these conclusions were largely conjectures based on the statement of relatives, for in 11 per cent of the maternal deaths investigated no trained person had been in attendance.

Eight hundred and eighty-seven maternal deaths were investigated, of which 701 were found to be due directly to child-bearing and the rest 186, due to diseases associated with child-bearing.

The following is a list of causes of deaths due directly to child-bearing:—

		per cent.
1. Septic abortion	33	4.71
2. Abortion (non-septic)	4	0.57
3. Ectopic gestation	6	0.86
4. Other accidents of pregnancy	7	1.00
5. Puerperal hæmorrhage	74	10.56
6. Puerperal sepsis	224	31.95
7. Puerperal alb. and convulsions	126	17.97
8. Other toxæmias of pregnancy	15	2.14
9. Embolism and sudden death	11	1.57
10. Other accidents of child birth	26	3.71
11. Other or unspecified conditions of the puerperal state.	10	1.43
12. Anæmia.	165	23.53

Puerperal sepsis, anæmia and eclampsia stand out as the most important causes of death due directly to child-bearing in Calcutta, while pulmonary tuberculosis was responsible for 40 per cent of deaths from diseases associated with child-bearing.

ANÆMIA.—The importance of anæmia was greater than appears from the table, for in addition to those deaths from anæmia per se, there were many others, specially in the sepsis group, in which anæmia was an important contributing factor. Very little information was forthcoming regarding the etiological factors and the types of anæmia responsible for this mortality. A further enquiry was accordingly undertaken with the object of collecting information regarding factors which cause anæmia, e.g., diets, economic conditions, purdah, personal history and associated diseases, in a series of moderately and severely anæmic women attending the welfare centres, maternity homes and antenatal clinics in Calcutta. It is hoped to discover, by means of blood examination at intervals in pregnancy and after delivery, the types of anæmia which occur and the effect of pregnancy and lactation on the course of the anæmia.

It has been found necessary to collect a control series of specimens of blood from healthy Indian women in order that the normal range of absolute values may be available for comparison. The findings so far collected suggest that the blood of healthy Indian women conforms to accepted European hæmatological standards.

TREATMENT OF CONSTIPATION

It is said that colon is a sewerage system but due to carelessness and abuse it becomes a cesspool. When it is clear we are happy, but when it stagnates the digestive function is upset by the poisons of fermentation and putrefaction which mix with the blood, poisoning the brain and the nervous system so that we become mentally depressed, melancholic, irritable and restless. We age prematurely, look and feel old and gradually quail down. The pleasure of living disappears. So even at the very onset of this undesirable malady, constipation should be cured by proper methods. Success in the treatment will be achieved only by the administration of some remedies which will bring about the proper fœcal consistency to move in a normal way. Very many drugs have been used in the treatment of constipation, some are drastic purgatives which are definitely harmful and others are habit-forming.

The leading opinion of the profession throughout the world is opposed to the indiscriminate use of cathartics as they sooner or later aggravate the condition leading to cessation of the proper functioning of the bowels owing to overstimulation. Constipation is in majority of cases due to the lack of natural lubrication of the bowels. Liquid paraffin has been used as a popular mechanical laxative but the disadvantage is that it seeps or leaks through the anal canal even when small doses are taken.

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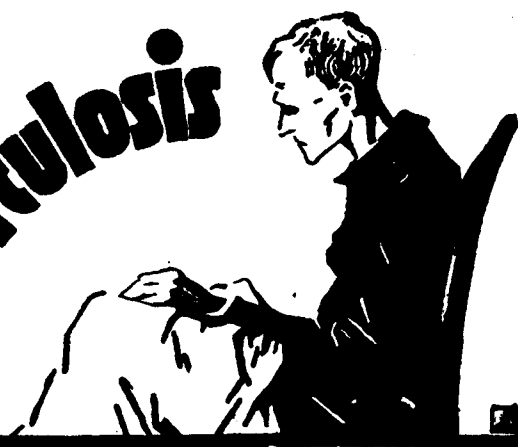
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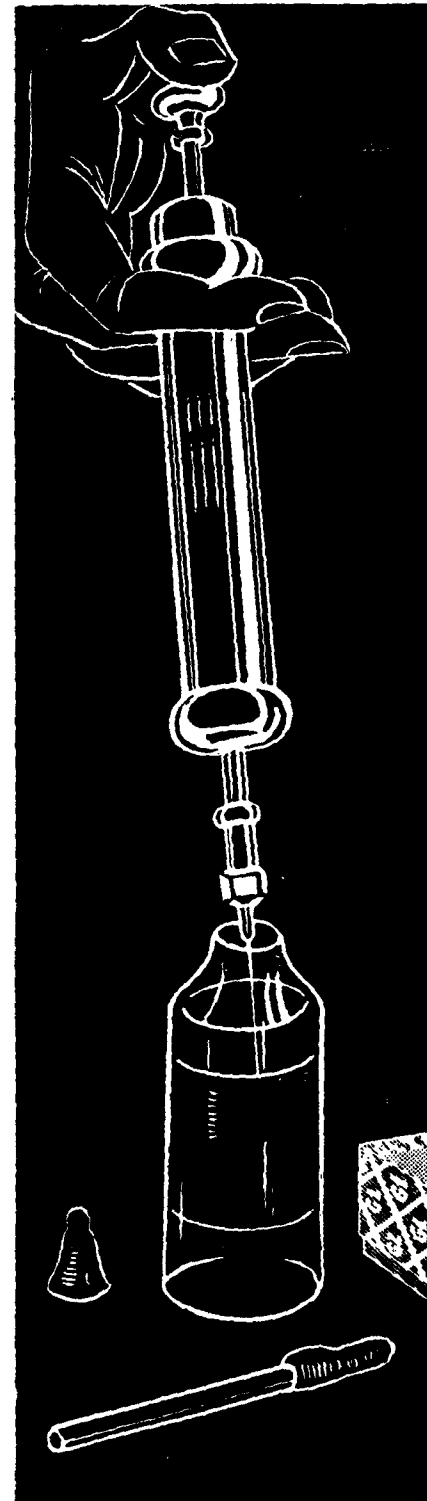
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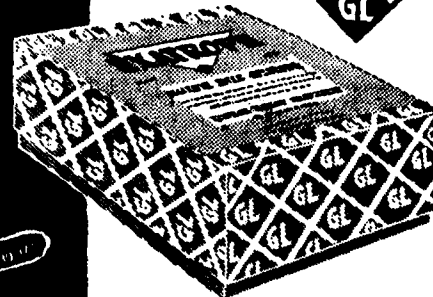
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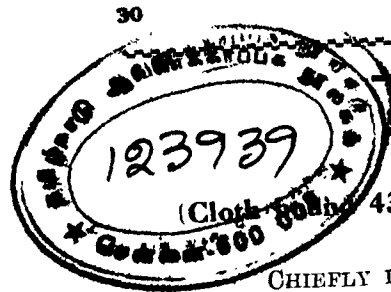
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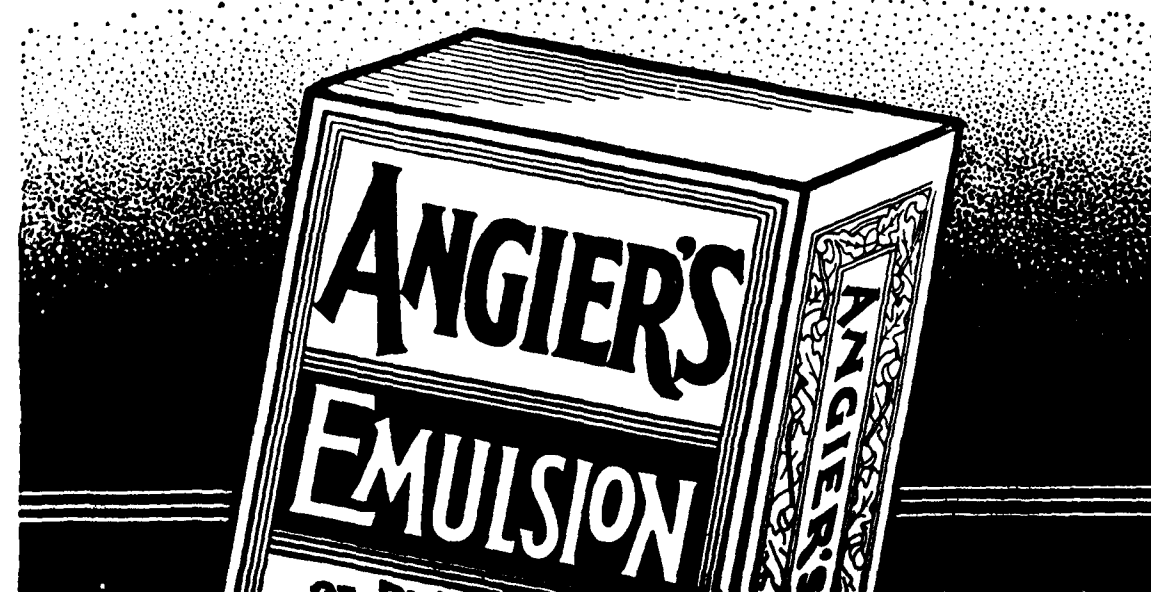
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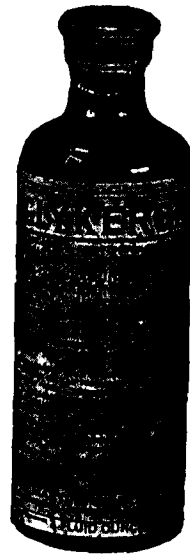
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