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Indian Medical Journal

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The Indian Medical Journal



Organ of the All-India Medical Licentiates' Association

(With which THE AGRA MEDICAL CLUB JOURNAL is incorporated)

CHOLERA IN INDIA

Vol. 33. No. 10

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October, 1939

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WITH SUPPLEMENT

PRESENTING THE ANNUAL REPORT OF THE JOURNAL FOR 1938-39

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SUPPLEMENT TO THE INDIAN MEDICAL JOURNAL

MADRAS

OCTOBER 15, 1939

No. 10

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Annual Report on the Working of the Office of the Indian Medical Journal for the year ending September 1939

GENERAL

The present Managing Editor was elected to the office in April 1935 and assumed charge at the end of June of the same year. Since then he has been in uninterrupted charge, being re-elected by the annual conferences of the All-India Medical Licentiates' Association.

This report covers the Association's financial year from 1st October 1938 to 30th September 1939. The *Journal* year, however, is from January to December.

CIRCULATION, STATUS AND POPULARITY

The circulation was steady with a raising trend during the year under report. One note worthy feature is that even the medical graduates and European doctors in our country have begun to subscribe to our *Journal*. Hitherto they were entertaining peculiar notions about it, simply because it is the official organ of the All-India Medical Licentiates' Association. It is therefore heartening to see this feeling of professional caste-exclusiveness being replaced by one of comradeship and co-operation, and the *Journal* may be counted as having substantially contributed to this rapprochement by impartial criticisms and publication of useful medical literature.

Although from the point of view of comparative circulation this *Journal* claims the highest in this country, yet it is regrettable to note that only about a tenth of the total number of registered practitioners are subscribers to the *Journal*—the former being about 32,000 at the end of 1937. In Great Britain there are about 60,000 Registered Medical Practitioners out of whom over 38,000 are subscribers to the *British Medical Journal*—roughly

more than half of the British medical profession. This is evidently due to the low economic condition of the Indian medical practitioner as compared to his British colleague. Even the recent autonomous provincial governments have taken no tangible and practical steps to put him on his feet. The *Medico-Political Supplement* which is now being issued with the *Journal* since January of this year is mainly intended to hasten the economic improvement of our practitioners by offering suggestions and schemes which the organised profession and the provincial governments may adopt if found suitable. Further increase in subscribers depends therefore on their economic improvement and as this is being achieved the circulation of the *Journal* is bound to increase *pari passu*.

The professional value of the contributions may be judged from authoritative professional opinions in this country and abroad. A very large number of appreciative letters were received in this office during the last four years. It is only possible to give a brief extract from a few such letters, just to indicate the esteem in which the *Journal* is held by contemporary medical men and Journals.

"Some of the articles appearing now are worth copying in other *Journals* in India. Please allow me to express my congratulations"—T. C. Gopalan, Syriam, Burma, December 12, 1935.

"Even the people of M. B. B. S. and I. M. S. class speak well of the *Indian Medical Journal* as it is published now"—I. N. Saxena, Saharanpur, January 5, 1936.

"I am happy to see the rapid rise in the standard of the *Journal*"—K. S. Ranganathan, Cuddalore, March 5, 1936.

"As interesting articles have been appearing of late in the *Journal*, I took the trouble of writing to you Allow me to congratulate.....the *Journal* on the excellent matter appearing in it."—C. Ramunni, Moulmein, December 12, 1935.

"The editorial of September 1935 is a piece of enormous information and clothed in the best of language.....In fact all the recent editorials are well-seasoned and well-reasoned."—R. Brahaspathy, Prome, October 26, 1935.

"Pray accept my congratulations.....in bringing out an excellent Leprosy Number of the *Indian Medical Journal*"—P. D. Gupta, Almora, July 28, 1936.

"The *Indian Medical Journal*.....is a monthly periodical corresponding to our *Practitioner* and like that *Journal* it issues.....symposia on specified subjects. The number for January 1936 deals with Cerebro Spinal Meningitis.....There are 13 articles covering all aspects of Cerebro-Spinal Meningitis.....the first three deal with incidence in part of India and give us matter which is new to us....." *Medical Officer*, April 4, 1936, p. 134.

"The July issue 1936 of the *Indian Medical Journal* is devoted to Leprosy and gives almost complete account of its clinical and pathological phenomena, and of its history and epidemiology also, so far as these concern India. The special number starts with an editorial 'The challenge of Leprosy' which is a brief but succinct view of the present position in India and elsewhere.

The various papers.....tell us practically all that is known of the disease. They make up a symposium of unusual excellence, and, to the initiated and uninitiated alike, give a complete account of the most interesting of human afflictions."—*Medical Officer* September 19, 1936, p. 120.

"The Leprosy Special Number of the *Indian Medical Journal* (July 1936) contains no fewer than 23 articles.....this symposium is open to little criticism and much praise, and we congratulate the *Indian Medical Journal* on the energy and enterprise that have gone into its production."—*Lancet*, September 1936, p. 699.

"There is much of great value in the Leprosy Number which you have just produced, and I trust it would do much to stimulate not only interest but right action"—A. Donald Miller, Purulia, Secretary, International Mission to Lepers, August 4, 1936.

"Your July 1936 issue, devoted to Leprosy contains much matter of interest to us"—H. W. Wade, Editor, *International Journal of Leprosy*, Manila, May 6, 1936.

"The whole magazine (referring to Ante-Natal Diseases Special Number) is most interesting and I think you have done well in the various contributions that you have received"—W. F. T. Haultain, Edinburgh, August 4, 1937.

"I have read with intense interest the historical account of the origin and growth of medical licentiates.....It is a vivid and comprehensive account.....written in an eloquent style.....a reference book showing the evolution of medical licentiates in this country."—Hon'ble Dr. U. Rama Rao, Madras, August 3, 1938.

"I regard the Whooping Cough Number as a boon to the profession and a literature with no rival or equal. I have enjoyed it like anything"—L. S. Gills, Nahianwala, August 16, 1938.

"The History of Medical Licentiates gives a very clear account.....gleans a lot of information—one of the copies was placed in the library, the other I intend having for my own use."—Major-General Wilson, Surgeon-General, Madras, October 6, 1938.

"I am very glad to have the copy of the Nutrition symposium which is most interesting and will prove to be a great value to me for reference". F. J. G. Lishman, Gloucestershire, January 23, 1939.

"I thank you for the most excellent issue of the *Indian Medical Journal* Special Nutrition Number. I find the articles most valuable and useful"—Dame Louise McLroy, London, March 4, 1939.

"Thank you for your Conference Number. I appreciate very much your courtesy and for the kind way in which you have defended the honour of the Indian Medical Service"—Gen. Bradfield, Director-General, I. M. S.

"The article on the 'Art of Medicine' appearing in the Special Number on the 'History of Medicine', *I. M. J.*

April 1939, certainly needs appreciation. It was so interesting that I could not help writing this card to you.....I will fail in my duty if I do not congratulate"—S. P. Srivastava, Moth, April 24, 1939.

"The get-up and arrangement of the *Journal* show a distinct improvement, particularly by the inclusion of the Supplement"—A. C. Ukil, Calcutta, May 1, 1939.

"The *Indian Medical Journal* for December 1938 is devoted entirely to a discussion of Nutrition. The whole subject receives very thorough treatment in the course of 16 special articles.....This number of the *Journal* forms an admirable summary of current views on Nutrition and will well repay study."—*Medical Officer*, April 29, 1939.

"I feel that the historical presentations of scientific medical subjects have a definite value." (He refers to the Spl. Number on History of Medicine, *I. M. J.*, April 1939).—Prof. E. W. H. Cruickshank, Aberdeen, May 15, 1939.

"I read with considerable interest and much profit the article on the 'Art of Medicine' (*I. M. J.*, April 1939).....It is a timely warning to the members of the profession, especially those in teaching institutions."—Prof. T. S. Tirumurthi, Madras, June 1, 1939.

"Please permit us to convey our best appreciation of your leading article on 'The Menace of Patent Medicines' in page 173 of your esteemed *Journal*....." Bengal Immunity Research Laboratory, Calcutta, June 23, 1939.

SPECIAL NUMBERS, SPECIAL COLUMNS AND MEDICO-POLITICAL SUPPLEMENT

Special Numbers.—Many contemporary medical journals in this country often issue special numbers dealing with diseases under a broad and general grouping, such as obstetric, ophthalmic, pediatric, gynaecological and tropical diseases special numbers. To avoid duplication of literature of this kind and consequently of waste of labour and material, we have resisted the temptation of following this example. We think the practitioners will be benefited if a single subject of topical interest is dealt with exhaustively rather than make them a jack of mixed knowledge and master of none. This plan of ours has worked well. We are slowly trying to increase the annual quota of such symposia, and we feel we cannot lie on the oars till each issue of the journal becomes a symposium of current and correct knowledge on a single series of medical or public health subjects of common and supreme interest and utility. This is certainly not impossible to achieve in view of the acknowledged medical intelligence and experience in this country, but the working difficulty is that our practitioners, unlike in other countries, fight shy of publicity out of a false sense of modesty. It requires more than a couple of letters to acquire their collaboration, and since we never felt bad in repeating our requests, the harvest we gathered as a result has proved sufficient though not abundant. A consolidated record of the special numbers published from the year 1936 to 1939 is given below for the information of our readers.

1936			
Cerebro-Spinal Meningitis	...	January	1936
Leprosy	...	July	"
1937			
Conference Number	...	March	1937
Ante-Natal Diseases	...	April	"
Ante-Natal Diseases	...	July	"
Hypertension	...	October	"

1938			
Whooping Cough	...	June	1938
History of Medical Licentiates & the	...		
All-India Medical Licentiates' Assn.	...	September	"
Nutrition	...	December	"
1939			
Conference Number	...	March	1939
History of Medicine	...	April	"
Dysenteries in India	...	September	"
Cholera in India	...	October	"

Special Columns.—To our paid foreign medical correspondents at Berlin and New York, we have added another one at London. Our London letter has commenced its career since the beginning of this year. The news they give have proved to be reliable and interesting. The post-graduate column has been safely running this year; a new column, 'Tuberculosis Notes' has been added in view of the fresh interest evoked by Lady Linlithgow's Anti-Tuberculosis Campaign. The post-graduate subject for this year is Cardiology by Dr. Jai Gopal, our Associate Editor. After this will come a series of articles on Advances in Tropical Medicine by a distinguished medical research worker of our country.

Medico-Political Supplement.—The idea of issuing *Indian Medical Journal supplements* was born out of a sheer chance suggestion to the editor by an experienced medical man who was discussing with him as to the best methods of stimulating local thought and interest among the practitioners, who are scattered in the different parts of our country, on organizational methods to improve their economic position. Most of them do not know what is happening in other countries in the domain of medical and public health practice and what medical and health legislation is being made, particularly in Europe, America and Russia. The systems of medical practice and administration differ in each of the European countries, between Canada and U.S.A., and between all these and the U.S.S.R. It at once struck the editor that if a resume of the systems as propounded by eminent authorities of these countries is given frequently it may be useful to our practitioners who may adapt any useful suggestions contained therein, awaken regional interest among the nearer colleagues and influence the medical associations, the local bodies and the provincial governments to foot a suitable scheme for their amelioration. At the same time there were repeated and insistent requests from some of the prominent members of the Association to have the Association and Service Notes published separately for ready reference by the branches. This looked very sound, tallied with our programme, and immediately we sponsored the "Medico-Political Supplement" of the *Journal*. It is hoped that it will have an useful and prosperous career, and serve to supply the bread of practice besides the wine of knowledge. So far, the supplement has been utilized for the following publications:— (1) Resume of foreign systems of medical practice, administration and legislation. (2) Discussion of current medical and public health

legislation in our provinces, with editorial criticisms. (3) Reporting of Association's conferences, memoranda, and schemes under arresting captions, often with editorial reviews and comments. (4) Reporting of the proceedings of the Provincial Medical Councils. (5) Association's propaganda. (8) Reporting of the usual branch proceedings. Twenty pages are allotted to it at present.

It may be noted in passing that ours is the only *Journal* in our country which has chosen to publish monthly supplements of this kind, and this has received an abundant appreciation from some of our distinguished medical leaders.

FORMAT, PRINTING AND PAPER

Format.—The present design of the cover page was conceived and executed in January 1937 after many trials and failures. It consists of fine tint printing in photo-brown ink on the upper and lower margins with the half-tone block of the founder of the Association on right top corner. A sufficiently large and clear space is left for printing of the contents in suitable bold types. Recently this design has been submitted for fresh opinion and criticism of a famous local artist with a view towards possible improvement. He is of the view that no change is needed and that the present one is good enough for the nature of the periodical. The cover is of 40 lbs. demi, imitation art and suits the tint under use.

Printing.—Messrs. Progressive Printers have been continuing as our printers since January 1937. Their tender for our printing was the lowest and other terms of the contract were also very favourable. A consolidated payment of Rs. 250/- per issue of 80 to 100 pages was paid during 1937, and this was increased to Rs. 275/- during 1938 on their representation to our Finance Committee that owing to frequent labour strikes and consequent increase of wages they were unable to continue under the old rate. We are therefore continuing the contract under this new rate.*

It is a pleasure to record that our printers have been faithfully observing the terms of the contract, and co-operating with us ungrudgingly. That their co-operation is sincere is evidenced by the fact that they were prepared to print our journal at a much reduced rate when we expressed to them our difficulties arising out of war conditions.

Paper.—Frequent troubles were experienced in getting a regular supply of paper. Till the middle of 1937, we were under a contract with Titagur Mills. They had serious and prolonged labour troubles and the supply inevitably became irregular. Besides, the prices varied from 3 annas per pound to 4½ annas per pound, and they refused to give the advantage of a fixed price. So we entered into

* This new rate stands suspended since the outbreak of war this September. Owing to high cost and scarcity of news-print we have inevitably to reduce the number of pages. Printing is therefore paid according to work done at a reduced rate of Rs. 12/- per forme of 4 pages demi. Other conditions of the contract remain the same. By this arrangement we would be saving Rs. 80/- or 100/- on an average per month per issue.

a fresh contract with the Bengal Mills, but the prices stipulated were again subject to market fluctuation. They were however supplying paper very regularly. Even the prices were going down owing to the partial lifting of tariff on paper by the Central Government. The last price we paid for Bengal paper was Rs. 0-3-3 per lb. Even this being too costly for a mass production like our *Journal*, we felt the need for bringing down the cost of paper to enable us to increase the number of printed pages and copies to cope up with the increasing circulation and the insistent need for more pages to clear off the matter pending publication. After many futile attempts, we finally succeeded in entering into a contract with a foreign mill through their local agents, Messrs. Charles Morgan & Co., for a thousand reams, demi, 24 lbs., at Rs. 0-1-5 per lb. We were anxious that even during this financial year the expenditure on paper should be reduced. We therefore placed our order during January last after obtaining the necessary sanction of the Finance Committee. But unfortunately owing to international tension the first consignment was delayed and arrived here only at the end of July 1939. Since then our *Journal* is being printed on this paper, and although good and in no way inferior to the previous brands used, we yet found certain defects and cabled to the mills to rectify them in their next lot. We advised them to give finer super-calendering and make the blend a shade whiter. They have consented. The consignment is expected to be regular unless war conditions intervene*, but we have got five months' stock on hand with local agents.

EXCHANGE JOURNALS

We are in exchange with the following medical journals except those marked with asterisk for which we subscribe as they do not exchange as a rule.

FOREIGN

(1) The Prescriber; (2) The Post-Graduate Medical Journal; (3) The British Journal of Tuberculosis; (4) The Medical Officer; (5) The Bristol Medico-Chirurgical Journal; (6) The General Practitioner; (7) The Bulletin of the New York Academy of Medicine; (8) The Japanese Journal of Obstetrics and Gynaecology; (9) The Irish Journal of Medical Science; (10) The Medical Times and Long Island Medical Journal; (11) The Philippine Journal of Science; (12) The Journal of the United States Navy; (13) The Medical Times; (14) The Lancet*; (15) The British Medical Journal*; (16) The Practitioner*; (17) The Journal of the American Medical Association*;

INLAND

(18) The Indian Medical Gazette; (19) The Calcutta Medical Journal; (20) Journal of the Indian Medical Association; (21) Indian Medical Record; (22) The Patna Journal of Medicine; (23)

* Since this report was written war has been declared and there is bound to be great difficulty in securing paper at cheap rates.

The Indian Dental Journal; (24) King George Medical College Magazine; (25) National Medical College Magazine; (26) Madras Medical College Magazine; (27) The Stanley Medical College Journal; (28) The Practical Medicine; (29) The Antiseptic; (30) The Medical Practitioner; (31) The Indian Journal of Pediatrics; (32) The Medical Digest; (33) Seth G. S. Medical College Magazine; (34) The Medical Bulletin; (35) The Sind Medical Journal; (36) The Orissa Medical School Magazine; (37) The Journal of South Indian Medicine; (38) The Journal of the Gwalior Medical Association; (39) The Calcutta Medical Review; (40) The Indian Journal of Medical Research; (41) The Calcutta Municipal Gazette; (42) The Chikitsa Jagat, Calcutta; (43) The Chikitsa-Prativa, Calcutta; (44) The Indian Veterinary Journal; (45) The Journal of the Rajshahi District Board Medical Association; (46) Leprosy in India; (47) The Arogya-Mitra, Gwalior; (48) The Indian Journal of Veterinary Science; (49) The New Health, Suchindram, Travancore; (50) The Arogya-Margam; (51) The Oriental Watchman and Herald of Health; (52) The Mysindia; (53) The Journal of the Andra Medical Association; (54) The Clinical Digest; (55) The Burma Medical Times; (56) The Indian Journal of Venereal Diseases; (57) The Medico-Surgical Suggestions.

TOTAL PAGES AND TOTAL PUBLICATIONS

The following table would give a comparative idea of the total number of pages of advertisement and reading matter and total number of published copies during the last three years:—

Period	Total No. of advt. pages.	Monthly average	Total No. of reading matter pages	Monthly average	Total No. of pages	Monthly average	Total No. of copies in effective circulation
1936-37	348	29	596	50	944	79	35,800
1937-38	378	30	648	54	1026	84	36,000
1938-39	404	34	646	54	1050	88	35,500

The above table would indicate that both the advertisement and reading matter have increased by 48 pages each during the year under report.

BUSINESS AND FINANCE

It is gratifying to record that business has continued to be brisk and prosperous, and the finances sound and satisfactory during the year. There was however a perceptible slackening in the later part of the year, owing perhaps to international tension. The payment of bills was somewhat delayed.

The relationship of this office with the reputable advertising agents in the world, particularly in India, England and U. S. A., and also with the prominent manufacturing houses has been very cordial, pleasant and fruitful. There was complete co-operation to our mutual advantage. It is necessary to record our thanks to them for the constant spirit of co-operation and help they have shown to our *Journal*.

It has been possible during the year under report to appoint The Universal Publishers' Representatives as our sole advertising agents for the United States of America.

Many advertisements of doubtful ethical standard have been refused, not only from the point of view of medical but also of fair business standards. Otherwise, the readers would be misguided, and the reliable and scientific manufacturing concerns would be placed at a disadvantage if they have no moral guarantee against unfair competition.

As in the last three years, so in this year the *Journal* has been supporting itself solely from its advertisement income. This office is not in charge of subscription: that is apportioned to the Honorary Treasurer at Karnal, Punjab. Any subscription received in or recovered by this office is credited to the Treasurer's account.

A comparative table of income and expenditure is given below. The net profit, excluding subscription* for the year is Rs. 1618. Out of this profit we purchased one Adrema Addressing Machine at a cost of Rs. 949. The Standing Committee sanctioned an extra amount for this purchase, but we did not take advantage of it, as it was our intention to utilise a part of the profit for this purpose. This machine has much economised our expenditure, time and labour in the preparation of subscribers' addresses, apart from ensuring their correctness.

COMPARATIVE TABLE OF INCOME AND EXPENDITURE

Period	INCOME		EXPENDITURE		Profit or loss
	Budget Estimate	Actual	Budget Estimate	Actual	
	Rs.	Rs.	Rs.	Rs.	Rs.
1935-36	10,250	12,623	11,834	11,964	+ 659
1936-37	15,225	14,026	13,054	12,118	+ 1908
1937-38	15,250	15,003	13,159	12,314	+ 2689
1938-39	16,000	14,111	15,000	12,493	+ 1619

CLASSIFIED TABLE OF INCOME AND EXPENDITURE FOR THE YEAR 1938-39

	INCOME			EXPENDITURE		
	Rs.	A.	P.	Rs.	A.	P.
Opening Balance	2065	1	7	Printing & Paper	6117	2 5
Net advt. income	14085	8	1	Postage	1587	5 9
Other receipts				Establishment	3620	0 0
Mainly sale of special numbers	26	0	6	Miscellaneous†	1218	9 7
Subscriptions recovered mostly by V.P. Ps. from this office	1165	15	0	Remittances to Treasurer and other adjustments	2059	3 6
Dr. Sarju Prasad Memorial Fund	9	0	0	Purchase of Addressing machine	949	0 0
				Closing balance	1850	3 11
	17351	9	2		17351	9 2

* The average subscription income per year is about Rs. 12,000. The Hon. Treasurer will submit his report in due course.

† This includes Stationary, other printing, house rent, subscription to foreign Journals, payments to contributors, and miscellaneous items.

PROFIT AND LOSS ACCOUNT

Rs. A. P.

Net advertisement income and other receipts excluding subscription, and Sarju Prasad Memorial Fund. ...	14111	8	7
Net expenditure, excluding Adrema Addressing Machine ...	12493	1	9
NET PROFIT ...	1618	6	10

It may be noted that the advertisement income this year is less by about Rs. 900/- compared to the previous year. But this fall is only apparent as will be evident from the following statement of outstandings:—

Bills outstanding at the end of Sep. 1938 ...	Rs. 2819	9	3
" " " 1939 ...	" 3461	10	9

The income would have slightly exceeded the previous year but, as mentioned earlier, bills were delayed payment during the later part of the year owing to business uncertainties due to troubled conditions in Europe. All these bills are however realisable though there will be inevitable delay.

It may also be noted that our total expenditure is Rs. 2500/- less than our estimate of expenditure, while on the income side we have fallen short of our estimated income by about Rs. 1900/-. We would have reached the estimated income had it not been for the delay in realising our bills for reasons already explained.

STAFF

The Association has sanctioned two clerks and one office boy for the year under report. Both the clerks are qualified to hold the appointment, one of them holds the G. D. A. and advanced stenography diplomas. They discharged their duties very satisfactorily and their industry and intelligence were commendable. The present staff is sufficient for the current volume of work.

EDITORIAL COMMITTEE

The local members of the Editorial Committee met twice during the year under report. There were also frequent personal consultations, apart from official meetings. Drs. Jai Gopal, A. N. Roy and T. V. Muthuswami Chettiar continued to take lively interest and to offer helpful and timely co-operation.

CONCLUSION

Our onerous and responsible duty as Managing Editor has been made exceedingly pleasant and light by the faithful work of our printers, the devotion and industry of our staff, the co-operation of our business agents, the ready collaboration of our contributors and the confidence and help of our Association colleagues.

The *Journal's* star is good and bright to day. May it continue to have an useful and prosperous career! May it be given to it to play a noble part in the to-day's renaissance of our country! This has been our hope and prayer day and night, at work and outside it.

POSTSCRIPT

Since the above report was written, war has broken out. Its reactions are felt acutely even by such a small enterprise as our *Journal*. If the market and the manufacturers are affected, advertisement is bound to be sluggish. This would certainly affect our *Journal* very badly. As pointed out in the editorial of this issue, no effort and sacrifice on our part will be wanting to make the *Journal* continue to live within its income. But there is no doubt that the new year which overtakes the *Journal* on this day is not altogether favourable for good business.

A. VISWANATHAN,

Managing Editor,

The Indian Medical Journal.

1st October 1939

Medical Education—Old and New*

● Dr. S. R. Mulgongker, F. R. C. S.

THE INVIDIOUS PROFESSIONAL CASTE

Years ago the British Government wanted cheap medical service. Of course they already had their own surgeons, surgeon captains, surgeon majors, etc., for their army. These were assisted by military assistant surgeons recruited from Anglo-Indians and domiciled Europeans. They underwent medical training for 4 years after a preliminary entrance examination which hardly came up to the then standard of the matriculation examination. They were started on a pay of about Rs. 250 a month and worked up to quite a respectable pay. Later the Government wanted more medical men but at a much cheaper rate. These were recruited from amongst the Indians. They were given a training which at first was for two and half years and later increased to four years. After qualifying, they were posted as hospital assistants and were later designated as sub-assistant surgeons. They were started on a pay of Rs. 35 which was later increased to Rs. 50 and worked up to about Rs. 150 per month. They got certain allowances which on an average worked at about Rs. 20 per mensem. The preliminary qualification necessary for these posts was pre-matriculation standard at first, then the matriculation and now the intermediate in science. Still later, the Government put another class of men with a little higher training. The preliminary qualification for them was at first the matriculation, then the F. A., and now the I. Sc. The medical training they underwent was at first for four but later extended to five years. They were designated as assistant surgeons and were started with a pay of Rs. 250 which has recently been reduced to Rs. 150 per mensem.

The sub-assistant surgeons were patronised by poor people. Even in those good old days they had to pass the matriculation and then spend three or four years in medical training as compared with the assistant surgeon's preliminary qualification of matriculation and four or five years medical training. *Considering the then little of*

* Extracts from his inaugural address to the students of the B. J. Medical School, Poona, during August 1939.

practically no difference in their training, the variation in the pay offered to the two grades could hardly be justified. Today the conditions of medical education have changed. The preliminary qualification necessary for both the classes is the same viz., the I.Sc. The only difference is that the licentiate has four years' medical training while the graduate has it for five years. I do not think it is right that for just one year's less training one should for ever and ever be put into an inferior grade and be condemned to a lower status in life. I am very glad to hear that your school and also other schools in the Presidency are soon to be converted into colleges, and that the sub-assistant surgeon's grade is to be abolished. *I only wish that they would cease talking about it and do it as soon as possible.* I wish further that you will move and approach the Bombay University to have your school recognised for the University M. B. B. S., so that those of you who want to obtain the degree may be enabled to do so.

EXAMINATIONS ARE NOT ALL IN ALL

I have always held and still hold that examinations are not all in all. Amongst those that pass an examination there are some who just come up to the standard of the examination and there are others who are far above it. There have been many men who have been only sub-assistant surgeons but who have made a great name for themselves. I shall only mention Sarju Pershad of Indore and Mathra Doss of Mogha. I can also give you a local example, Dr. Mone, who was a student of this institution. Even though it all depends on what one makes of oneself rather than on what examination one passes, yet in this world one must have attained a certain minimum standard by which the general public can recognise your merit to start with. Let that standard be as high as possible and now that there is only an year's difference of training between the licentiate and the graduate there is no reason whatsoever why you should be content to get yourself labelled as belonging to a lower standard.

THE CONTEMPLATED HYBRID STANDARD

I have also heard it said that for village uplift work a special standard—a hybrid standard—is to be set up i. e., some men will be trained half in the allopathic way and half in the Ayurvedic way, and the whole course is to be finished within four years. I must here say that I have every respect for the Ayurveda and I sincerely believe that their materia medica deserves a thorough and sympathetic investigation and some of its useful drugs and preparations deserve to be incorporated into our materia medica. But this is not possible so long as we are dependent on the British Pharmacopoeia. *We must have an Indian Pharmacopoeia in which Indian drugs and preparations—whether allopathic or Ayurvedic—will be there not on sufferance but on preference.* It requires about 4 to 5 years to impart a working knowledge of allopathic medicine. It used to take 12 years in the good old days to turn out a *vaidya* but how a combined *Doctor cum Vaidya* is to be manufactured in 4 years and to be let loose on the villages surpasses my comprehension. Let us hope that wiser counsels would prevail.

TEACHER IS BUT A SENIOR STUDENT

I have now been a senior student for about 30 years and a teacher-student for the past 15 years or so. I say teacher-student advisedly because one really learns more as a teacher than in the ordinary way. As a teacher one has to try and crystallize one's knowledge, to make it simple so that one can explain it in such a way that people who are new to the subject can easily

understand it. Again one is made to think about many questions and facts which one took for granted before, because junior students ask questions about these very things and one cannot ask them to just accept things without question. Thus it makes one think and try to find out a plausible explanation: sometimes one puts it to the test of an experiment in order to prove that what one tells one's students is correct or not, and in that way one learns.

STUDENTS' FUNNY IDEAS

As a teacher-student I have come in contact with a large number of junior students in Bombay. I have found them on the whole to be good fellows but they have some funny ideas which I wish to bring to your notice. I can but hope that you here in this bracing climate of Poona are free from such failings.

One fixed idea that the junior student has in his view is that he joins the school or college not to gain knowledge but to pass an examination. I think it is indeed a very narrow view to take. Whatever may be the result of an examination one should try to understand his subjects and learn them in as great a detail as possible. Once you thoroughly understand a principle or fact and are convinced of its truth it is very difficult to forget it. Many junior students study their subjects in such a way as if it were a memory test for that particular examination, and that subject is to be forgotten as soon as one has got through the examination. I do not deny that you have many subjects to learn and it is not possible that you will be a past master of every subject, but you cannot afford to forget the principle and main facts of any subject.

PRE-MEDICAL AND MEDICAL SUBJECTS

You have pre-medical subjects which help you to understand many facts which are taught to you later on. For example chemistry is useful for your bio-chemistry, sound, light, heat and electricity in physiology, electro-therapeutics and radiology. I would not object to call these subjects accessory, but there are other subjects which I consider as fundamental or foundational. On the proper knowledge of these subjects your superstructure of medical knowledge is based. If these are weak the superstructure will be wobbly. These subjects are anatomy and physiology and, the subject you study a little later on, pathology. You study first normal structure and normal functions. When you know that thoroughly you learn how the structure is changed with consequent derangement of function as a result of disease. That is pathology. If you have a sound knowledge of these three subjects the remainder is quite easy. I want to impress on you how important it is for you to know normal structure and functions. I do not mean to say that in your fourth year you must be able to say, if you are awakened at 2 a. m., what are the routes and branches of the otic ganglion—though from a recent examination paper it looks as if you may have even to do that by and by. At the same time you must not emulate the boy I have once asked some years ago as to what bones enter into the formation of the knee-joint, when I was talking about the disease of the knee-joint—he said “femur, tibia and fibula”. He forgot patella and added fibula! And when I asked him about the ligaments he could not go beyond the capsule. Now how is such a boy to learn about the diseases and derangements of the knee-joint if he just learns to forget all about it within a few weeks?

Whatever knowledge one may possess one must be able to apply it. This requires thorough understanding. Otherwise that knowledge is useful to no one.

SPIRIT OF ENQUIRY

I always ask my students to keep on enquiring. In fact I ask them to become one big question mark, to ask themselves first: Why this is so, why this is done, why this is not done? By this way they may get a satisfactory explanation. If they are not satisfied or if they cannot explain satisfactorily to themselves, then ask the teacher-student and he is always at their service to explain to the best of his capacity. But they should in their own interest exercise their own brain so that the capacity to think and to use the knowledge they have may develop properly. If they are spoon-fed entirely, if they depend entirely on the teacher-student, they will be completely at sea when they have to stand on their own legs and face their own problems in practice. The teacher-student will not be there to prompt them. It will then be too late also to think of the opportunities for training they had lost while they were at college or school. It will mean that they will be handicapped in the race for livelihood and then they will have to fall back on semi-quackery to make a livelihood. What a shameful thing it is that a student of this school should have to descend to such subterfuges. I hope what I see in Bombay is not applicable to you in Poona, but if some of you find that what I say applies to you also, I ask you to wake up and throw off that lethargy, and make an effort to exercise your brain God has given you, and cultivate knowledge that will stand you in good stead in after-life.

NOTES TAKING

Another thing I want to say something about is notes-taking. While the clinic is going on I find the student writing notes. Unless the students are capable of attending to the writing of notes, understand their meaning and at the same time able to see any demonstration that is going on, all at once, he will be losing the substance of what is being taught. After all, the teacher-student is only telling you how to investigate a case, how to elicit the necessary information and how to marshal the facts in their proper sequence and to arrive at a conclusion. That is not the time to write notes but one to think. After you go home read up the disease the teacher has been talking about, note what points the teacher explained and then write your notes. They will then be of immense value to you.

CASE NOTES

There is one other kind of notes I wish to refer to and that is case-notes. The general attitude appears to be to do the minimum possible. If it is possible to copy down any casualty or other notes full advantage may be taken of them later; but most of the notes consist of “patient says this, patient says that” and very little in fact practically nothing of what “I found and I think”. Of course history is important and in fact it points to the line of investigation, but the case-notes should not consist almost entirely of that. I tell my students that the ward-boy if he could write would write all that the patient says. The difference between the literate ward-boy and the medical student must be in the observations and the conclusions which the latter makes. You attend the hospital and you pay the fees in order that you should train yourself to observe and to make use of those observations. Well, then, make full use of your opportunities while you can. Take your textbooks with you to the wards in the afternoons, read up your case, then investigate and find out whether it shows all the features that are described in the book. Whatever you require after you have conscientiously tried yourself, the house-surgeon, the assistant surgeon or the surgeon is

there to help you further. But to do nothing yourself and expect the teacher to talk to you like a gramophone is suicidal to your development of intelligent reasoning and observational powers. The daily case-notes are also of the same quality. The temperature chart is merely filled up regarding temperature, pulse, respiration, and motions, and finally some remark is added like "the patient slept well". This is no real observation. Some of you who are following this routine, when you look back, will say "oh, what a pity that we did not use our opportunities".

SYMPATHY TOWARDS THE PATIENT

*The hospital is meant for poor people, people who often starve, people who are ignorant. It is because such people come to the hospital that you are afforded an opportunity to study disease. That they are poor, that they are ignorant and often dirty is not their fault. They are at their best according to their means. They do not lead luxurious life that you lead and they have no pleasures like feasts and cinemas to look forward to. You can often mitigate their sufferings and make them happier by a kind word and by kind treatment. Remember always that they are as much human beings as you are, only that they are doubly unfortunate—they are poor and they are diseased. A kind word and a sweet smile cost you nothing and it will repay you a hundred-fold afterwards when you start your practice, because it will be by then a second nature with you to express sympathy. Believe me, your patients need sympathy as much as they want your medicine or your treatment.

KEEP FIT

Medical life both during its apprenticeship and afterwards is a pretty strenuous life. Hours are irregular and you have to be at the beck and call of patients day and night. In order that you should meet all these demands you must keep fit. In Poona I see happily that the conscience for physical fitness is manifest to a great degree. You who live in this atmosphere need therefore no exhortation from me. At this stage of your life, not only have you to acquire knowledge but also physical fitness to make yourself useful to the profession and our country.

I thank you all for listening to me so patiently and I am very glad to have had the opportunity of visiting this institution and meeting you all.

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 members of the Association. The numbers given against their names indicate their membership roll numbers—Ed., I. M. J.]

Punjab—June 1939

- 144 Dr. Gopal Das, General duty, Civil Hospital, Multan to New Central Jail Hospital, Multan.
1338 " Hari Kishen Nangia, General Duty, Civil Hospital, Multan to Mithankot Dispensary, Dera Ghazi Khan Dist.
1958 " Nur Muhammad, Canal Dispensary, Raya, Amritsar District to Sahiwal Dispensary, Shadpur District.

- 3509 Dr. Muhammad Shariff Khan, General duty Civil Hospital, Amritsar, engaged as a temporary Sub-Assistant Surgeon.
574 " Balmokand Nehru, Raikot Dispensary, Ludhiana District, to General duty, Civil Hospital, Ludhiana.
2973 " Ata Ullah Khan Chima, General duty, Civil Hospital, Multan to Canal Dispy. Rashida, Multan Dist.
1939 " Mul Chand, extension of 2 months leave on medical certificate.
746 " Jiwan Das, Second Class Senior, General duty, Civil Hospital, Gurgaon to Jail Hospital, Ludhiana.
259 " Chabil Das, Second Class Senior, Sub-charge, Civil Hospital, Ludhiana, to City Dispensary Sialkot.
2951 " Nur Ahmad, General duty, Civil Hospital Karnal, Karnal, to Ladwa Dispensary in the same district.
1265 " Facir Chand Bhandari, to Rahon Dispy., Jullundur Dist. on expiry of leave.
633 " Mul Chand, 1st Class Senior, retired on expiry of leave.
3527 " Naranjan Singh Gosal, General duty, Civil Hospital, Hissar to Sohna Dispy., Gurgaon Dist.
3505 " Ghulam Mustafa Ahmady, General duty, Civil Hospital, Amritsar, to Canal Dispy., Bhatinda, Ferozepore Dist.
1597 " Beant Singh, granted extension of 1 month's leave on medical certificate.
2260 " Iqbal Ahmad II, Khol Dispy., Gurgaon Dist., to Alirazabad Dispy., Lahore Dist.

U. P.—June & July 1939

- 1120 Dr. Bhanwar Lal Sharma, Jail & Police, Fyzabad, invalided.
227 " Ram Archa Suren from leave to Jais.
1656 " Chintamani Anthwal from Kandi to Okhimath.
2374 " S. L. Kapoor, from Central Jail, Lucknow, granted leave two months, from 10-6-39 to 9-8-39.
397 " Rikhab Chand, Jail & Police, Unao, granted two months' leave, from 9-6-39 to 8-8-39.
1812 " Nawab Ali, Mahoba, granted leave 1 month and 15 days, from 19-6-39 to 2-8-39.
227 " Ram Archa Saran Bhatnagar, from leave to Jais.
1497 " A. S. Attrey, Reserve duty, Gonda, to Jail and Police, Hardoi.
2639 " Ambika Prasad Dube, Secrole, Benares to leave 4 months m. c. from 19-5-39 to 18-9-39.
1329 " Gokran Prasad Sarina, Dist. Jail, Sultanpur, to leave.
2626 " Nand Lal Ghosal, Madhotanda, Pilibhit to leave 2 months m. c. from 4-7-39 to 3-9-39.
3444 " Triloki Sahai Saxena, Bazpur, Naini Tal, to leave.
2433 " Chandan Swarup Gupta, Reserve duty, Shohratganj, to Shohratganj, Basti.
2516 " Sheo Lal, Jail Hospital, Ghazipur to leave 1 month and 18 days from 14-7-39 to 31-8-39.
207 " Jagmohan Mehrotra, Fatihabad Dispy., Agra, to leave 15 days from 11-6-39 to 25-6-39.
1675 " Kameshwar Nath Johri, Peranpur Dispy., Pilibhit, to leave 15 days from 14-8-39 to 28-8-39.
409 " A. B. Endlaw, Bilgram, Hardoi, to leave 6 months from 8-6-39 to 2-12-39.

Bengal—May & June 1939

- 3404 Dr. Sailendra Nath Choudhury, Sadar Hospital, Krishnagar, Nadia, held charge of the Moharpur Sub-division & Dispensary on 19-4-39.
128 " Surendra Nath Biswas, Jail Hospital, Barisal, held charge of the Bhola Sub-division and Dispensary, on 17th and 18th April 1939.
1352 " Bhuvan Mohan Sen Gupta, Demonstrator of Anatomy, Ronaldshay Medical School, Burdwan, held charge of the Asansol Sub-division and dispy. from 2nd to 6th June 1939.
100 " Karunamoy Benerji, Police Hospital, Rajshahi, held charge of the Naogaon Subdivn. and dispy. on 2nd and 6th June 1939.
1304 " Paritosh Kumar Mukherjee, Demonstrator of Physiology, Ronaldshay Medical School, Burdwan, held charge of the Kalna Subdivn. and dispy. on 17-6-39.
" " do. held charge of the Asansol Subdivn. and dispy. on 6th and 7th June 1939.
1078 " Priya Nath Ghosh, Sadar Hospital, Rangpur, held charge of the Kurigram Sub-divn. and dispy. on 9th, 10th & 26th June 1939.
1352 " Bhuvan Mohan Sen Gupta, Demonstrator of Anatomy, Ronaldshay Medical School, Burdwan, held charge of the Katwa Subdivn. and dispy. on 13-6-39.
1892 " Jayanta Kumar Bose, Jail & Police Hospital, Pabna, to Diamond Harbour Subdivn. and dispy. 24 Pargs.
" " do. held charge of the Serajganj Subdivn. and dispy. on 21-6-39.
3405 " Roma Nath Biswas, Demonstrator of Anatomy, Campbell Medl. School, Calcutta, to Naxalbari Dispy., Darjeeling.
2211 " Pramotha Nath Ghosh, R. M. O., Mitford Hospital, Dacca, held charge of the Manikaganj Subdivn. and dispy. from 27th to 29th June 1939.
" " do. held charge of the Munshiganj Subdivn. and dispy. on 4-7-39.
3105 " Abinash Chandra Nag, Demonstrator of Anatomy, Chittagong Medl. School, held charge of the Cox's bazaar Sub-divn. and dispy. from 27-4-39 to 10-5-39.
1299 " Sisir Kr. Sinha, Demonstrator of Pathology, Ronaldshay Medl. School, Burdwan, held charge of the Kalna Subdivn. on 27-6-39.

operated upon for purposes of deposit and withdrawal under the General Secretary, the Treasurer and the Secretary, Finance Committee, and not otherwise, subject to the specific resolutions of the Property Committee.

Further resolved that all documents concerning the reserve funds of the Association in any form whatsoever, at present in the custody of the President shall be deposited in the Imperial Bank of India, Delhi, with instructions to the said Bank to collect and credit into the Association account interest falling in respect of each Government Bond and transactions, and that the postal savings account, at present operated on by the President shall be transferred to the current account at the Imperial Bank of India, Delhi."

Ref. Circular No. 25

"Resolved that the last election of the Bombay Provincial Branch conducted by the Provincial Secretary, Bombay, is null and void and he be directed to hold a fresh election as per resolution of the Standing Committee in pursuance of circular No. 25 of the General Secretary. Votes in favour 11, against 1. The resolution is therefore carried"

Tingri Valley (Assam): Proceedings of the meeting of the above branch held on the 16th July 1939 at 3 p. m. at Keyhung Indian Club with Dr. D. D. Sarma Baruah in the chair. Eleven doctors were present.

1. Proceedings of the last meeting were read and confirmed.

2. Circular No. 7 from the Provincial Secretary and the extract of the proceedings of the last sitting of the Assam Medical Council were read before the members.

Circulars Nos. 19, 20 and 21 from the General Secretary were read and considered.

3. The following scientific discussions were held:—

(a) Dr. D. Sarma Baruah described a case of abnormal manifestations due to round worm infection.

(b) Dr. A. T. Roy described an interesting case of pneumonia complicated by empyema, dysentery and anaemia. The anaemia of this particular case resisted iron and Campolon treatment but improved with rice-polishings and banana.

(c) Dr. S. C. Dutta described his experience on treatment of pneumonia by M & B 693 in a short series ten cases, treated in Itakhooli T. E. Hospital.

(d) Dr. H. C. Das described the following cases:—

(i) An interesting case of hysteria.

(ii) A case of gonorrhoeal septicaemia treated successfully with Sulphonamide-P.

(iii) A case of intermittent fever without any other diagnostic finding or history of amoebiasis, which responded nicely to Emetine-treatment.

All the members joined in the discussion.

Nadia (Bengal): A monthly meeting was held on 9-7-39. 9 members were present.

Proceedings of the last meeting were read and confirmed. Circulars Numbers 19 and 20 dated 4-6-39 from the General Secretary were read and all the members were requested to act according to his valuable suggestions.

Scientific discussions on some surgical cases were made by the members present.

Monthly accounts for June 1939 were examined and passed unanimously.

Madras: Proceedings of the Managing Committee Meeting of the above Branch held on 12-6-39 at Woodlands, Royapettah at 6 P. M. with Dr. T. V. Ranganatha Rao in the chair.

ASSOCIATION NOTES

Proceedings printed below refer only to the Committees and Branches of the All-India Medical Licentiate's Association, unless otherwise stated.

STANDING COMMITTEE

Ref. Circular No. 23

The following amended resolutions are passed unanimously by the members of the Standing Committee, by 14 votes in favour and against nil.

"Resolved that in future all reserve funds of the Association in deposit with any bank, including Postal Savings Bank Account in the form of cash and postal certificates, Government bonds, Government Securities and the like documents held by the President shall be

(i) The minutes of the last Managing Committee Meeting were read and confirmed.

(ii) The accounts for the month of June and July upto 12th aggregating to a sum of Rs. 12-1-3 (Rupees twelve annas one and three pies) were passed unanimously.

(3) Resolved that the Surgeon-General be congratulated for having sanctioned uniform allowance of Rs. 25/- for medical graduates and licentiates without invidious distinction between these two classes of medical men.

(4) Resolved that His Excellency be congratulated for having amended the rules G. O. No. 169 P.H. dated 18-1-39.

(5) The letter from Dr. P. Srinivasan, M. L. A., was put before the house and it was resolved to wait on a deputation with the Hon'ble Dr. T. S. S. Rajan, Minister for Public Health, and the Secretary had been authorised to fix up the date for the deputation.

Mymensingh (Bengal): A meeting was held on 26-6-39. 4 members were present.

Contingent bill amounting to Rs. 12-3-0 was discussed and unanimously passed.

Discussion about recent Government circular regarding appointments in four medical schools—the matter was postponed.

Simla (Punjab): Meeting held on 28-5-39. 6 members were present.

Proceedings of the last meeting were read and confirmed. Drs. Abdul Karim and Ram Nath Sharma were unanimously elected as President and Vice-President respectively for 1939-40; Dr. Mohamed Yousaf Khan to continue as Secretary and Treasurer.

Considered the letters received from the Provincial and General Secretaries and the following resolutions were unanimously passed:

"(1) that this meeting protests against and resents the unjustifiable remarks of Dr. J. J. Cursetji against the medical licentiates contained in the *Insurance World*, February '39, Pp. 265-67, and informs the insurance companies in the country that Dr. Cursetji's opinions are not those of the organised profession, as will be evidenced from previous resolutions on this subject by both the A. I. M. L. Association and the I. M. Association.

(2) that this Branch requests the I. G. C. H., Punjab, that the recommendations of Civil Surgeons' Conference on points affecting the interests of medical licentiates in the Punjab Province may be forwarded to the Government for consideration and action after the opinion of the A. I. M. L. A., Punjab, has been gathered over these points.

(3) that this meeting reiterates the demands contained in the memorandum submitted to the I. G. C. H., Punjab on 25-4-38 and the Hon'ble Minister for Education on 27-10-38, by a deputation of the Provincial Branch of A. I. M. L. A. and prays for an early and sympathetic consideration to remove general discontent.

(4) that this meeting expresses its satisfaction over the nomination of one of the members of its class to the governing body of the provincial state medical faculty.

(5) that this meeting appreciates the action of the authorities concerned in raising the standard of medical education in the Medical School, Amritsar, to satisfy the requirements laid down by the Medical Council in India.

(6) that this meeting congratulates Col. P. B. Bharucha, O. B. E., D. S. O., I. M. S. on his appointment as I. G. C. H., Punjab and hopes that the task of introducing reforms in the standard of medical education at the Amritsar Medical School and the upliftment of the class of medical licentiates, so zealously taken up by his predecessor, Col. G. G. Jolly, C. I. E., I. M. S., would be given further impetus by him till the desired results are achieved.

(7) that this meeting expresses its deep debt of gratitude to the untiring zeal and interest taken by the Principal, Medical School, Amritsar—Major S. M. K. Malik, I. M. S., in improving the standard of medical education in that school."

Hissar (Punjab): Special meeting held on 30-6-39. 13 doctors attended.

The minutes of the last meeting held on 14-5-39 were read and confirmed.

Read circular letter No. 20 from the G. S. This Branch is doing its most to achieve the objectives. The non-members

are requested to become regular members. The Branch Secretary should approach such gentlemen to enlist them.

Read circular letter No. 19 from the G. S. Seven doctors responded to appeal from the Branch Secretary and subscribed for the Fund.

Dr. Jhanji Ram, the Branch President, is at present availing leave prior to his retirement and is settled in Delhi. Resolved that Dr. Jhanji Ram be requested to resign if he had no interest to return to this district and that Dr. Prithi Singh be provisionally elected as President of the Branch.

Resolved that this committee approves of the action of the Branch Secretary regarding the steps taken for arranging the farewell to the retiring civil surgeon, Dr. Bhagwan Dass Taneja, Patron of the Association. But in view of the confusion created on account of a simultaneous act being initiated by the licentiate doctors on famine duty under the leadership of their captain on the same date as fixed by the Secretary, a sub-committee consisting of Drs. Perthi Singh, S. C. Rawal, Chama Lal and Kanshi Ram is constituted to decide on such matters in future and that the decision of this sub-committee shall be binding on all the licentiates serving in the district.

Resolved that after defraying the expenditure incurred in connection with the farewell, the amount as falling due against the individual S.A.S. should be kept in their names as their half-yearly contribution to the local fund as per Branch resolution No. 5 dated 17-7-38 and that the licentiate-members or non-members of the district should be requested to contribute to the local fund.

The postage account of the Branch as checked was passed. Resolved that the same be forwarded to the G. S. for payment.

Dr. Prithi Singh and Uttam Chand paid their annual subscriptions.

Dr. Khanshi Ram agreed to renew his membership.

All the doctors met and bid farewell to the retiring civil surgeon, Dr. Bhagwan Dass Taneja.

MEDICAL COUNCILS

BENGAL COUNCIL OF MEDICAL REGISTRATION

As a result of election under Sec. 4, clause h, of Bengal Medical Act, Dr. A. D. Mukherji of Calcutta, Rai Saheb Dr. S. C. Gupta and Dr. J. K. Chakravarti of Mymensingh have been elected to the Council. Dr. Mukherji got overwhelmingly large number of votes and is re-elected for the fourth time in succession.

STATE MEDICAL FACULTY OF BENGAL

The Bengal Government has at last recognised the claims of the licentiates of Bengal by nominating Dr. A. D. Mukherji, President, Bengal Provincial Branch of our Association, to the governing body of the State Medical Faculty, which was reconstituted in July 1939. This is the first time a medical licentiate is admitted to this body.

Punjab Medical Council

UNQUALIFIED MEDICAL PRACTITIONER CONVICTED.

Mehar Chand an unqualified medical practitioner of Dina Nagar, District Gurdaspur, has been convicted under section 23 of the Punjab Medical Registration Act and sentenced to pay a fine of Rs. 5/- by a first class Magistrate of Gurdaspur. The accused unlawfully styled himself as a registered medical practitioner.

UNITED PROVINCES MEDICAL COUNCIL, LUCKNOW.

The complete list of registered medical practitioners will be sent for publication on January 1, 1940. All registered medical practitioners are requested to communicate by November 30, 1939, their correct addresses and appointments, if any to the Registrar, United Provinces Medical Council, Lucknow. If they have ceased to practise, the fact should specially be mentioned. When addressing the Registrar the number of registration certificate should kindly be invariably stated.

LETTER TO THE EDITOR

THE ROBERTSON MEDICAL SCHOOL, NAGPUR.

The only medical school in C. P. and Berar will be facing vast change in its curriculum from this year. The following changes are contemplated:—

(a) Examination in Pathology will be henceforth (from Oct. 1940) conducted by the C. P. Medical Examination Board. The students are not very sorry but for the next change, that—

(b) The final year students will be required to appear henceforth in six subjects at a time viz., (1) Pathology, (2) Hygiene (3) Jurisprudence, (4) Midwifery, (5) Surgery and (6) Medicine.

Thus after passing the Intermediate Examination the student is free from examinations in the third year. He will have to attend the classes in those subjects for two years, besides his ward duties. Before this change, the students finished their Pathology in the third year and Hygiene and Jurisprudence six months after that and in the final year they appeared in Midwifery, Surgery and Medicine only. Students had no complaint against this. Anatomy is the body of Medicine, Physiology is the mind, of and Pharmacology is the soul of medicine. Hence these subjects can never be separated. They must go side by side with the final year subjects. So we wish that we should be examined in nine subjects instead of six only. We hope that the Board will kindly consider our humble request.

(c) Students (matriculates) of 1st year admitted in July shall be required to appear in examination in October 1939 in (1) Biology and (2) Science, and in their second year they will complete the examination of these pre-medical subjects. Students who enter hereafter

having at least Intermediate in Science qualifications are exempted and can thus finish their medical studies in 3½ years.

These changes seem to be quite beneficial but all will depend upon the future results.

In this institution there is no concession for sisters or brothers as regards the tuition fees. In support of this the Students' Union passed a resolution unanimously. The authority's reply is that as there are no such rules this concession cannot be granted. For this we request the members of the Board to make an amendment, if possible, very soon.

The last but the most important thing concerns the vital problem of some of the students of the second year. There are about fourteen students who appeared in the examination during this month i. e., October 1939 for the fourth time, which is their last chance. If they pass so much the better, otherwise they will have to give up the idea of continuing medical studies for good and shall have to bid good-bye to this institution where they spent a lot of money and time. The board is requested to consider their case with sympathy.

RANJIT DATTA,

Student

28-9-39.

Robertson Medical School, Nagpur, C. P.

NOTICE

The Second Annual General Conference of the Association of Surgeons of India will be held in Madras on 28th, 29th and 30th December 1939. Details as to conditions of membership of the Association and other particulars can be obtained from the Honorary Secretary, 'Binfield', Poonamallee High Road, Kilpauk, Madras.

CONSOLIDATED ACCOUNTS OF THE ALL-INDIA MEDICAL LICENTIATES' ASSOCIATION FOR THE MONTH OF JUNE 1939.

Receipts			Payments		
		Rs. A. P.			Rs. A. P.
To Subscription (old and new)	...	657 0 0	By Printing I. M. J.	...	471 12 8
" Advertisement	...	940 8 6	" Establishment	...	421 0 0
" Interest	...	183 5 4	" Office Rent	...	50 0 0
" Miscellaneous Rs. 2/8/0, Loan from Gen. Secy. Rs. 54/10/6	...	57 2 6	" Stationery	...	2 13 9
Total	...	1838 0 4	" Travelling allowance	...	71 11 0
Balance from last month	...	63050 11 4	" Postage etc.	...	202 14 9
Grand Total	...	64888 11 8	" Miscellaneous	...	69 13 6
DETAIL OF BALANCES					
13 Shares of Bacterio Clinical Laboratory Ltd. (1936)	...	85 0 0	" Other Printing	...	...
New Loans	...	8200 0 0	" Propaganda/work	...	5 0 0
5 Years Postal Cash Certificates	...	6511 14 0	" Expenses for Branches	...	64 14 0
G. P. Notes	...	10891 9 0	" Furniture	...	...
10 Govt. Bond for S. S.	...	10000 0 0	" Audit fee	...	...
Govt. Bond for 1943	...	5600 0 0	" Payment to Contributors	...	70 5 0
With Dr. S. P. Sen Gupta, Ex-Manager I.M.J.	...	793 12 1	" Advt. Commission	...	9 0 0
Omera Gold Medal account	...	362 10 3	" Loan returned to G. Secretary	...	242 2 0
Postal Savings Bank with President	...	2155 3 11	Total	...	1681 6 8
With Branches	...	177 8 0			
With Editor:—					
In hand	17 7 9				
In Bank	1051 2 2				
In Stamps	150 10 9				
With Ex-Gen. Secy.:(Dr. U. B. Narayan Rao of Bombay.	...	1219 4 6			
With Treasurer:—					
In hand	113 0 0				
In P. N. Bank	65 15 9				
In P. S. Bank	17028 7 6				
Total	...	17207 7 3	Balance in hand	...	63207 5 0
			Grand total	...	64888 11 8

All-India Medical Licentiates' Association Family Fund

STATEMENT OF ACCOUNTS FOR THE MONTHS OF MARCH, APRIL, MAY, JUNE, & JULY 1939.

RECEIPTS.	March 1939	April 1939	May 1939	June 1939	July 1939	PAYMENTS.	March 1939	April 1939	May 1939	June 1939	July 1939
Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Balance brought forward from last month's a/c	604 9 0	521 14 0	485 15 6	444 13 6	223 9 6	By Office Establishment	17 3 0	25 0 0	50 0 0	25 0 0	...
To death calls Nos. 171-175	...	...	5 0 0	...	...	do. paid in advance	...	0 10 6	...	4 10 9	...
" " 183	...	...	1 0 0	2 0 0	...	Stationery	33 2 0	20 0 0	0 1 0	0 5 0	...
" " 184	...	...	1 0 0	2 0 0	...	Printing charges	33 0 0	...	40 8 0	...	...
" " 185	...	1 0 0	2 0 0	2 0 0	...	Postal Commission	0 14 0	...	...	...	...
" " 186	...	1 0 0	2 0 0	2 0 0	...	Miscellaneous	...	0 4 0	...	...	1 14 0
" " 187	...	2 0 0	3 0 0	3 0 0	...	Death calls paid	...	25 0 0	12 9 0	1 0 0	...
" " 188	...	3 0 0	4 0 0	5 0 0	...	Deposits returned	...	...	147 8 0	263 9 0	180 14 0
" " 189	...	4 0 0	5 0 0	5 0 0	...	Furniture	32 0 0	...	...	...	1 0 0
" " 190	...	6 0 0	5 0 0	4 0 0	...	Balance in hand	521 14 0	485 15 6	444 13 6	223 9 6	56 13 6
" " 191	...	8 0 0	5 0 0	7 0 0	...						
" " 192	...	...	103 0 0	19 0 0	2 0 0						
" " 193	...	...	...	...	6 0 0						
To further calls in advance	1 0 0	...	38 0 0	19 0 0	5 0 0						
" deposit	...	3 0 0	3 0 0	...	3 0 0						
" admission fees	3 8 0	13 0 0	3 0 0	...	...						
" cost of certificate	...	1 0 0	0 8 0	...	...						
" postage (advance)	...	...	...	4 10 9	...						
Rs. ...	638 1 0	546 14 0	695 7 6	523 8 3	239 9 6	Rs. ...	638 1 0	556 14 0	695 7 6	523 8 3	239 9 6



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Indian Medical Journal,
A. VISWANATHAN,
Managing Editor.

October 15, 1939.

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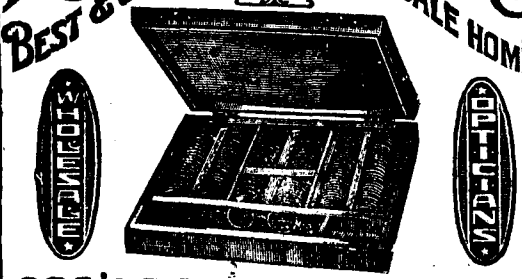
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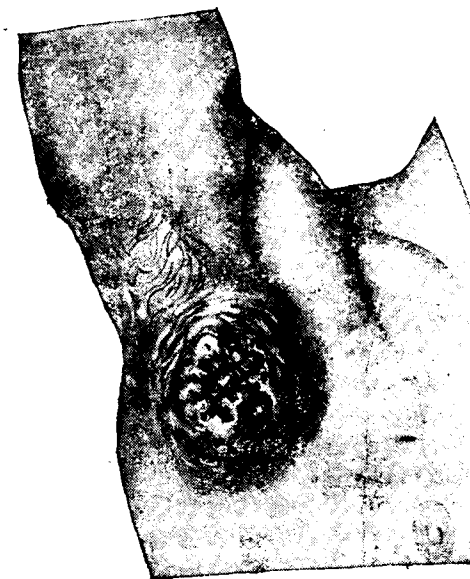
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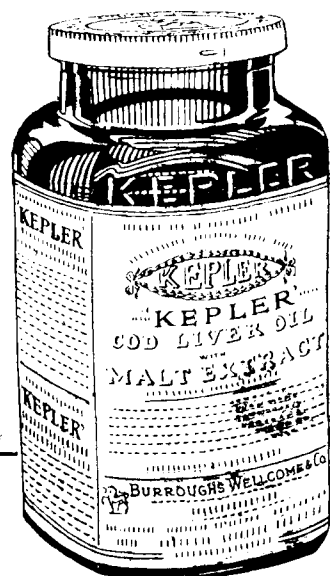


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CHILDREN ENJOY ITS DELICIOUS FLAVOUR



THE Indian Medical Journal

Vol. 33 | MADRAS: Oct. 1939 | No. 10

War Crisis and Our Journal

Owing to the outbreak of war, newsprint has become scarce and costly. Most of the city's dailies and other periodicals are now published in reduced volumes. Our *Journal's* stock of paper would last only for 6 months, and we have no other go but to conserve it for a longer time by reducing the volume of the *Journal* from the usual 84 to about 60 pages per issue.

The *Journal* has been wholly supporting itself so far on its own income, while its subscription revenue was entirely at the disposal of the Association for Association work. But we are not sure whether this happy position would continue under the present crisis, as the *Journal's* business is bound to be shy and foreign bills would be delayed by many months in collection, apart from losses in exchange rates.

We are trying our best to exercise strictest economy on all sides in consultation with the President and the General Secretary of our Association. We hope yet to tide over all difficulties, and in this task we earnestly solicit the co-operation and good-will of our subscribers, branch secretaries, contributors and advertisers—Indian and foreign.

The branch secretaries are requested to curtail considerably the proceedings of meetings intended for publication.

The contributors are requested to bear with us a little while if their contributions are delayed publication which is inevitable owing to the temporary reduction in the size of the *Journal*.

Our British and American advertisers may receive their voucher copies late owing to disorganization in steamer service. They are requested to clear our bills as early as possible and our Association will be indebted to them for this timely obligation.

Our Indian advertisers will receive their voucher copies as promptly as before, but they are also requested to dispose off our bills expeditiously. To them again our Association will be indebted for this act of timely help and co-operation.

The Managing Editor will consider no sacrifice too great to make on behalf of the *Journal*, and he has already imposed on himself a voluntary reduction in his honorarium. Other efforts at economy are also being made to meet the situation.

It is expected that as a result of these arrangements, the *Journal* will continue to be

self-supporting as before without drawing on the tender resources of the Association. We have every hope that this call for co-operation will spontaneously be responded to by all the well-wishers of the Association and its *Journal*.

A. VISWANATHAN.

War and Our Duty

Peace loving nations have been unwillingly drawn into a stupendous war by the present hysterical ruler of Germany—Herr Hitler—who by sheer force has broken international agreements to which he was a signatory, and terrorised his neighbours and annexed their territories to the Reich. No nation is in a position to trust his word today.

The labour of peace-makers has come to nought and the world has been involved in a great calamity unparalleled in its history by the passions of a single individual.

Apparently this but affects European nations, but really all the nations of the world—West or East—cannot for long remain unaffected, because truth, equity and justice are put in jeopardy by the greed of a single man.

India has to share the burden of this conflict by virtue of her spiritual heritage and national needs. Every nation is on the threshold of a difficult ordeal today, and ours must go through it with strength and courage.

We of the Indian Medical Profession must help Britain and her allied democracies with a willing heart and a ready hand. The people and princes of India have responded magnificently. Medical men also must respond likewise, because they are needed most to relieve the physical suffering of the wounded in the war. We are a band of missionaries and we must respond to this call of duty without any kind of political or personal considerations.

We appeal to the members of our Association, and of the profession at large, to volunteer their services to whatever duty they may be required to render by the Provincial and Central Governments.

Great and spontaneous was the response of the members of our Association in the last War, and the monuments of their dead are standing proudly in many of the medical schools of our country. Let us share the glory of service this time also.

We assure the Government of our unstinted help, and we hope the response will be great enough to ease any anxiety of our Government in respect of the medical needs of our army.

DR. D. V. VENKKAPPA,
President.

DR. MANOHAR LAL KAPUR,
General Secretary
All-India Medical Licentiates' Association.

RECENT ADVANCES IN CHOLERA

The cholera pandemic of 1865-1875 which originated, as in the previous pandemics, in the low lying deltaic areas of Bengal, spread like wild-fire to Europe and Western hemisphere. Since then, our country, particularly Bengal, has been spotted out as the chief endemic home of cholera in the world, and other nations have been looking to us for protection against this spread by our controlling the infection at the source. The eradication of cholera from our country has, therefore, become its special responsibility in the interest of our nation and others; and this has assumed an urgent importance owing to the incredibly fast means of communication which modern science has made it accessible to all and sundry, particularly in view of the oft-quoted aphorism that cholera can travel only as fast as man. It may be after all due to a mere concatenation of fortuitous circumstances that the rest of the world, except India, is free from cholera today, and the pandemic history may repeat itself at any unknown moment.

India has no desire to imperil other nations, and she has been grappling with the problem of cholera during the last fifty years with some amount of fair if not spectacular success, and this has been in direct proportion to the growth and development of public health and research organisations in our country. That complete success at eradication has yet not been attained is proved by the sickening regularity of our annual cholera epidemics in almost all the provinces. But this is due not to the want of genuine, serious and concerted attempts but to the difficulties intrinsic to the researches in cholera. It happens that man alone is susceptible to this disease. This means that field experiments and observations are of greater primary and basic importance than animal experiments in the laboratory. This in turn means time, labour, money and extensive organization. Again, the nature of the cholera vibrio has uptill now resisted all attempts at its elucidation. It is no wonder, therefore, that although the output of cholera research in our country has been commendable both in quality and quantity, yet a review of the literature for the last 20 years shows but incomplete conclusions, contradictory observations, and inconsequential controversies. This, to our mind, is not an unnatural development if one does not forget the mystifying nature of the cholera vibrio, and the utter honesty and sincerity of the research

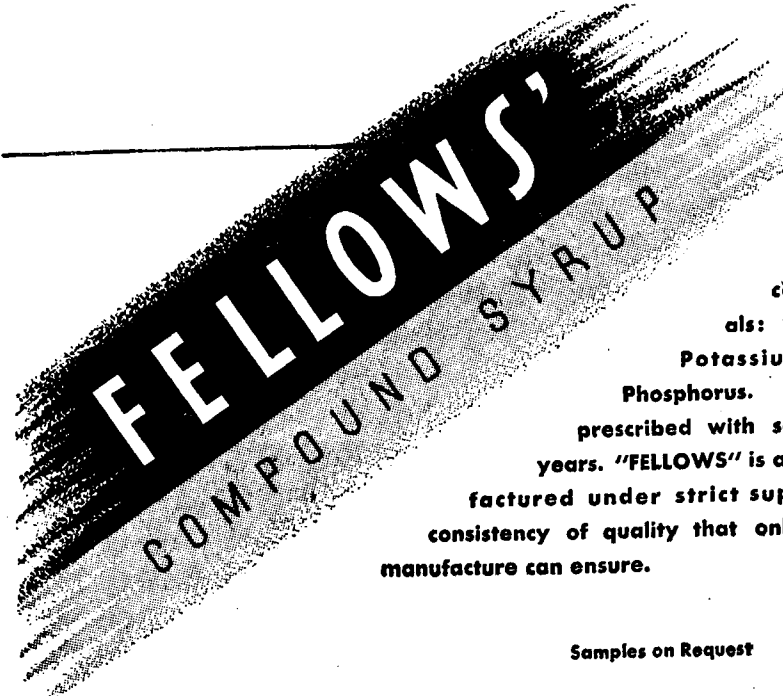
workers who rightly resist the temptation of arriving at premature conclusions. Nevertheless it is still true that all the researches on this subject have not been in vain, and there are certain advances which deserve recognition and which are certainly capable of showing the way to the final truth. Some of these recent advances are reviewed in this article.

The Cholera Vibrio

It is not our intention in this leading article to indulge in an academic discussion as to the true nature of the cholera vibrio, or to pronounce a judgment on this question with the help of the now available evidences. It is acknowledged by those who are qualified to express an opinion that the problem of the true nature of cholera-vibrios remains yet unsolved. We think they are right. The only best way of presenting this aspect of the subject to our readers would be to place before them the important developments in chronological sequence.

Koch discovered and isolated the cholera vibrio from a case of acute cholera in about the year 1833, and having seemed to have satisfied his own postulates he declared it to be the true and specific cause of cholera. Ten years later, Frankel questioned the value of Koch's guinea-pig experiments, and d'Herelle in 1930 wrote strongly that the vibronic peritonitis induced in the experimental animal had nothing to do with cholera, that it was a fictitious disease and pure laboratory artifice and that all the deductions so far drawn on the strength of animal experiments corresponded to nothing real. Lloyd Arnold, in the same year, however proved that cholera vibrio injected into the duodenum of rabbits in alkaline buffered phosphate solution instead of in saline did produce diarrhoea and death in the experimental animal, and vibrio cholera was recovered from its intestinal tract and other organs. Thus a new question of host susceptibility to cholera was raised. But this by no means materially contradicts the present-day belief that man only among the animals is susceptible to cholera, and that the results of animal experiments belie the true nature of cholera infection in man.

The next stage in the study of cholera is the discovery of cholera vibrios from non-choleraic sources, and this discovery is further complicated by the fact that these vibrios bear a close resemblance to the true cholera vibrio in all respects except in serological reactions as has been developed and applied subsequently. Hankin in Europe, and Haffkin and Simpson in India (1895) were the first to observe such



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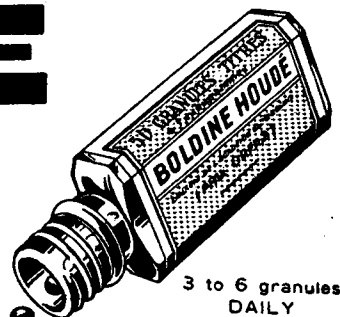
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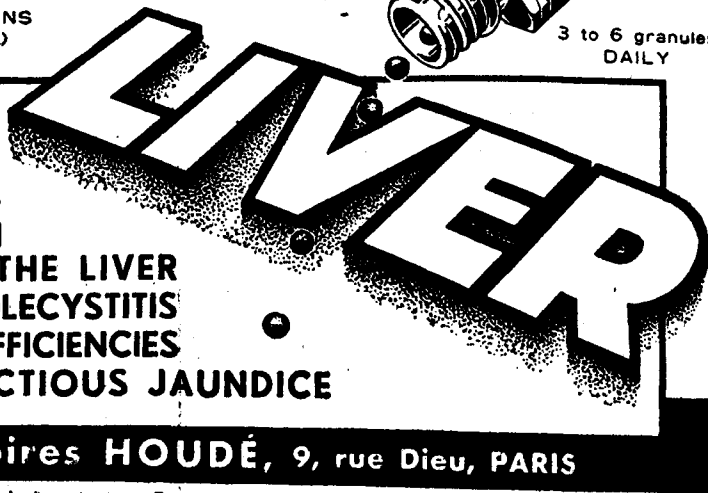
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RECENT ADVANCES IN CHOLERA

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vibrios, but they maintained that they were available only during and immediately after an epidemic of cholera. It is these vibrios which d'Herelle later on characterised as but the products of bacteriophagic action, by which the virulent, hæmolytic and agglutinable cholera vibrios became avirulent, non-hæmolytic and non-agglutinable post-choleraic vibrios. He further maintained that this mutation brought about by the action of bacteriophages was permanent and irreversible, and that therefore the post-choleraic vibrios played no important role in the epidemiology or epidemiology of cholera infection. He believed that water-vibrios found in non-choleraic regions or seasons had no relationship whatsoever with the true cholera vibrio.

The third stage in the study of cholera vibrio is the development of more accurate and reliable methods of bacteriological diagnosis by a subtly devised serological and chemical tests by which the extra corporeal phases of the vibrio can be exposed in true colour. Gardner and Venkatraman (1935) gave the "O" serology test by which the infectivity of the vibrio could be clinched, and Linton in the same year propounded his chemical classification of the vibrio, since even "O" serology tests gave wide variations in results. Seal wanted to combine both these tests as a basis for classification of the vibrios into different definite types, as is being done with the pneumococci and meningococci, and for preparing type-specification. Taylor and Ahuja (1938) found that water vibrios were found to be universally present, but they were of very heterogenous types as determined by biochemical and serological reaction. They therefore concluded that vibrios other than typical V.Cholera as defined by its characteristic "O" antigen, including strains which agglutinate with cholera "H" and "O" serum only, do not play a part in the ætiology of cholera.

The topical question whether the post-choleraic vibrios or the water vibrios found in nature could re-acquire or acquire afresh the typical and specific agglutinability of the true cholera vibrios thus remains unsolved. Even so early as 1927, Tomb and Maitra, while confessing experimental failure of converting the inagglutinable into the agglutinable vibrio yet maintained, corroborated by a limited clinical evidence, that the inagglutinable might become agglutinable under certain but as yet unknown biochemical-physical conditions in the human intestines, that this mutation was the cause of epidemic cholera, that the non-agglutinable vibrio was the

cause of endemic cholera, and that it was not unreasonable to assume that a characteristic so unstable might as easily be acquired as lost. We have to wait and see how far this is true.

Epidemiology

Various workers in India have studied the epidemiology of cholera and the results of these studies seem to bear close analogy to the shifting conception of the cholera vibrio. Till the time of d'Herelle's discovery of bacteriophage, it was complaisantly believed that infected water was the chief source of epidemic spread, that the cholera carrier was the villain of the piece and that the rise and fall of cholera epidemics could be explained satisfactorily by the theory of acquired natural immunity. Every bit of these beliefs was completely shattered by d'Herelle in his classic publication of THE STUDIES IN CHOLERA in 1930. He was supported by a host of co-workers such as Saranjankan, Lahiri, Psaricha and others. They all said that if cholera was water-borne, the vibrio should maintain its vitality for a reasonably long period, if not water could not be the chief source of the spread of infection. By a series of field experiments in the different epidemic areas of India, Hankin, Greig, d'Herelle and others found and proved that virulent vibrios when sowed in Indian waters of epidemic regions lost their virulence and agglutinability, and thus became atypical and that at the end of twenty-four hours did not survive at all. These they attributed to the contemporaneous action of specific bacteriophages which lysed the vibrios and thus modified their virulent characteristics. They did not however deny the truth that the vibrio could maintain its vitality for a long time in waters of virgin areas where cholera epidemic was unknown or had occurred after long intervals, and this again they attributed to the absence of bacteriophages in these areas, which have been observed to be present in relative abundance only during and after the epidemic periods, and to be totally absent in the virgin and non-epidemic areas or countries. Individual and collective immunity, according to these observers, was a myth; the individual's recovery and the subsidence of cholera epidemic were solely due to the beneficent influence of the bacteriophages; there was no such person as cholera "carrier"; the infection was actually spread only by the active cases of cholera, particularly in the initial stages, by promiscuous contact, or flies or such other means of dissemination. They did how-

ever admit the problem of endemicity still baffled them and d'Herelle suggested the possibility of the cholera vibrio finding a favourable extracorporeal habitat in the intestines of such aquatic animals as the annelid, crustacean or mollusc. Clinically, however, epidemics of cholera have been observed by some workers to arise from non-agglutinating vibrios, but these have not been authentically confirmed. There is something lacking in the now visible chain of evidence which has failed to establish the epidemiology and other closely related problems of cholera on an unassailable foundation. What it is time alone can reveal.

Treatment

In a disease which attacks the people *en masse* and becomes rapidly fatal, prophylactic treatment alone can offer the best means of prevention, at any rate of reduced mortality. Cholera inoculation, in proper time and in proper dose, has been so far hailed as the best weapon available, and a few reports of limited observations have confirmed the efficacy and utility of inoculation. But d'Herelle laughs at this make-shift belief and points with scornful irony to the fact that the recurring annual mortality and incidence bear little or no co-relationship to the increased and increasing numbers of inoculation. He challenges the rationale of inoculation on the ground that cholera has not yet been proved to give temporary or permanent, active or passive immunity as in the case of small-pox or typhoid. He deplores the futility of even the disinfection of water, and warns that this is a dangerous procedure as the chemicals would destroy the natural anti-cholera phages and thus keep the infection going. These are indeed views which seem to admit of no compromise, and he believes in and advocates strongly the sowing of highly potent and polyvalent strains and races of bacteriophages in all potable waters, and prophylactic doses of the same to communities exposed to the dangers of epidemic cholera. Recent studies on cholera phages have revealed various types A to M, designated in the manner of vitamin description, and it has been observed that cholera phages in nature are of the quick acting type A while B, C and others die out in nature. Besides, Pasricha and others (1932) have shown that under the influence of certain races of bacteriophage, the inagglutinable vibrio may become agglutinable and thus become indistinguishable from the authentic cholera vibrio. It becomes thus obvious that care and judgment are necessary in the prepa-

ration of therapeutic bacteriophages. This method of prophylaxis has not however gained ground in our country, and the public health authorities are still continuing to issue cholera vaccine, although their annual reports reveal favourable results with cholera phage in selected experimental areas. Probably this caution is justified lest they may be accused of misusing public money.

The treatment of an actual case of cholera requires consideration of the best methods to inhibit multiplication of vibrios and to eliminate or neutralise toxins. The premonitory diarrhoea indicates two things, one that the specific bacteriophages are not yet mobilised, and the other that the vibrios are still in the lumen of the intestines and have not yet penetrated the intestinal mucosa. This is the best period to attack effectively the vibrios. The moment the cholera vibrios penetrate the intestinal mucous membrane, then only, but not before, the typical symptoms of cholera appear, viz., dehydration and toxæmia—dehydration due to purging and vomiting, and toxæmia due to the absorption of cellular exudates and or to the still untraced cholera toxins. This is the period of greatest danger and call for heroic remedies. The older methods to tackle the first period are the administration of acidulated antiseptics such as potassium permanganate, Tomb's essential oil mixture, and the like. The newer method is to administer potent and polyvalent specific bacteriophage till diarrhoea and vomiting stop. A number of reliable workers have spoken well of this measure with a surprising unanimity, and it may, therefore, be taken for granted that the older methods would soon lose their appeal. It is now possible to administer even intravenous bacteriophage according to the severity of the case, but it must be clearly understood that while it certainly destroys the living cholera vibrios it can by no means neutralise the toxins already produced in the body or cure the organic lesions brought about by the vibrios and their toxins. The latter has necessarily to be treated by saline alkaline transfusion, hyper or isotonic, according to the specific gravity of the blood and the blood pressure. Bacteriophages can advantageously be combined with saline transfusion. Complications such as extreme collapse, uræmia, heart-failure and oedema of the lungs require appropriate treatment on the usual lines.

What remains to be mentioned is the possibility of preparing and using a potent anti-cholera serum. But so long as the nature of cholera toxin is not clearly analysed

and understood there seems to be little hope of successfully evolving an effective anti-cholera serum. The attempts to prepare a specific anti-cholera serum from convalescent cholera cases and cholera culture filtrates have not met with uniform success. But if this is possible, as the 1934 report of the Calcutta School of Tropical Medicine observes, a potent cholera anti-toxin combined with bacteriophage treatment would constitute the ideal method of treating cholera.

Conclusion

The present review is by no means exhaustive. The literature is too vast and the opinions are so conflicting that it is not possible to assemble them in an effective summary. Only a broad outline has been attempted and important land-marks are indicated. The cholera vibrio has yet to reveal to our view the complete cycle of its life. Consequently we are forced to mark time and be satisfied with incomplete knowledge. d'Herelle's bacteriophage has given us a new conception of the life of the cholera vibrio and a new weapon to stem its depredations, and like all first discoverers he is over-enthusiastic and over-confident of this secret he has unearthed from Nature. There is no doubt that bacteriophages are a living reality, and indicate perhaps a system of cosmic beneficence to which humanity is subject without its knowledge and seeking. From the scientific point of view, the bacteriophage has by itself become a complex problem—the extent of its prevalence, the degree of its adaptability, the nature of its pleomorphism, the limit of its lethal effect on offending bacteria remain unassayed with scientific precision. We would therefore warn our readers against premature and impetuous conclusions, but they are certainly free to make use of such of the advances in the treatment of cholera as they think best. Bacteriophage therapy is unique in one respect: it is absolutely non-lethal to man. It may or may not be effective—this depends on many factors—but it is absolutely safe.

Selected references to recent (1925-38) cholera literature in our country on which this review is based are given below to enable any reader to make a thorough study of the subject, if he so chooses.

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The *Vibrio Cholerae*: Recent Studies on Its Structure and Their Application in the Prevention of Cholera.

• Dr. D. C. Lahiri, M.B. (Cal.), D. T. M. & H. (Eng.), D. B., London, Bengal Immunity Research Laboratories, Calcutta

Fifty-five years ago Koch discovered the comma bacillus, the *Vibrio Cholerae*. Yet only recently has it been possible to determine easily that such and such organism is the true cholera vibrio, while others are only closely or distantly related to it and are not responsible for epidemics or cases of cholera. Since Koch's original discovery of the cholera vibrio in the dejecta of cholera patients, numerous other vibrios closely resembling it were isolated from various sources, such as food, water, faeces of patients suffering from other diseases and animals suffering from various diseases (Topley and Wilson, 1936). Recently Taylor *et al* (1938) isolated vibrios resembling *V. Cholerae* from different samples of water; also Pasricha *et al* (1938) isolated cholera vibrios from various non-human sources. It is only on the basis of recent studies that these para-cholera or cholera-like vibrios can be differentiated easily from the true cholera vibrio.

Apart from its importance in the diagnosis of stray cases of cholera or cases at the beginning of an epidemic, especially in a region usually free from it, the proper identification of the true cholera vibrio in its typical state is absolutely essential in the selection of organism for the preparation of vaccine, which is undoubtedly the best known preventive against cholera. It has been proved by Landsteiner and other workers (Landsteiner, 1936) that antigens are highly specific—the specificity being determined chiefly by the nature and arrangement of the surface groupings. Thus a particular kind of antigen produces antibody specifically acting on the surface of that type of antigen only. Greenwood *et al* (1931) have shown that antibodies acting on the surface antigens of virulent, smooth bacilli are essential agents in effective antibacterial immunity. Hence, in order to be able to produce antibodies protecting against infection with *V. Cholerae*, the organisms used in the preparation of vaccine must possess the same surface structure as the true cholera vibrio, which is virulent and in smooth phase. There lies the absolute importance of selection of true cholera vibrio in its virulent and smooth phase; and this has been made easy by the recent studies on its structure.

STUDIES ON ITS ANTIGENIC STRUCTURE

Though the existence of different serological types of *V. Cholerae* and the presence of two diffe-

rent kinds of antigens—flagellar and somatic—were recognised long before (Venkatraman and Pandit, 1938), the particularly careful study by Gardner and Venkatraman (1935a) have done much to clarify the confusion resulting from the work carried out before the importance of flagellar and somatic antigens had been appreciated. Gardner and Venkatraman (*loc. cit*) have first of all classified the vibrios into two groups on the result of biochemical reactions. Group A comprises organisms most of which give the cholera-red reaction and produced acid without gas in glucose, maltose, mannite and sucrose, but not in dulcitate. Group B organisms are biochemically distinct from Group A, have less fermentative power and are non-cholera-like vibrios.

Antigenically, Group A organisms possess a common H antigen. Hence they cannot be distinguished from each other by means of H agglutination. But the principal O antigens are much more specific and are used as a basis for the differentiation of Group A organisms into sub-groups. Six such sub-groups have already been differentiated. The true cholera vibrio and most of the El Tor strains all appear to fall into sub-group I. But the true cholera vibrio is non-hæmolytic in contradistinction to El Tor vibrio, which is hæmolytic. Hence, according to Gardner and Venkatraman, the true cholera vibrio is a non-hæmolytic organism containing the specific O antigen of sub-group I. Sub-Groups II to VI contain organisms that have been isolated from cases of choleraic diarrhoea or from water. These organisms have been referred to by them as para-cholera or cholera-like vibrios.

Gardner and Venkatraman (1935 b) have further distinguished two serological types—"Inaba" and "Ogawa"—within the sub-group I. Organisms resembling both of these types in antigenic structure seem to be responsible for epidemics of cholera in India (Venkatraman and Pandit, *Loc. cit.*). Hence a vaccine to be of use must contain organisms which have the same antigenic structure as that of "Inaba" and "Ogawa" strains. Or, in other words, they must be agglutinable with standard "Inaba" and "Ogawa" sera.

STUDIES ON ITS CHEMICAL STRUCTURE

Linton *et al* (for references see Prasad, 1938) have followed up the earlier work of Landsteiner and Levine (1927) in the chemical analysis of the various antigens present in the organisms. They have isolated polysaccharides from the vibrios and have identified three types of such polysaccharides on the basis of their hydrolytic products which were glucose only in one case, galactose with aldobionic acid in another and arabinose with aldobionic acid in the third case. They have also isolated and identified two proteins from the vibrios on the basis of their nitrogen distribution and results of racemization.

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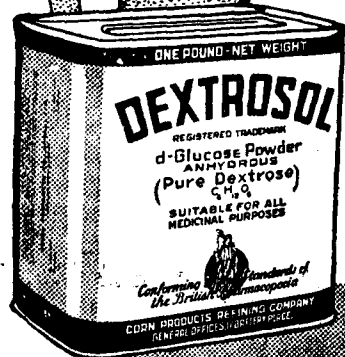
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Pathology of Cholera*

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PART I

THE GASTRO-INTESTINAL TRACT IN CHOLERA

There is great deal of obscurity in the link between the pathology of cholera described so far and its signs and symptoms.

The dramatic and violent symptoms such as the repeated precipitous vomiting, the copious rice water stools, the great collapse and the lack of parallelism between these and the comparatively little or only mild changes in the gastro-intestinal tract make this disease a mysterious clinical entity.

The outstanding fact which cannot be ignored is the presence of agglutinable comma vibrios in the intestines and to a less extent in the gall-bladder. Thus from the cholera post-mortem cases in the Carmichael Medical College in 1935-36 numbering 85, the agglutinable cholera vibrios were cultured in 70 per cent of the cases from the intestinal swabs; in 60 per cent of the cases from the gall-bladder swabs and in 25 per cent of the cases from the mesenteric glands. From these cases about 80 per cent showed the vibrio from one or more sources.

In sharp contrast to these are the post-mortem changes found in the small intestines and to a even less extent in the large intestines. There were marked changes in only 30 per cent whereas in 50 per cent, the only change observed was a congestion of slight degree and in the remaining 20 per cent the intestines were to all appearances quite normal although many showed agglutinable comma vibrios on culture.

Thus the whole gastro-intestinal tract may be quite normal both to the naked eye as well as on microscopic examination.

The changes observed in cases which show them may be described as follows:

1. A pink velvety congestion of the portions of the small and large intestines. The congestion is of a rather evanescent type as the same is not seen after a few days in the museum specimens which have been mounted with ordinary preserving fluids.

2. A peculiar swelling of the solitary lymphatic follicles of the large and small intestines. These enlarged solitary lymphatic follicles stand out like swollen round seeds or even like small buttons. The Peyer's patches comparatively escape. Rogers (1921) has pointed out the enlargement of lymphatic nodules at the back of the tongue and pharynx.

* A paper read before the 26th session of the Indian Science Congress, Lahore, Jan '39.

They find that specific protein and specific carbohydrate substances are arranged in different combinations in different vibrios. On the basis of this difference in their combinations they have suggested a classification of the vibrios into six groups. According to this grouping the true cholera vibrios belong to groups I and II; old laboratory cultures of the true cholera vibrio belong to Group VI; and water and carrier strains belong to Group III, IV and V.

These works on the chemical structure of the vibrios have added significantly to our knowledge of the true cholera vibrio. But its practical application in the routine identification of the true cholera vibrio with the help of a simple technique has not yet been possible.

It has been noted by Linton *et al*, (1938) that a classical "Inaba" strain (Inaba T) maintained under laboratory conditions for a long time does not possess, unlike freshly isolated strains, a lipid complex, although the strain agglutinates with "Inaba" O anti-serum. They suggest that it is quite possible that a vaccine prepared with old laboratory strains of the true cholera vibrio though agglutinating with O Sub-group I anti-serum, may lack in this lipid complex and hence its usefulness may be less than that of a vaccine prepared with freshly isolated strains having the same antigenic structure as the true cholera vibrio. This particular observation suggests the necessity of using strains which should not only resemble the true cholera vibrio in its antigenic structure, but also be freshly isolated from cholera cases.

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3. A superficial necrosis of the mucous membrane and denudation of the surface epithelium. This change is often associated with active congestion of the intestinal wall including the mucous membrane and the peritoneum. It is possible that this denudation of the epithelium is due to disintegration and post-mortem change in some of the cases at least. Good Pasture (1923) may be quoted here: "Preparations from the intestine of an executed criminal, fixed within one hour after death, show many denuded villi, evidently the result of mechanical dislodgement" and again "patients dying of cholera may lie in a moribund state with barely a perceptible pulse for some time before death. Under such conditions the active growth of intestinal bacteria, especially in the lower ileum and the presence of digestive enzymes in the intestinal fluid would seem sufficient to macerate the projected epithelial layer so that it may soften and fall away, thus admitting bacteria whose penetration and growth can no longer elicit an inflammatory response; it is not a part of the disease; it is the beginning of disintegration."

4. The dry appearance of the intestinal serous coat described in books on cholera is not seen nowadays owing to the therapeutic saline infusions. The peritoneum might show a pink congestion and in very few cases an active congestion of the blood vessels.

5. Very rarely an active inflammatory congestion with engorged blood vessels have been seen on opening the intestines. An ecchymosis and ulceration of the intestines have been observed still less frequently.

MICROSCOPIC EXAMINATION

The peculiar congestion which gives a pink velvety colour to the intestines as can be seen at the post-mortem table is observed much less frequently in microscopic section. Apparently it disappears during the process of hardening and fixation. This congestion may or may not be attended with necrotic changes of the surface epithelium when examined under the microscope; a great congestion of the surface capillaries with a perfectly intact surface epithelium is the picture which may be seen in sections.

This congestion is due to dilatation and engorgement of the minute capillaries of the intestinal wall and is a salient feature of cholera, but Atchley (1930) and Moon (1938) have described circulatory disturbances of this type under 'medical shock.'

It is limited more or less to the mucous membrane and submucous coat of the intestine; rarely the peritoneum might show the same while the muscular coats more or less escape completely. Inflammatory cells are conspicuous by their absence near these pink areas.

The solitary enlarged follicles show a great proliferation of the lymphatic cells and several tiers of lymphatic nodules might be seen one above the other, the whole elevation being covered

by the surface epithelium which may be normal. On closer examination when stained with iron-haematoxylin a large number of mitotic figures are seen in the lymphatic cells.

The different parts of the gastro-intestinal tract show the above changes in the different degrees. They may be summarised as follows:

(a) Stomach shows occasional congestion only or no change.

(b) Duodenum same as stomach.

(c) Jejunum may show very little change in the upper part; shows the peculiar velvety pink colour mentioned previously; occasionally and much less frequently a denudation of the surface epithelium.

(d) Ileum may present the above peculiar velvety appearance but a more characteristic feature is a marked proliferation of the lymphatic follicles, especially the solitary follicles. These enlarged lymphatic follicles are not always necessarily congested and might show a normal colour on the post-mortem table. The Peyer's patches are comparatively much less conspicuous.

(e) Large intestine shows occasional congestion only but lymphatic proliferation may be found similar to that of the ileum.

As has already been mentioned, ecchymosis or hemorrhagic ulceration of the large intestine is very rarely seen.

The cytological consistency of the stools from the cholera patients also present peculiar features. A careful study by Maitra, Ganguly and Basu (1925) has demonstrated that pus cells are, as a rule, absent from the stool of cholera patient—a fact which rather negatives active inflammatory changes in the intestinal tract. The cells are usually the altered epithelial cells of the small intestines with badly stained nuclei and very little protoplasm round them. They may be few in number but are invariably present.

DISCUSSION

It is rather a paradox that a disease with so great and violent gastro-intestinal symptoms should manifest so little inflammatory changes. The congestion which is present, is mostly non-inflammatory. It is due to the dilatation of the capillaries and is confined more or less to the mucous membrane and the submucous layer.

Many other similar diseases of the intestines attended with violent purgation and vomiting, are always associated with inflammatory changes in the alimentary tract, viz., arsenic poisoning or food poisoning. These cases are also associated with great collapse and signs of acute inflammation of the intestinal tract, viz., pus cells and red blood corpuscles in the stools.

Good Pasture's (1923) careful observations may be mentioned here. According to him the

desquamation and necrosis of the intestinal wall, if any, must be regarded as a complication and not a part of the pathology of cholera. Good Pasture may be further quoted here: "judging from the post-mortem appearances of the intestines where evidences of their pathogenic nature should be most prominent the symptoms of cholera are induced by the production within the lumen of the small bowel of material which as absorbed through the non-ulcerated mucosa."

SUMMARY

1. Agglutinable cholera vibrios are isolated from 80 per cent of the post-mortem cases.

2. *Actively inflammatory and ulcerative lesions are not common in the intestines of cholera post-mortem cases.*

3. A peculiar capillary dilatation of the mucous membrane and submucous coat of the small and large intestines is a common feature.

4. Hyperplasia of the lymphatic follicles is seen in many cases, especially the more severe ones.

The informations about the cultural findings in post-mortem cases of cholera are obtained from the routine examinations of the cases which were carried out by Prof. C. C. Basu and Dr. H. Banerjee to whom the writer expresses his grateful thanks.

PART II-HAEMOLYMPH ORGANS BONE-MARROW

The bone-marrow from the femur, tibia and humerus from 25 cases were examined. To the naked eye the marrow presented big areas of the dark-red appearance although a white (yellow) structure might be seen here and there in the adult marrow. Under the microscope the changes observed form a very characteristic and constant feature. These changes consist of a great dilatation of the bone-marrow capillaries which are filled up with large number of red blood cells.

Most of these capillaries are without any regular lining. So peculiar is this feature that one can almost trace the course taken up by the red cells as continuous tracks filled up by them. Another remarkable feature is a comparative preponderance of the eosinophil cells in the marrow (Fig. 3). The average eosinophil count of the bone-marrow in the non-cholera cases of our series was 3-6 per cent whereas in the cholera cases it was 15-20 per cent. The above facts do not point towards the condition being an inflammatory toxæmia in which latter case the bone-marrow response is quite different.

There might also be a slight or moderate amount of myeloblastic reaction on the part of the marrow. This is not a constant feature. The marked and pronounced myeloblastic reaction found in acute infections such as pneumonia, meningitis, etc., has not been seen by us in cholera.

The capillary dilatation of the marrow, however, is very characteristic and constant. There might be a certain amount of capillary dilatation in the bone-marrow in epidemic dropsy, but the same

greatly differs from the bone-marrow of cholera in that, (a) there is an associated oedema of the marrow, (b) eosinophilia is very much less pronounced or is absent in epidemic dropsy, and (c) the capillary dilatation is much less pronounced. Sometimes in acute inflammatory conditions, a certain amount of congestion of the bone-marrow is also seen; but in these cases the red corpuscles are always seen in regular capillary channels provided with a definite visible endothelial lining. This is in great contrast to the picture found in the bone-marrow of cholera where great masses of red cells seem to open up, as it were, the tracts of the closed channels which have no visible definite endothelium.

According to various workers such as Doan, Sabin and Cunningham (1922), Drinkor, Drinker and Lund (1922), the capillaries of the bone-marrow are known to consist of two varieties viz., (1) the patent capillaries lined with a regular endothelium and (2) the collapsed capillaries of Doan. In cholera the latter capillaries dilate remarkably and large dilated capillaries without any visible lining and filled up with red cells form a remarkable feature.

Other features:—Occasionally we have come across specimens which show nodules consisting of lymphocytic cells. These nodules are surrounded by the usual tissues.

THE SPLEEN

The spleen presents peculiar changes. It is somewhat enlarged and palpable in practically a large proportion of cholera patients. Thus the average post-mortem weight of the spleen in adults in 50 consecutive cholera cases (in our series) was 119 grms.; the average of 50 consecutive non-cholera cases was 160 grms., cases of malaria, kala-azar, congestive heart failure and cirrhosis of the liver were excluded. The enlargement is due to congestion which is also present in various other organs of the body. This is sometimes so marked that on cutting across a spleen of cholera, blood almost spurts out. The congestion is further associated with a marked increase in the lymphatic tissues so that on section the Malpighian bodies stand out somewhat prominently. The characteristic changes thus consist of a great engorgement of the red pulp, the white pulp more or less escaping and lymphatic proliferation. The large congested and hemorrhagic areas alternating with numerous collections of lymphatic cells form a very constant picture in the spleen of cholera. The general structural architecture of the spleen, especially the red pulp seems to be disorganised and rather made loose by the great engorgement of capillaries.

It has to be stated in conclusion that according to Crowl (1914) and MacCallum (1932), the spleen is not enlarged in cholera.

THE LIVER

In contrast to the changes observed in the spleen those in the liver are comparatively less conspicuous. With the naked eye the liver

may present a somewhat normal appearance or it might be congested here and there. Pieces from the different portions of the liver, viz., the anterior and posterior parts of the left lobe, the anterior and posterior parts of the right lobe, and a piece from near the porta hepatis were sectioned and observed. The changes, however, are inconstant. As a rule the portions from the under surface of the liver, viz., near the portal entry show a good deal of sinusoidal congestion. Portions from the anterior parts of the liver, especially near the surface show more congestion than the posterior part.

Microscopic examination shows a great dilatation of the sinusoids and their engorgement by red blood cells. As a rule the outer and middle third of each liver lobule shows the above congestion. The medial third comparatively escapes unless the congestion is very marked. The central veins remain more or less empty and it is unusual to see the congestion reaching up to the central vein (Fig. 7). The congestion is just the reverse of what is seen in passive venous congestion in which latter case it starts from central veins. This again is more marked immediately under the capsule of the liver and it is not rare to find marked congestion of a surface lobule and a perfectly normal lobule a small distance away. As has already been mentioned, only in a few lobules where the congestion was extreme, the red cells were seen to enter the central vein; some times this occurred in a thin stream of red blood cells which are seen to enter the central vein in a single file. It is seen that the most central portions of the liver sinusoids do not dilate and consequently there is a partial obstruction to the flow of corpuscles to the central vein.

In the sinusoids here and there a polymorphonuclear cell as well as an occasional eosinophil cell is seen. The portal veins do not appear to be filled up or dilated. The congestion affects more or less the capillary sinusoids of the liver which dilate greatly.

The red blood cells lie within the sinusoids and are separated from the hepatic cells by the endothelial lining. In some sections those red cells can be traced back to the tributaries of the portal vein from which they can be seen to enter the dilated sinusoids.

OTHER FEATURES

Occasionally one comes across specimens of liver which show peculiar nodules of lymphocytic cells in between the lobules of the liver.

THE THYMUS

The majority of cases of post-mortem examination, viz., 70 out of 85 cases examined showed a remarkable enlargement. Microscopically, the lymphatic tissue was very abundant and Hassal's corpuscles, numerically conspicuous. The stroma was well formed and definite. The whole organ showed a somewhat congested appearance with amounts of capillary dilatation. The enlargement of the thymus irrespective of the person's age can

be said to be one of the most remarkable features of the post-mortem appearance of cholera. The enlarged thymus must have pre-existed as otherwise it is difficult to explain such a great proliferation of all the structures of thymus in so short a time, nay, within a few hours.

MacCallum (1932) has also observed a similar enlargement of the thymus in his post-mortem examination of cholera cases at Manila and states "that the thymus is enlarged in nearly every case."

THE LYMPHATIC GLANDS

A very constant finding in cholera on the post-mortem table is the enlargement of the mesenteric glands. They are enlarged and are soft; the capsule is somewhat tense and on section may or may not present a congested appearance. Under the microscope the blood capillaries are seen to be dilated and filled up with corpuscles, especially near the surface. The lymphatic follicles are prominent and the lymph sinuses are greatly invaded and filled up by the lymphatic cells. The cellular structure mainly consists of lymphocytes which present a fair number of mitotic figures and sprinkling of eosinophil cells.

In some cases the proliferation is so great that the lymphatic nodes can be hardly made out at the periphery of the gland. It has already been mentioned that in about 25 per cent. of the cases examined, culture of agglutinable comma vibrios was obtained.

It is thus a remarkable fact that certain lymphatic structures show hyperplasia and enlargement. Amongst these may be included the solitary lymphatic follicles of the intestines, the mesenteric lymph glands; the lymph nodes at the back of the tongue and oesophagus; lymphatic nodes of the spleen; and the thymus gland. Nodes of lymphatic tissues are also seen in unusual situations such as the liver and the bone-marrow. It is also a peculiar fact that some other lymphatic nodules escape hyperplasia, viz., the Peyer's patches of the intestine and the peripheral lymphatic glands of the body.

DISCUSSION

The tissues of bone-marrow are normally very sensitive to acute inflammatory conditions and infections.

Therefore, although the symptoms and signs of cholera are very acute, the absence of commensurate myeloblastic reaction in the bone-marrow somewhat goes against the disease being an acute inflammatory condition.

The pathology of the dilatation of the collapsed capillaries of the bone-marrow suggests that some histamine like substance is at work. Moon and Leiber (1935) have observed a moderate degree of leucocytic reaction after injections of histamine.

My thanks are due to the Calcutta University for their grant of the Kulyan Kamar Mukherjee Scholarship under which further work is proceeding on the subject.

Epidemiology of Cholera

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HISTORY OF EPIDEMIC CHOLERA IN INDIA

Sushruta's description of *Vishuka* is typical of what we now call by the name of cholera. It would therefore be not incorrect to presume that cholera was known to our ancestors and that they too should have been subject to the epidemics of this disease. But no recorded history is available till we reach the time of the East India Company. Even during this later period, no more than sporadic references were made regarding the epidemics of cholera. Gaspar Correa, a Portuguese physician, recorded that 20,000 men of the army of the King of Calicut died of cholera in 1503, and that there was a severe epidemic in Goa in 1543. From a *verbatim* copy of official instructions by the "Medical Department" of the East India Company published in the year 1817 (this was brought to light by Major John, Superintendent of Cuttack Medical School in the year 1928), it is evident that cholera epidemics must have been frequent and oppressive during those hectic days of Indian history. We owe to Scott (1817), Jameson (1820), Macpherson (1872), Beyden (1874) and Hirsch (1883) a fairly fully recorded history of the Indian epidemics of cholera for the century ending by the year 1900. Their records reveal five distinct pandemic periods: 1817-1823, 1826-1837, 1846-1849, 1865-1875, and 1892-1900, apart from many years of smaller epidemics. The pandemics of 1817 and 1865 not only over-ran the whole of the Indian peninsula, including Ceylon, but almost every part of the habitable globe—Europe, America and the far-east. The disease seemed to have been disseminated by travellers and adventurers from those far-off regions who came to our country in search of land and lucre.

THE EPIDEMIC HIGH WAYS

From the records of earlier writers, it will be observed that the epidemics had always started from lower Bengal and spread in three definite directions, what Breyden called as epidemic high ways: (1) The North-western highway through the United Provinces, the Punjab and the Frontier. (2) The South-western high way through Central

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SUMMARY

1. In the bone-marrow of cholera cases the normally closed and collapsed capillaries dilate and are filled up with red blood corpuscles.

2. The spleen shows enlargement. There is a marked engorgement of red pulp. The lymphatic elements of the spleen show a marked hyperplasia.

3. The liver shows dilatation of the sinusoids and their filling up by the red cells.

The changes do not affect the whole liver uniformly. One unusually sees apparently normal areas side by side with the congested areas.

4. The thymus is seen remarkably enlarged in a good proportion of the cases.

5. There is a marked enlargement of the mesenteric lymph glands with hyperplasia of the lymphatic structures. The enlargement of the solitary follicles have been already dealt with.

6. Besides the above, lymphatic nodules are also seen in some uncommon situations such as the bone-marrow and liver.

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India, Deccan and Bombay. (C) The Southern high way through Orissa, Madras and Ceylon.

Before the days of the locomotive, the epidemic spread slowly and took anywhere between one and five years to reach the farthest limit of the high-way, but after the introduction of the locomotive and its gradual extension into all the provinces the rate of spread has to be counted not by months or years but by minutes and days, and the trail of dissemination has now outrun the boundaries of Breyden's high-ways.

The history of both ancient and modern epidemics of cholera reveal on close analysis certain facts which are of interest. In no single year Bengal was free from epidemic or endemic cholera during the last 100 years, and the average minimum mortality was not also less than 40,000 per year. All the epidemics of which we have got any record traversed from Bengal. There is also a suggestive correlation between the figures of cholera incidence and mortality for Bengal and other provinces, notably the United Provinces, Bihar and Orissa. On the strength of these observations, Bengal has been considered as the chief endemic home of cholera in the world and the starting point of its epidemic spread.

OTHER PROBABLE ENDEMIC CENTRES

But Sir Leonard Rogers hotly contended against the belief that Bengal was the only endemic home of cholera in India. He conceded that Lower Bengal, Orissa and Assam constituted a hyper-endemic area but pointed out three other areas as equally important endemic homes: Behar, Chotanagpur and part of U. P. (particularly Jhansi); low lying districts of south east of Madras; and North Konkan districts of Bombay. The writer is of opinion that this controversy is futile except in so far as it points out where we should concentrate our attempts to eradicate the endemicity of cholera. But the factors that lead to the establishment of endemicity are still obscure, and no fresh light is visible even to-day. Fry asks: why is it that cholera should attack other countries and other provinces in India and fail to establish endemicity while Bengal has been highly endemic without a break for over 100 years? Density of population, conditions of humidity of air and soil, and variations in winter and summer temperature have been adduced as explanations for endemicity, but they do not offer any solution, particularly in the face of d'Herelle's contention and proof that the true epidemic cholera vibrio becomes irreversibly non-infective under the influence of the ubiquitous bacteriophage. Tomb and others suggest that the post-choleraic vibrio causes endemic cholera, while the true Koch's vibrio causes epidemic cholera. Though they were unsuccessful in their experiments to convert the inagglutinable post-choleraic vibrio into the active agglutinable form, they yet maintain that unknown biochemical physical conditions in the human intestines or even outside man, may induce mutation of the

inagglutinable and non-infective to the agglutinable and infective form. The claim of Brahmachari of the Bengal Public Health Department (1927) that the non-agglutinable vibrio can be converted into true agglutinable Koch's vibrio is till to day unconfirmed. Apart from the post-choleraic vibrio which is widely prevalent during and a short time after the epidemic period, it has also been recently brought to light by Taylor, Ahuja and others (1938) that the water vibrios are common and universal in this country, can be isolated from choleraic and non-choleraic sources in non-epidemic regions and seasons, and that these resemble closely the true cholera vibrio, except in "O" serology test, although they point out equally clearly that these water vibrios have nothing to do with real cholera. It would therefore appear that the problem of endemicity of cholera has to await its solution till the exact relationship of the different and varied types of cholera vibrios are determined. In other words, the extra-corporeal phase of the Koch's vibrio requires a systematic and scientific study to forge the key that would unlock the secrets of cholera endemicity.

THE FORECASTING OF EPIDEMICS

In order to aid mobilization of preventive measures, particularly in view of the quick modes of modern communication, Sir Leonard Rogers has by an intelligent study of cholera statistics in the different provinces of our country, and of the climatic, atmospheric and weather conditions under which cholera epidemics occur, devised a formula for forecasting them, and his yearly forecasts since 1926 have proved remarkably correct with but few exceptions. He found that in all places which showed a high average cold weather rate for cholera the absolute humidity was over 0.400 while in all areas which had a low average cold weather rate the absolute humidity was below 0.400, and that in the area covered by Lower Bengal, Orissa and Assam, the chief hyper-endemic cholera zone in our country, the annual rate of incidence never fell below 1/10 of the average rate for the last 30 years and the absolute humidity had never known to fall below 0.400. He also found that a preceding year of deficient rainfall added to the effect of high absolute air humidity and in precipitating an epidemic outburst of cholera in a given area. He further added that the movements of returning pilgrims from infected places are no less important in formulating a successful forecast. Thus Roger's forecast of cholera epidemics in any given area in our country is to be determined by reference to the following factors:

- (1) high absolute air humidity;
- (2) year of preceding deficient rainfall;
- (3) introduction of infection by returning pilgrims.

The Provincial Public Health Departments, as recorded in their annual reports, seem to have taken advantage of Roger's annual forecasts of epidemic diseases province-wise and claim to have

adopted with fair success preventive measures such as inoculation of the outgoing and incoming pilgrims and other people, quarantine, propaganda, etc.

THE PROBLEM OF IMMUNITY AND CARRIER STATE IN CHOLERA

From the days of Hippocrates to Pasteur and Sydenham, from William Farr to Ross, Rogers and Russell, a host of observers have by a study of epidemics by statistical, experimental and observational methods tried to establish a theory of individual and collective immunity to infectious diseases of epidemic nature. It is asserted that the periodicity of epidemics and their rise and decline, the phenomenon of recovery or death from bacterial and protozoal infections are the results of the development of sufficiency or otherwise of acquired natural immunity to specific infections. This is attributed to the elaboration of anti-bodies in the individual or the community. Modern science has demonstrated its reality by successfully inducing artificial immunity by inoculation of specific anti-bodies, and thus made it possible for any individual or community to protect themselves from the dangers of epidemic infection, if not for a long period at any rate for a period sufficient enough to cross the Rubicon with safety. There are many diseases which give relative states of immunity for a shorter or longer period. There are yet others which confer little immunity. Small-pox is an instance of the former category, influenza of the latter.

Does cholera confer permanent or temporary immunity? Are there cholera "carriers" capable of communicating the infection? These are questions which remain yet to be answered.

The older view is in the affirmative, but the later view of which d'Herelle is the originator holds that cholera gives no kind of immunity, individual or collective, that there is no carrier state in cholera as in typhoid, and that the rise and fall of cholera epidemic is influenced not by the laws of immunity but by the specific bacteriophages brought into play by nature against the cholera vibrio. He points out the unfailing regularity of annual epidemics in the accustomed areas, the uninfluenced rate of incidence in spite of mass inoculation in the affected regions and the lytic effect of bacteriophages on the cholera vibrio as essential contradictions to the theory of cholera immunity and the cholera carrier. It only remains to be stated that his views are not fully accepted, but his observations and experiments in support of his view have not been seriously challenged by other workers in our country.

TRANSMISSION

That cholera is chiefly a water-borne disease has been so indelibly impressed in the minds of many a worker that Col. Gill (1930) wrote in gentle protest: May it not be that the undue stress laid upon water-borne transmission is

largely responsible for the small progress made in controlling this disease?

The observations made during the London cholera epidemic in 1854, and another in Hamburg at about the same period were the foundations on which the water-borne transmission of cholera were based and perpetuated till today.

If cholera is water-borne, the cholera vibrio must be able to maintain its vitality for a reasonably long time in water. Let us review the recorded evidence in literature.

When the true Koch's vibrios of highly virulent, agglutinable and haemolytic strain were sown in various European waters in regions where cholera epidemic was either unknown or rare. Pleiffer found them alive and unchanged in sterile spring water upto 7 months; Krylov found them alive after 568 days in the waters of the Volga; Jacobson found them alive for 45 days in sea-water at Copenhagen. Experiments in Indian waters give different results: Hankin sowed agglutinable vibrios isolated from an active case of cholera in a sample of Jumna water and found no colonies of vibrios at the end of 24 hours; Greig examined every day for one month the water of the sacred tanks of Puri during the period of epidemic prevalence and was unable to demonstrate the true cholera vibrio on any one occasion; d'Herelle sowed typical agglutinating vibrios in Kazauli drinking water and found that the number of colonies after immediate plating was five but nil after 24 hours.

The contradictory result of these two sets of experiments is explained by d'Herelle as due to the difference between a virgin and an epidemic soil, in other words between the presence or absence of specific bacteriophages. If in virgin areas an epidemic cholera breaks out it will indeed be very severe till Nature comes to the rescue by a prolific dissemination of specific bacteriophages which would bring down the epidemic in course of time. There is a progressive diminution of these bacteriophages corresponding to shorter or longer inter-epidemic periods. If however an epidemic breaks out in areas where epidemics are frequent—as is the case in our country—specific bacteriophages do contemporaneously exist and multiply in enormous numbers.

It is not that water is not and could not be a source of infection. It certainly is when cholera breaks out in virgin areas where the cholera vibrio has little or no chance to be influenced by the bacteriophages; it certainly is not so in India according to d'Herelle, as the cholera vibrio does not maintain its vitality in Indian waters owing to the lytic action of bacteriophages. Therefore it is stated by him that since the true cholera vibrio rapidly loses its virulence and agglutinability in waters of epidemic areas and during epidemic seasons the theory of cholera as an essentially water-borne disease is not tenable except under certain circumstances, namely:

(1) the infection of water must be recent as otherwise the vibrios will undergo serological modifications, and

(2) the infected areas must be virgin areas where epidemics of cholera had never occurred or had occurred after long periods of time, in which case bacteriophages will not be available to effect a beneficent symbiosis with the vibrios.

It is also stated by him that the period of infection of a case of cholera corresponds to the period of preponderance of the agglutinable phase of the vibrio—namely, the stage of premonitory diarrhoea and the acute stage of the disease; and therefore the infection is transmitted more commonly and extensively by contact and house flies than through water. This is the sum and substance of d'Herelle's thesis.

It may be stated in general terms that this exposition is not universally accepted by other workers in the field although they say that d'Herelle's experimental proofs are beyond cavil or question. Their reasons for the position they take are that there may yet be certain factors by which either the ubiquitous water vibrio or the post-choleraic vibrio may undergo in its extra-corporeal phase in water or outside it such changes in its antigenic and chemical structure as would turn it to be infective; and that till this is finally proved as impossible it would be dangerous and unwise to exclude infection of water as the chief means of cholera transmission. The writer is however inclined to accept the view of d'Herelle not only because his experiments and observations are convincing enough but also because of the implications of Roger's theory of the influence of high atmospheric humidity on the infectivity of the cholera vibrio. His theory, which is now well-accepted, will become untenable if water-borne transmission is presumed, for the atmospheric conditions are more likely to sustain the life and virulence of the cholera vibrio outside the water than within it.

In fact, the writer's personal study of a number of cholera epidemics reveal that the method of spread is more commonly by means of contact and flies than by the use of infected water. A gets the attack and before he is conscious of it he becomes a source of infection to those in immediate contact with him. His stools now abound with true cholera vibrios. He infects his hands while performing his ablutions and thus infects the food-stuffs he may handle. Flies sit on the infected stools, ingest the vibrios, and thus transmit the infection to a series of food-stuffs to which they have easy access. Then, very much before the fly enters the scene, B is infected and the contact C and so on. Thus the seeds of the epidemic are sown. Insanitary habits, promiscuity and flies do the rest. If B or C leaves the place either in the stage of incubation and premonitory diarrhoea or in the stage of acuteness of the disease he, in turn, sows the seed in the place to which he is destined. Thus the epidemic skips from place to place. The severity and extent of the epidemic depends on the

virulence of the vibrio, the topographical sites infected, corresponding insanitation and fly population and the rate at which the specific bacteriophages mobilise their strength against the invaders.

Even if one does not want to take sides in this controversy, it is difficult to escape the conclusion that the fly plays a conspicuous role in the transmission and spread of cholera. Particularly is this true of our country where insanitation (and its inevitable by-product, the fly) is a rule and not an exception.

TODAY'S ACHIEVEMENTS AND TOMORROW'S HOPES

Notwithstanding the incomplete and inconclusive knowledge about the epidemiology of cholera, enough is known for formulating schemes of prevention. The advances in applied public health are of universal application, and these hold good in the prevention of cholera also. The system of quarantine and the compulsory inoculation of the immigrants and emigrants has fairly ensured against the spread of any infectious disease into other countries. From this point of view, the cholera pandemics of the eighteenth century are not likely to recur so far as human attempts could prevent them. But the question of cholera epidemics at home remains, though much enterprise has been shown by the provincial public health departments. Till 1919, the control of public health and sanitation was in the hands of the Government of India, but after the passing of the Government of India Act, 1919, this control with the exception of such subjects as international health affairs, wider aspects of epidemiology, census and statistics, emigration and immigration, pilgrim traffic *ex-India*, port quarantine work and medical research, was transferred to the Provincial Governments without however providing a Ministry of Health. The Government of India Act, 1935, has gone further and wholly transferred the powers of legislation and control of Public Health and Sanitation to the Provincial Governments with the exception of port quarantine, and has wisely provided a ministry of health this time. Pure water supply, protective inoculation and public health propaganda are increasing day by day due to the strenuous efforts of the Provincial Governments, and but for the chronic poverty of the people and the vastness of the country better results might have been achieved. The present ministries of health are closely watching the advances in medicine and public health and they would not hesitate to apply them in their own provinces.

A new era has dawned in our country. Her people are determined to shake off the slough of despond, the shackles of political dependence and the coils of preventable disease. Adapting the words of Pope, the present mood of India may be described thus:

"Hope now springs eternal in the Indian breast,
Indian never is, but always to be blest."

SUMMARY

(1) A brief history of cholera pandemics during the last century is given.

(2) The high-ways of epidemic travel are indicated. Endemic areas in India are pointed out. The factors that produce endemicity are discussed, and stress is laid on the fact that the key to the solution of the problem of cholera endemicity lies in the further studies on the extra-corporeal phase of the cholera vibrio.

(3) Roger's laws of epidemic forecast are described: that his forecasts have generally proved correct and useful is acknowledged.

(4) The question of cholera immunity and cholera carrier is discussed, and the controversy reviewed.

(5) The modes of cholera transmission are discussed. d'Herelle's proofs against water-borne transmission are recorded faithfully, but briefly. The role of the house fly is stressed as very important in reference to Indian conditions.

(6) The development of public health measures in India is traced, and the hope is expressed that ere long the provincial ministries of health would tackle the problem of epidemic and preventable diseases successfully.

(7) A fairly exhaustive bibliography on which this articles is based is given to help those who are interested in studying the subject more extensively and deeply.

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Symptoms, Differential Diagnosis and Treatment of Cholera*

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Cholera is a specific infectious disease caused by comma bacillus and is clinically characterised by persistent vomiting, passage of a large number of painless watery stools, intense thirst, cramps in the muscles of the extremities, cold clammy perspiration and imperceptible pulse at the wrist. Death is caused by heart-failure resulting from excessive dehydration and possibly also from toxins of cholera circulating in the blood.

It is chiefly a water-borne disease and occurs in epidemics during the months of June and July i.e., the commencement of the rainy season, but in certain parts of Bengal and Assam it prevails in an endemic form where the atmospheric humidity is high and the climate is damp. Sporadic cases are noticed during the months of April and May in our country. In the beginning the virulence of the disease is very high with a heavy mortality rate, but as time passes, the death rate is very much diminished. The incubation period of cholera varies from a few hours to seven days, and is very uncertain.

SPREAD OF INFECTION

The infection is conveyed through water, milk, food, flies, fingers and fomites. The drinking water supply is usually obtained in our country either from rivers, tanks or wells and they are usually polluted by washing the clothes and utensils used by the patients before they are properly disinfected. The villages situated on the downward course of a river are generally affected. The house-flies sit on the evacuations of the patients, and act as mechanical carriers of the infecting organisms. They deposit these organisms on the unprotected foods and sweetmeats, and utensils containing them. Carelessness on the part of the attendants is also not an uncommon or unusual source of infection. The clothings used by cholera patients are hardly disinfected by our people before being washed in the rivers, tanks or in the neighbourhood of wells from which the drinking water supply of the village is obtained. Under-cooked food, over-ripe and raw fruits, ill-ventilated accommodation and overcrowding due to poverty are also accessory factors which contribute to the spread of the epidemic. Lowered vitality due to acute or chronic illnesses, excessive mental or physical exertions, digestive disturbances due to excess of tobacco or alcohol, keeping late hours during nights, overfeeding, dyspepsia and extremes of age are also responsible for providing suitable soil for the infection. Above all, complete

* Dr. Ramchandrier's Memorial Prize Thesis for the year 1938, awarded by the Gujrat Branch of the All-India Medical Licentiate's Association.

ignorance regarding sanitary measures and hygienic mode of life contributes its quota to the incidence of cholera epidemic which occur every year without exception. Cases of cholera are generally imported from the sacred places like Benares, Allahabad, Puri, Nasik, Pandharpur or Haridwar where a large congregation of people assemble on account of festivals or fairs. The water of even big rivers in these places is bound to be polluted under such conditions, and therefore serves as a great source for the spread of cholera infection. During the early part of June a few showers of rain give rise to small collections of water in the *nalas* or in fields and these small collections of water deteriorate. The cultivators as well as the labouring class make free use of these pools for drinking and other purposes. Thus they get infected and start the epidemic. The aborigines and other itinerant tribes usually carry infection of cholera from one place to another, wherever they go, and thus pollute the drinking water supply of the villages and towns. By the time the enquiry into the origin of epidemic is started, one will be surprised to find that the tribes have run away to an unknown destination. Big hotels in the towns where infected aerated waters and other articles of food are likely to be used, contribute also their own share in the spread of the cholera infection.

AGE AND SEX INCIDENCE

Both the sexes are equally prone to the infection. The prognosis is generally grave in very old or young patients. Relapses are liable to occur if no dietetic restrictions are observed and principles of hygienic life be neglected. Death rate is very high amongst the labouring classes and the poor.

SYMPTOMS

Clinically the symptoms of cholera are divided into various stages so that the line of treatment suitable to each stage could be easily adopted.

1st Stage of Onset: After a heavy night meal one is disturbed at about 1 A. M. with a sensation of nausea, and passes two or three ordinary stools. After a while the patient vomits the undigested food and the initial symptoms are mistaken for ordinary indigestion. In the presence of an epidemic one gets anxious regarding further progress. The tendency of going to stools and vomiting increases while the patient feels thirsty. Intake of water gives rise to vomiting out of all proportion to the quantity ingested. Stools assume loose character. It is only at this stage an attack of cholera is suspected.

2nd Stage of Progress: With the increased vomitings and watery stools, patient feels very much thirsty. He gets painful cramps in the muscles of the calf, forearms and other parts of the extremities. They spread to the muscles of the trunk after a while. The pulse becomes rapid and low in tension. The patient would relate that his muscles are squeezed out as if juice is being pressed, which makes him very restless and toss in

the bed. Stools assume the character of rice water and the frequency is very much increased. He may pass scanty urine. Patient assumes a peculiar countenance: pinched face, sunken eyes, hollow cheeks, dry tongue, anxious look and difficulty in breathing. Loss of fluid from the system increases, with the result that the specific gravity of the blood is increased while the blood pressure falls much below the normal. The greater the specific gravity of the blood, the lower will be the blood pressure. The specific gravity of the blood ranges between 1060 to 1064 while the blood pressure falls below 90 M.M. of Hg. Pulse is very rapid and feeble. Heart sounds get weaker and faster.

3rd Stage of Reaction: In mild and favourable cases patient reverts to the stage of reaction instead of progressing to the stage of collapse. Vomiting as well as motions begin to diminish. The thirst and cramps of the muscles subside. Tension and volume of the radial pulse begin to improve. Facial expression shows a change for the better while the characteristic countenance begins to disappear. Patient feels comfortable though left very much exhausted. The urine is freely passed which heralds the onset of return to normal life once more. Blood pressure tends to become normal though steadily, while the specific gravity of the blood is diminished till finally it comes to normal.

4th Stage of Collapse: This stage may either be due to vasomotor paralysis or dehydration or both. All the symptoms of the second stage are exaggerated. Patient is found covered with profuse perspiration and is generally semi-conscious or comatose. Pulse at the wrist is imperceptible if at all felt. Skin is cold and clammy. There is total or relative suppression of urine resulting in uræmia. Respirations are shallow and laboured. Patient passes motions in the bed. Eyes are sunken and fixed. He responds only with great difficulty. Blood pressure is very low while the heart becomes very feeble and at times irregular till it fails due to intense toxæmia. The picture of a cholera patient in collapse is so characteristic that if once seen it could hardly be forgotten. The cause of collapse, whether due to dehydration or vasomotor paralysis, can be ascertained only by carefully watching the signs and symptoms. In the former, the number of stools is very great, tongue is very dry and hot while the specific gravity of the blood is always above 1,060. In the latter, the patient is found covered with profuse perspiration cold, clammy-skin, moist tongue with the specific gravity of blood at 1,060 or below. The number of watery motions and vomits is generally limited. If both these factors are present, the prognosis is very grave and generally the results are fatal.

5th Stage of Convalescence: Patient is very weak and exhausted. Appetite is lost while the bowels are either constipated or irregular. Patient may suffer from insomnia. However, with regular life, light exercise and complete physical and mental rest, patient returns to his original state of health in due course of time.

DIFFERENTIAL DIAGNOSIS

In the presence of the epidemic, the diagnosis of cholera is very easy. Sudden onset of vomiting and passage of rice-watery painless motions, intense thirst, painful cramps of the muscles of the extremities accompanied by restlessness, sunken eyes, hollow cheeks and anxious look of the patient give a sufficient clue to arrive at a proper diagnosis. Microscopic and cultural examination of the stools will show the presence of gram-positive comma-bacilli. Naked eye appearance of the cholera stool is also very typical. The motions are greyish-dirty in colour resembling the washed water of rice, hence called 'rice-watery'. In sporadic cases the diagnosis offers some difficulty but the signs and symptoms of cholera are so characteristic that no mistake could be made if one has seen and treated a cholera patient once at least. However the differential diagnosis from the following diseases which resemble cholera is essential.

Summer Diarrhoea: Cases generally occur during the hot weather in a sporadic form. The onset may be sudden or insidious. The thirst and cramps of the muscles are very mild. The stools are watery but the colour is either green or pale-yellow but never rice-watery. Microscopical examinations show the presence of organisms other than comma bacilli. The prognosis of the patient is always good.

Green Diarrhoea: Generally occurs in infants due to feeding irregularities and contaminated milk amongst artificially fed children. It is also a sign of the teething period. Stools are greenish in colour and contain mucus. Microscopical examination of the stools may show R. B. C and other bacilli. The attack is always accompanied by slight rise of temperature.

Acute Gastritis: Vomiting is accompanied by pain and tenderness over the epigastric region. There is a reflex sensation of frequency of motion, but patient is generally constipated. The attack follows heavy meals or indulgence in alcohol. A slight rise of temperature may at times be noticed.

Acute Bacillary and Amœbic Dysentery: Vomiting is absent and rise of temperature may be present. Stools are accompanied with gripping pain around the umbilicus, and tenesmus during and after the act of defæcation. Stools contain blood and mucus while microscopically pus-cells, number of R. B. Cs. giant cells, entamoeba histolytica, etc., would be detected.

Ptomain Poisoning. The symptoms follow the intake of stale food or rotten meat, either tinned or ordinary. The vomitings and motions are always accompanied by pain and tenderness over the pit of the stomach. The rice-watery character of the cholera motion is absent.

Arsenical Poisoning. History of the patient, if carefully enquired into, will always give some clue. Vomiting and diarrhoea are always accompanied by severe gastric pain. Rice-watery character of the stool is absent. In cases of poisoning, unlike in cholera, vomiting precedes diarrhoea.

Cerebral Type of Malaria:—The onset of vomiting and diarrhoea is accompanied by high fever preceded by severe rigors. Blood examination will show malarial parasites.

GENERAL TREATMENT

The best result would always depend on correct and prompt diagnosis of cholera. The present mortality rate can be reduced to minimum if the treatment could be started in the initial stage of the disease. Co-operation on the part of the patient as well as intelligent nursing are as essential as efficient medicines to avoid fatal results.

Choice of methods and drugs in the treatment of cholera depend on the stage at which the patient is seen. The first stage of initial vomiting can be checked by (1) fractional doses of calomel and soda bi-carb and (2) Tomb's cholera mixture.

If the mixture is vomited out one may apply mustard plaster over the pit of the stomach for ten minutes and then repeat Tomb's mixture.

Ice can be given to suck, while iced but previously boiled water in sips would also quench the thirst. Fresh lemon syrup prepared with glucose D or sugarcandy is very useful but should be given in sips only as otherwise it may not be retained. No food is allowed by the mouth till vomiting and diarrhoea cease for 72 hours.

If the patient is seen after two hours of the onset of the symptoms with profuse rice-watery stools, persistent vomiting, painful cramps in the muscles of the extremities, intense thirst, restlessness and deafness, atropine (gr. 1/100) should be given by injection and repeated once more during 24 hours. The following mixture may also be given:

Camphordyne ...	...	m. 10
Tomb's mixture ...	...	dr. 1
Spirit vinum gallici ...	...	" 2
Aqua ...	...	oz. 1

One dose every half an hour for the first two hours and then every hour for the next four hours and every two hours till the patient comes round, i. e., till vomiting and purging completely stops.

Cupping and hot fomentation over the kidney area along with diuretin (grains 10) given every 5th hour will increase the urinary output and lessen the toxæmia. This is the turning point and if the patient is to recover through the above lines of treatment the number of stools and frequency of vomiting will be reduced. Patient will begin to pass urine freely while the pulse will show improvement in volume and tension. Cramps of the muscles would automatically be relieved. But Tomb's cholera mixture must not be abruptly stopped nor any indiscriminate feeding should be allowed for 72 hours, as relapses are more fatal than the original attack itself. The interval between each dose of the mixture should be increased as the patient shows improvement, while camphordyne and spirit vinum gallici could be omitted from the mixture if no indication for their continuance be present. Orange and pomegranate juices may be given provided the tendency towards vomiting has ceased. If the patient does

not show signs of improvement, it means that he will pass on to the stage of reaction and then to collapse.

When the patient is for the first time seen in the collapse stage with profuse perspiration all over the body, cold and clammy skin, no pulse at the wrist, suppression of urine with specific gravity of the blood below 1060, the collapse should be attributed to an intense vasomotor paralysis. Blood pressure and specific gravity of the blood should always be ascertained before starting the treatment.

Tomb's cholera mixture with brandy should be given every hour till definite improvement is noticed and if the number of watery motions increases, 10 minims of camphordyne should be added to the alternate doses of the mixture.

Atropine (grain 1/100) and strychnine (1/60th grain) should be injected twice a day for two days.

Caffeine citras (grain 5) and diuretin (grains 10) should be given every 4th hour.

Dry cupping to the kidney region and mustard plaster over the stomach should be applied if necessary. If the patient is conscious, sips of lemon syrup should be given by mouth.

Transfusion of hypertonic saline is the sheet anchor in the treatment of collapse. In this stage the rectal temperature may be found very high though the axillary temperature would be little more than 98.4. The quantity of hypertonic saline should be in accordance with the specific gravity and blood pressure records. Generally four to six pints of the hypertonic saline would be found quite sufficient in moderately severe cases. The lower the blood pressure and higher the specific gravity of the blood the more will be the quantity of hypertonic saline required. After saline transfusion the circulation and pulse is improved in volume and tension while the kidneys begin to function vigorously. Patient looks comfortable, and, if watched carefully, can pass the critical period. During the administration of saline, patient should be covered with hot blankets to counteract severe rigors while a strict watch should be kept on the rise of temperature which follows the saline infusion as many patients die of hyperpyrexia in neglected cases. Hence rectal temperature should be recorded every hour and any rise above 102°F. should call for hydrotherapy. Ice-bag should be applied over the forehead and cryogenin (grains 10) should be given immediately to counteract the hyperpyrexia. Bowel wash with iced normal saline (8 ounces) should be given if found necessary. Careful watch should be kept over the bowels. Due to increased peristalsis the patient generally passes liquid stools either during saline infusion or soon after its administration is over. Every case should be given a dose of tincture opium (minims 20), otherwise the whole fluid would pass away from the system and the patient may need another repetition of saline which means an additional involvement of avoidable danger. The administration of hypertonic saline

should be done by open method under local anaesthesia with one per cent novocain solution. It should be thoroughly sterile. A stock hypertonic saline should be duly sterilized and kept in the hospital during epidemics so that no time will be wasted. The question as to the repetition of the hypertonic saline should receive careful attention and unless the indications are present it should not be repeated for fear of oedema of the lungs and embarrassment of the heart which follow repeated transfusions. More harm than good would result after its repeated administration if the collapse is due to vasomotor paralysis. Cardiac musculature which is already affected by cholera toxin becomes unable to draw the blood from the veins and the lungs. In such cases strychnine and atropin injection is indicated while hypertonic saline is definitely contraindicated due to sodium chloride concentration of the blood after the second and third hypertonic saline transfusions. Osmotic balance of the body fluid is disturbed and results in oedema of the lungs. In such cases, even if the collapse is due to dehydration, isotonic saline should be given, partly intravenously and partly subcutaneously. In cases where frequent purging continues and a third saline infusion becomes necessary, hypotonic saline should be given intravenously and isotonic saline subcutaneously to avoid the resulting oedema of the lungs.

TREATMENT OF THE OEDEMA OF THE LUNGS

Castor oil, one ounce, should be given as soon as pulmonary oedema sets in. The dose should be repeated without any hesitation if the patient does not pass motion after two or three hours of its administration. The purging thus induced would eliminate the sodium chloride ions from the system. If, however, the purging increases more than that what is aimed at, kaolin and bismuth powder should be given. Three to four motions are quite sufficient to relieve the oedema of the lungs.

Atropine (grain 1/100) and strychnine (grain 1/60) may be injected twice a day but saline infusion is definitely contraindicated. Due to paralysis of the muscles of the intestines, resulting from the cholera toxins, it may be that even after two to three doses of castor oil no motion is passed. If so, the prognosis is indeed very grave. Cardiazol, coramine or camphor in oil may be injected for oedema of the lungs though their effect is very temporary.

Recently 20 c. c. of a 20% sodium chloride solution has been advocated intravenously in place of the usual hypertonic saline. This should receive a fair trial for treatment of the collapse stage.

TREATMENT OF CONVALESCENCE

For fear of relapse, great care should be taken during this stage. Return to food should be very gradual. Ovaltine, sanotogen, milk and fruit juices should form the main items of the diet. Complete rest in bed with regular graduated exercise would improve the lost tone of the system.

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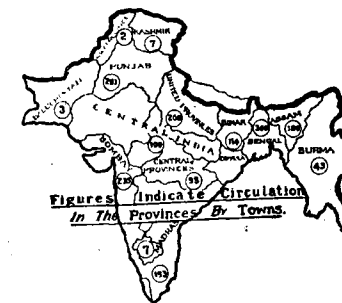
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Treatment of secondary anæmia with iron mixture along with the injections of hæmocystoserum or syrup hæmoglobin should be continued for about a month. Hepabos with pomegranate and orange juices, coupled with Campolon injections intramuscularly, help in restoring the patient to his normal health. A dose of Tomb's mixture, one drachm to an ounce of water, should be taken at bed-time daily as a prophylactic measure during the epidemic period. Any tendency towards constipation or diarrhœa should be carefully watched and properly treated.

SOME SPECIFIC METHODS OF TREATMENT

Experience so far obtained with the bacteriophage* treatment of cholera during the epidemics showed great variations in results. In some cases it works like a charm while in others no improvement can be noticed even though the treatment is continued for a sufficiently long period.

Failures with the bacteriophage treatment in these cases have been attributed to great variations in the virulence and strains of the cholera vibrios. The ideal bacteriophage would be one that has been freshly prepared from the local strains of cholera vibrios, so that uniformity in results in the particular area could be expected in majority of cases. It is therefore advisable that medical officers in charge of cholera epidemics in provinces other than Assam and Bengal should just in the beginning of the epidemic send the specimen of the cholera stools for the preparation of the specific bacteriophage either to Messrs. Bengal Immunity Co., or to the Pasteur Institute, Shillong, as is done for the preparation of the various auto-vaccines. Some time is likely to be lost in this process before we get the fresh and more reliable supply of local bacteriophage, but in case the epidemic persists for a long period this method would be warmly rewarded. In the meantime the stock supplies available at hand should receive a fair trial. Bacteriophage should always be kept in ice-chambers or very cool and dark places, otherwise their therapeutic value would be diminished.

If the patient is seen either during the first stage or the second stage, the results obtained with this treatment are very encouraging. But if no improvement takes place after 24 hours of treatment with bacteriophage, the line of treatment should be changed either to Tomb's cholera mixture or Sanitol which will be described hereafter.

During the 1st and 2nd stages, 3 c.c. of bacteriophage should be dissolved in 3 ounces of pure cold water and one dose of this is to be given every hour preceded by soda-bi-carb (grains 20) every time for the first 4 hours and then every 3 hours for the next 24 hours. No other antiseptic medicines should be given by mouth during treatment with bacteriophage.

*The writer has been using bacteriophage prepared by Bengal Immunity & Co., and Pasteur Institute, Shillong.

Mustard plaster over the epigastrium, atropine and strychnine, and dry cupping over the kidney region may be employed as per indications. Ice water in sips and lemon syrup with glucose can also be given freely.

If the patient is seen during the stage of collapse bacteriophage 1 c.c. with an ounce of cold water preceded by soda bi-carb (grains 20) every hour should be given. Atropine and strychnine injections should also be given in addition to the transfusion of hypertonic saline (4 to 6 pints) as already described. The same considerations against the repetition of hypertonic saline transfusion would be applicable here also, in which case isotonic saline intravenously and hypotonic saline subcutaneously should be given to avoid oedema of the lungs. Hyperpyrexia and excessive evacuations leading to dehydration should receive appropriate treatment.

**TREATMENT WITH CRESOL SAPONIFIED
OR SANITOL***

Very serious cases have been successfully treated with this method. Patients with common source of infection were given this line of treatment during the epidemic cholera which broke out at Katni Murwara in Jubbulpore district during June and July 1935 and the results were more favourable than with Tomb's mixture. In neglected and severe cases the improvement cannot be noticed within 48 hours but if persisted many apparently worst cases may revive. Intravenous transfusion of hypertonic saline should in addition be resorted to if the necessary indications be present.

The following doses are prescribed by Col. Palmer according to age.

Age	Cresol or Sanitol	Acid sulphuric Armstrong	Water
1 to 3 years	m. 1	m. 2	Ounce 1
3 to 6 "	" 2	" 4	" 2
6 to 9 "	" 2	" 6	" 3
9 to 12 "	" 3	" 8	" 3
12 years and adults	" 4 to 5	" 10	" 4

The dose may be repeated as often as necessary.

PROPHYLACTIC TREATMENT

Prevention is better than cure and is more important as the control of the epidemic mainly depends on the effectiveness or otherwise of the prophylactic measures. There should be a thorough co-operation between the medical officer, sanitary staff, patients and their attendants, otherwise the question becomes a difficult one.

Education: Every year during the non-epidemic period regular lantern lectures on cholera should be organised in schools and public places so that the people would know the mode of infection, its spread, and the danger of neglecting sanitary measures. Printed instructions regarding prophylactic measures to be adopted during the epidemic period should be freely distributed amongst the public.

Notification: If the importance of early detection of cholera and its notification to the health

*Frank Ross & Co., as outlined by Col. Palmer.

officer could be realised the disease can be nipped in the bud. The medical officers and their sanitary staff would then be in a better position to take adequate measures in time before the epidemic spreads. Private medical practitioners should make it a point to report suspicious cases. As soon as the epidemic is declared a small cholera committee should be formed to watch whether prophylactic measures are strictly carried out in their respective areas. In addition to the inoculation work, private medical practitioners should volunteer their services and be kept on duty turn by turn for the active treatment of the cases who cannot afford to pay for their medical aid. A progressive daily statement of new attacks and deaths should be prepared by the sanitary inspector and submitted to the health officer who will be able to judge the results of this prophylactic campaign. Special volunteer corps such as boy-scouts, St. John Ambulance, Seva Samiti dal, and like bodies should be requested to undertake the job of rendering active help to the actual sick by way of supplying medicines etc. The initial signs and symptoms of the various stages of cholera should be thoroughly explained to these volunteers and the members of the cholera committee, so that they will be in a better position to keep the medical officer well-informed about the actual stage of patient's condition. Due to the reliability of such information much time can be saved and the medical officer in charge will be able to use his discretion as to which patient needs his immediate attendance.

Segregation and Isolation of the sick: Members of the cholera committee would pick up the suspected cases in their respective wards and with the help of the volunteers working under them arrange for their despatch to the isolation hospitals. Proper facilities of conveyance of the sick should be made available throughout 24 hours in every ward. A ward member and 4 volunteers would form a transport unit for every ward and should be supplied with one stretcher. They will also inform at once the health officer about the actions they have taken. The isolation hospitals should be within the reach of the people. The cholera cases or even the suspected ones should not be admitted into the general hospitals under any circumstances for fear of infection being spread to others in the hospital who are generally in a low state of health. If for any reason the patient is unwilling to go to the isolation hospital, strict segregation and isolation of such patient in his own house should be enforced. In rural areas this supervision work can be entrusted to the members of the village panchayat or in its absence to the Patels and Patwaris.

Inoculation: Mass inoculation with cholera vaccine would give active immunity against the disease and should be carried out vigorously no sooner than the epidemics is declared. As there is no legal compulsion, as in the case of small-pox vaccination, great tact is required to induce the public to submit to

inoculation. Cholera inoculation in two stages, first dose 0.5 c. c. to be followed after three days by a second dose of 1 c. c., has been found more useful, and should be done whenever possible. Generally, majority of the people are against injections and as such it would be very difficult to carry on inoculations in two stages, specially when they are to be done on a large scale with a limited number of medical officers. In practice 1 c. c. of cholera vaccine injected in one dose has given equally good result and should always be carried out as it would be too much to expect of the lay public to return for a second prick. If the inoculation has been done during the incubation period patients cannot escape the attack and the public mind is therefore likely to be prejudiced against it. Proper discretion should then be used and the inoculation postponed for the time being if one is found sickly and in a lowered state of health. After ten days of the inoculation one gets sufficient immunity which affords necessary protection against cholera and even if one catches the infection after this period, the signs and symptoms are always mild and the prognosis is good.

It has been found that the immunity obtained from cholera inoculation lasts for 6 months only.

Liberal supplies of cholera vaccine should be made to the private practitioners during the epidemic period. Public should be informed by the beat of drum of the various centres and timings of the inoculation work. In big towns and cities these centres should be within the reach of the public, and one centre for each ward would solve the difficulties. Lady doctors either in service or in private practice should be requested to look after the inoculation of the purdah women and their children, otherwise they would never attend the inoculation centres. Pilgrims intending to attend the melas, fairs or bathing festivals should report to the local hospitals and get themselves inoculated about a week prior to their departure. Facilities are always provided on big railway stations and junctions for the inoculation of pilgrims going to sacred places. None should be allowed to attend these melas, fairs or bathing festivals unprotected. Some provision in the present law for their compulsory inoculation is absolutely necessary. Many a time inoculations are done very late when the epidemic is on its decline or has already subsided. Any amount of vaccine thus spent should be considered as a simple waste of money, time and energy.

Disinfection: Disinfection and protection of the drinking water supply from being polluted should receive immediate attention of the health officer. The source of the infection must be traced out by a thorough spot enquiry and further use of the infected water for any purpose should be prohibited. If the tank or river water is responsible for the infection, temporary wire-fencing should be erected round the banks of the river or a tank and the route used by the public to fetch water should be closed. Residents of the infected mohalla should be explained the conse-

quences of and warned against the use of the polluted water. Special guards should be appointed to stop the public from using the infected water and to report the offenders to the proper authorities. In big cities where arrangements for chlorinating the drinking water supply on a large scale are available, the task of the health officer becomes an easier one. If on the other hand the source of infection could be traced to a particular well it should be thoroughly treated with potassium permanganate. Generally 4 ounces for a small well, or 8 ounces for a big well should be used twice a week for disinfecting the well-water during the epidemic period as well as the whole rainy season. Sanitary inspector with his assistants would form a disinfecting gang and should look after this work for the whole period. In villages this work could be done by vaccinators or Kotwars. Chlorogen can also be used to disinfect the drinking water supply. If the water is muddy, a small piece of alum should be added to the boiled water during the previous night, so that all the dirt would settle down by the next morning. On no account the clothes of the cholera patients should be allowed to be washed in the neighbourhood of rivers or on the banks of the tank and wells from which the drinking water for the basti is mainly obtained.

Milkmen are always a source of great danger to the public. In spite of several warnings they will always try to adulterate the milk with infected water or wash their utensils with the dirty water in which the cattle are daily washed. Milk is a very suitable media for the cholera germs and often the source of infection can be traced to a common milk supply.

Next to milk, factories producing aerated water should receive the careful attention of the health officer. The proprietors should be cautioned against the use of ordinary water before it is boiled and properly disinfected. Stocks of soda-water and other drinks kept in the hotels and cinema houses should be checked from time to time. Public should be warned against the use of these waters which might form a source of infection. The aerated water factories should be regularly inspected to ensure cleanliness of the bottles, corks, water and the premises as well. Fortunately in rural areas the use of these drinks is rather limited.

Food: It should be protected from flies and should be well-cooked and fresh. The green vegetables and fruits should be washed with boiled hot water before being used. Meat markets should be daily inspected to prohibit the sale of bad meat while its sale in open places should be altogether stopped. Over-ripe and rotten fruits should be seized from the bazaars and destroyed far away from the basti. Over-feeding, heavy night meals and starvation should be avoided during the epidemic period.

Disposal of infected materials: Disinfection of the stools and urine of the patient should be carried out with carbolic or cyllin lotion. Ordinary lime is equally good. The excreta is finally burnt in an incinerator, or trenched in suitable places. Liberal supplies of cyllin or phenol should be made available for free distribution to the poor families and at reasonable cost to the other public by the municipal committee and district boards who are mainly responsible for public health. Disinfection of the clothings, beddings, bed-sheets, *gad-lies*, and *durries* used by the cholera patient offers difficulties when no arrangements for steam disinfection are available. Burning is the only best way of disinfecting clothes but as it is uneconomical the linen may be kept soaked in cyllin or phenol lotion for about 6 hours, and then boiled thoroughly before they are finally washed with ordinary soap. They should be exposed to the sun for 24 hours before they could be used by other people.

Disinfection of the rooms in which the patients are accommodated should be done with cyllin lotion. The walls and floor of the room should be daily sprayed. Chlorinated lime may be spread over the floor and should always be at hand in villages to treat the excretions of the cholera patients effectively as the supply of cyllin and phenol are very difficult to obtain in the rural areas.

Transport: Means of communication to and from the infected areas should be temporarily stopped. Milk, fruits and other articles of food coming from the infected area should be forbidden and should not be allowed for sale. The movements of the travelling tribes should be restricted. Returning pilgrims should be instructed to disinfect their clothes and other belongings. Suspicious cases should be notified to the medical officer in time.

CONCLUSION

Thorough organisation is absolutely essential for an effective control of the cholera epidemic. In big towns and cities one cholera expert assisted by a small cholera committee as suggested above would always be of paramount importance to organise and look after the various problems that crop up during the epidemic periods. In rural areas the difficulties of obtaining efficient medical aid are numerous, and only medical officers with good experience should be deputed to the panic-stricken villages. The public should realise the gravity of the situation and carry out the instructions of the medical officers with loyalty.

REFERENCE

- H. GOSH—Cholera : Choice of stimulants - Prevention and Treatment of the cedema of the lungs.
Ind. Med. Jour. Vol. 32, No. 1, p. 1.

Medicaments in Cholera*(Culled from Different sources)***ANTISEPTIC REMEDIES**

- (1) Calcium or potassium permanganate gr. 1 to 6
Aqua ad pint 1

To be given as often as possible in the stage of premonitory diarrhoea.

It may also be given in the form of keratin coated pills. It appears to act by converting the highly toxic nitrites formed in the intestines by the cholera vibrio into nitrates.

- (2) *Tomb's cholera mixture:*

Spts. æther	m. 30
ol. carryoph	" 5
ol. cajup	" 5
ol. junip	" 5
Acid sulphuric aromat	" 15

One drachm in half an ounce of water every half an hour. Average dose required is approximately 8 drs. One drachm daily may be given as a preventive.

It is said that the carbolic acid contained in the oil of cloves is responsible for the success of Tomb's cholera mixture.

ASTRINGENT REMEDIES

- (3) Acid hydrocyanic dil. m. 4
Vinum pepsin dr. 1
Liq. bismuth m. 30
Aqua chloroform ad oz. i

Half an ounce every 4 hours till vomiting stops.
or

- Cocaine gr. 2
Aqua ad oz. 3

One drachm every hour in intractable cases of vomiting, not amenable to the above mixture or to the simpler methods such as ice to suck or mustard plaster over the epigastrium.

- (4) Kaolin oz. i
Aqua ad " 6

One ounce every half-an-hour.

It is said to absorb or physically fix up the bacterial toxin and prevent its absorption. Osmo-Kaolin is a colloidal preparation, one teaspoonful of which may be given every hour in the place of ordinary Kaolin.

- (5) Kaolin dr. 2
Bismuth salicylas gr. 10
Tannalbin " 5
Pul. creta " 10
Mucilage qs. 8
Aqua cinnamon oz. i

One ounce every four hours for moderate purging. of urine.

- (6) Tannalbin gr. 5
Pul. creta arom. c opia " 15

One powder every three or four hours for moderately severe purging.

- (7) Tr. opii m. 10
Acid sulph. dil. " 15
Tr. card. co. " 20
Aqua cinnamoni ad oz. i

One ounce every four hours to check severe purging.

Tr. camphor co., chlorodyne or camphordyne may be substituted for Tr. opii. It must be noted that opium in any form is contraindicated in the later stages of cholera.

REMEDIES TO COMBAT DEHYDRATION, SHOCK AND TOXEMIA

- (8) *Hypertonic saline for intravenous transfusion:*

Sodium chloride	gr. 120
Pot. "	" 6
Calcium "	" 4
Sterile water	pint 1

The fluid should be at a temperature of about 100°F if the rectal temperature is below 99°F; if the rectal temperature is above 100°F, the temperature of the saline should not be above 90°F. The flow should not be more than 4 oz. per minute. Quantity to be given: if sp. gravity of the blood is 1063-3 pints; if 1064-4 pints; if 1065-5 pints. If sp. gravity of the blood is lower than 1060, hypertonic saline is contraindicated—isotonic saline should be used instead. Bayliss suggests the addition of a 6 or 7-per cent solution of gum acacia to fix the salts to the tissues and to combat shock and collapse. Glucose, sodium bicarb (gr. 60 to 90) and adrenalin (1-1000) may be added, if uræmia supervenes. Rogers combines hypodermic injections of atropine 1/100 gr. morning and evening and states that it adds to the effect of hypertonic saline transfusion.

- (9) *Isotonic saline:*

Sodium chloride	... gr. 90
Calcium " ...	... " 4
Sterile water ...	... pint 1

This can be given when hypertonic saline is contraindicated owing to the low specific gravity of the blood or severe reaction or pulmonary oedema. It simply increases the volume of the blood, dilutes the toxin and favours elimination through skin and kidneys.

- (10) *Alkaline saline:*

Sodium chloride	... gr. 60
" bicarb	... " 160
Sterile water ...	... pint 1

For uræmia, to combat acidosis and suppression

SAFEGUARD THE EXPECTANT MOTHER

HORLICKS as an addition to the diet of the expectant mother—

1 PROMOTES SOUND SLEEP AND NEUTRALISES EXCESS ACID WASTE PRODUCTS

2 PREVENTS AND RELIEVES MORNING SICKNESS

Horlicks has a high anti-ketogenic value; many cases of morning sickness are associated with a mild ketosis.

3 HELPS THE ELIMINATION OF WASTE PRODUCTS

Experience shows that Horlicks promotes good bowel habits and helps to overcome constipation.

4 IN THE LATER MONTHS PROVIDES EXTRA NOURISHMENT

in a partially pre-digested and easily assimilable form.



HORLICKS is pure fresh cow's milk modified with the nutritive extracts of malted barley and wheat.

Bombay,.....

Dear Colleague,

According to your last letter I am glad to draw your attention to ALCOPHLOGISTIN.

ALCOPHLOGISTIN is prepared from finely powdered Dehydrated and Sterilised Aluminium Silicate, chemically pure concentrated Glycerine, Boric and Salicylic Acids, Methyl Salicylate, Peppermint and Eucalyptus oils and Compounds of Iodine.

This thoroughly antiseptic preparation supplies continuous moist heat, and destroys the infecting germs. In the treatment of Pneumonia, Influenza, Pleurisy, Colds, Inflamed Breasts, Swollen Joints and Glands and whenever Inflammation and Congestion is to be treated, I have been freely prescribing ALEMBIC'S ALCOPHLOGISTIN with great confidence and remarkable success. I therefore recommend you to prescribe it in your practice also.

Yours sincerely,

Dr.....



**for
INFLAMMATION
AND CONGESTION**

ALCOPHLOGISTIN

**ALEMBIC CHEMICAL WORKS Co., Ltd.
Bombay, Baroda, Madras, Calcutta.**

(11) Hypertonic glucose solution:

Glucose ... oz. 5
Sterile water ... pint 1

Rogers recommends this to be given intravenously for suppression of urine.

(12) Atropin sulphate 1/100 gr. hypodermic.

Rogers recommends its regular use morning and evening in severe cases of cholera. It acts as a cardiovascular and respiratory tonic, and is useful in extreme collapse with cyanosis, pulmonary complications and heart-failure.

(13) Strophanthin 1/100 gr., digitalin 1/100 gr., strychnine 1/130 gr. are indicated singly or in combination for threatened heart-failure. Given hypodermically.

(14) Castor oil 1 oz.

Dr. Gosh strongly recommends this for pulmonary oedema, and Dr. Guin advises its repeated administration for severe uræmia.

SPECIFIC REMEDIES

(15) Palmer's cresol treatment:

One to four minims of cresol, according to the age of the patient, are dissolved in a similar number of ounces of tepid water. To be given frequently as per indications. Palmer recommends the addition of 3 to 10 minims of acid sulphuric aromaticus per dose.

(16) Anti-cholera bacteriophage:

These are available in 6 to 12 ampoules of 3 c. c. each. They are made up of various races of highly virulent cholera bacteriophage isolated from cases of cholera in our country. The contents of one ampoule are given in an ounce or two of alkaline water every one or half-an-hour according to the severity of the case. There is no danger of excessive dosage and it can be given *ad libitum*. In fulminant cases it can be given intravenously even, along with saline transfusion. But no internal antiseptics of any kind should be administered either before, during or after bacteriophage therapy. It is best given in an empty stomach. If after 24 or 48 hours improvement does not set in, it means that the bacteriophage used is ineffete either because it has deteriorated or it is not homologous to the infecting cholera vibrio strains.

The anti-cholera bacteriophage, one ampoule in alkaline water every morning for three or four days, can be used as a prophylactic during the season of cholera epidemics. *Reliable and highly potent specific bacteriophages can be obtained from any of the provincial depots, of Messrs. Bengal Immunity Co., Ltd., or Bengal Chemical and Pharmaceutical Works, Ltd.*

It must be clearly understood that saline transfusions, when found necessary, are not at all

contraindicated during bacteriophage therapy. In fact such transfusions are necessary in all serious cases, because bacteriophage therapy can only inhibit the multiplication of cholera vibrio in the intestines but has no effect on dehydration and toxæmia.

(17) Anti-cholera serum (polyvalent).

It is available in 10 and 25 c. c. ampoules. 10-25 c. c. intramuscularly or subcutaneously, is given as a prophylaxis. 25 to 50 c. c. intravenously well-diluted with warm saline, is given as a curative.

(18) Prophylactic cholera vaccine.

It is usually issued in the strength of 8000 million dose per c. c. It is necessary that the strains used in the preparation of the vaccine must be fresh, as it has been found that the old preserved laboratory strains are useless. It is also necessary that strains must be polyvalent as most of the strains are antigenically different. Experience has proved and established the necessity of frequently testing the cholera vaccine for potency and polyvalency, as they are lost by lapse of time. This vaccine is used for mass inoculation during epidemics, and for protecting such of these persons who proceed to infected areas, particularly for festivals in the sacred places of India. Usually two injections of 1 c. c. each are given at intervals of a week or 10 days, but in cases where this is not possible single injection alone is given, and this has been found to be quite satisfactory. It is advisable that persons living in endemic areas should be protected against cholera before the advent of the cholera season.

(19) Bili-vaccine cholera. Prof. Bersedka was the originator of oral prophylactic or curative vaccine. He found that heat-killed bacilli introduced into the intestines by the oral route brought about immunity almost immediately. Since the germs do not make their way into the intestinal cells in the absence of lesions, Bersedka advised a prior administration of bile extract which has the acknowledged property of sensitizing the intestinal surface by sweeping away the mucosa and thus laying bare the receptive cells.

Bili-vaccine cholera (available in tablets) is said to protect the individual for one year and to establish immunity within 48 hours. No reactions or contraindications.

Adults are given 3 tablets of vaccine and 3 pills of vegetable bile, early morning in empty stomach. Each tablet contains 50 mg. heat-killed and desiccated cholera vibrio prepared from Indian strains by La Biotherapie Laboratory, Paris. It is available in our country from G. Loucatos & Co., Bombay, Calcutta or Madras.

Cholera Bi-oro-vaccine is a similar preparation by the Bengal Immunity Laboratories, Calcutta. It is issued in boxes of 6 ampoules in 10 c. c. and administered in the same manner as Bersedka's bili-vaccine.

Our London Letter

(From Our Own Correspondent)

ABERDEEN SESSION OF B. M. A.
PRESIDENT'S SPEECH

Despite the pre-occupations and anxieties arising out of international situation, the 107th session of the British Medical Association kept up to its schedule and finished its business with its usual success. Thomas Fraser's presidential address, often punctuated with cheers, recounted the history of the Association: how it was responsible for the birth of the General Medical Council and for the many Medical and Public Health Acts sponsored by the Parliament during the last 100 years. "It has experienced the usual ups and downs" he said, "but the up-strokes on the chart of progress have steadily transcended the down, and is now holding the annual meeting for the second time in this historic city at its highest peak not only in membership but in influence with the community and the State, its area empire-wide and its public spirit second to that of no other similar body; in 1914, when the meeting was last held here its membership was in the region of 22,000; now it is 38,000 showing a remarkable and steady increase, a tribute to the sterling character of its work." He pointed out that it was mainly due to the work and influence of the Association that the practitioners were able to secure better terms and capitation fees in the panel service inaugurated by 'that stormy petrel of politics—Lloyd George'. He protested against the labelling of the Association as a trade union, and this, in his opinion, was due to the confusion between the General Medical Council and the Association, especially at times when the press recorded disciplinary action taken by the G. M. C. The Association had never advised its members to strike in the trade union sense, although, as its duty to protect the interests of the practitioners, it does advise refusal of service in underpaid establishments. The Association was, he continued, an effective force in the orderly progress of medicine and public health, and had often contributed to it by initiating programmes and schemes for public welfare. Its nutrition report, and the schemes of General Medical Service for the nation were outstanding examples of hard work and anxious endeavour to improve the status of the profession and the security of the public in the matter of curative and preventive medicine. 'One feels confident' he concluded, 'that so long as it continues to attract to its Council men of knowledge, public spirit, wisdom and vision, its accomplishment in that direction in the future will transcend all its past achievements'.

DISCUSSION IN THE REPRESENTATIVES' MEETING

A good amount of heat was generated by some speakers particularly while discussing the Association's policy regarding propaganda, nutrition committee, refugee practitioners and the position of the general practitioners in medical schemes and programmes. Dr. Dain, Chairman of the propaganda committee, presented the official report, and although the work of the committee was severely handicapped by international affairs, some good work was yet done, he said, and whenever there was opportunity the committee intervened to present the doctor's point of view. In

Northern Ireland it had also assisted in the preparation of a series of articles which had been published in the newspapers there. Pridam, Morrison and Gardner complained that the report was placed to late before the Representative Body to allow intelligent study and discussion, and believed that the committee was "trying to sell something by painting the exterior with a pretty colour". Finally, however, the report was adopted without any dissent. So also the report of the Nutrition Committee though one member protested that such work fell within the Province of the Ministry of Health and not of the Association. While discussing the work of the General Practice Committee, Dr. Carter regretted that there was a very scanty representation of general practitioners. His motion disapproving the decision of the Council in not having taken any action on the last year's resolution on this subject was carried, while McKerlie's motion to confine the membership of the Committee exclusively to general practitioners was lost by a large majority. Earnest Ward regretted that the Council did not consult the Representative Body regarding the admission of further fifty refugee practitioners and hoped that in future at least such consultation would take place.

Numerous other subjects of importance were also discussed. The official motion to disaffiliate the B. M. A. from Association Professionnelle Internationale des Medicines was defeated for the reason, as Peter Macdonald said: "In the A.P.I.M. there was a glimmer of internationalism left, was that flickering flame to be extinguished?" Earnest Ward's resolution to strictly limit the number of non-nationals admitted to the Medical Register was carried. Twining's motion to discontinue the interleaved advertisements in the *British Medical Journal* as being 'objectionable, inconvenient and undignified' was lost, and Henry Robinson even protested against the violent language of the resolution and its mover. Dr. Gordon, chairman of the Journal Committee, presented the report of the work and progress of the Journal and he detailed the various improvements made in the format, the presentation and publication of medical literature and the business side of the Journal. He said that it would not be desirable to state in public exactly how much of the member's subscription went to the Journal, but he was in a position to say that the sum paid to the Journal from subscriptions would be less than the preceding year, notwithstanding the increased cost of production. McCarthy said that he was very much perturbed at the increasing gap between costs and receipts which seemed to have assumed alarming proportions. He maintained that the Journal should pay for itself, as after all the people who could read it were the "retired and the semi-retired practitioners." He also said that the size of the Journal should be reduced which would automatically result in reduction of expenditure. These were no doubt harsh criticisms, but the report was adopted. Boyd's motion protested against the monopoly of auxiliary hospitals and nursing homes by specialists and consultants on the staff of the hospitals to the exclusion of practitioners not on the staff. He however finally withdrew his motion as the Chairman of the Committee was almost in entire agreement with him and promised to do the needful. Then the question whether anaesthetics could be administered by midwives gave rise to a heated discussion in which ethics and experience were pitted against each other, resulting finally in the decision that it would be unsafe and inexpedient to allow the midwife to administer anaesthetics. The most important of all the resolutions discussed in the Representative Meeting was the one

Our American Letter

(From Our New York Correspondent)

BLOOD PRESERVATION

Duliere reported in 1931 a constant enrichment in the serum potassium of blood kept in contact with cells over a period of days. In their new studies in blood preservation, Scudder, Drew, Corcoran and Bull came to the following conclusions:—

There is a daily increase in the plasma potassium of preserved blood kept under aseptic, bacteriostatic conditions, with increments reaching as high as 1000 per cent. None of the preservatives tested prevent this diffusion of potassium from the cells, the lowest rates being found in blood preserved in a mixture containing 0.3 gm. of sodium citrate per hundred cubic centimeters. Agitation, such as shaking, hastens the loss of potassium from the cells.

The shape of the container markedly influences the rate of potassium diffusion; the greater the interface area between the cells and the supernatant plasma, the greater the rate of diffusion. This suggests that tubular containers may be preferable to wide-bottomed flasks. There is no parallel between the rates of diffusion of potassium and haemoglobin; hence the degree of hemolysis cannot serve as an index of plasma potassium. In pathologic states associated with potassium retention or sensitivity, the use of blood preserved too long seems ill advised.

The parenteral administration of potassium is associated with toxic manifestations of both muscular and nervous tissue together with a depression of the central nervous system. The almost specific action of potassium is on the heart and circulation, with disturbances varying from diminished cardiac output to immediate diastolic arrest. Recovery may be affected by artificial respiration, cardiac massage, the use of oxygen, injections of salt solution and administration of cortical extract in large doses.

"FRORYEN SLEEP" FOR CANCER

Dr. Temple Sedgwick Fay, head of the neurology department at Philadelphia's Temple University, and Dr. Lawrence Weld Smith showed to the St. Louis meeting of the American Medical Association a method of relieving the pain of cancer patients with ice blankets. The authors induced 38 volunteers who suffered from incurable cancers to "freeze" their tumors, possibly to prevent the multiplication of cancer cells.

The patients were stripped, placed on beds and piled high with crushed ice. An electric fan blew chill winds through the cold room, and soon after the first numbing pain of the ice obliterated by anaesthetics, they fell into a frozen slumber. For five days they remained in a coma. Pulse beats became imperceptible. Kidneys and digestive organs no longer functioned. Their metabolism slowed down 10 to 20 per cent. Their general body temperatures fell from a normal 98.6° F. to 90 and 89°. The temperature of one woman was carried down to 82° for a short time. Only sign of life was the silent, easy rhythm of their beating hearts.

After five days of lethargy, the doctors awakened the frozen patients with warm applications and steaming cups of coffee. As they opened their eyes, said Dr. Fay, they all smiled, commented on their deep, dreamless sleep. Not one of them developed pneumonia, or even a slight cold, for all the germs in their bodies were slowed down by refrigeration. All reported "definite relief of local pain." The growth of the tumors was checked and some of them even shrank. No new

moved by Gray on the subject of Public Medical Service. He urged for the immediate formation, extension and development of Local Public Medical Services in all parts of the country as now prevailing in London with satisfactory conditions of service and remuneration, and for the inclusion of general practitioners in such services. The Chairman of the Council felt astonished that the Council's policy should be so misunderstood, and repudiated the charge of lukewarmness in support of Public Medical Services. Some of the members urged the necessity to pay subsistence allowances to members who attended the meeting of the Representative Body or other committees of the Association, and Howells argued that "if the Representative meeting was for the good of the profession, it should pay for it." Arthur said that it cost him 7s. 6d. an hour for the privilege of attending the Representative Meeting. Leak said that if the Association did not pay the representatives, the Government could hardly be expected to pay doctors more. Spengin maintained that the essence of the Association was now and always based upon voluntary service. The Treasurer, Dr. Bare, said that the question was a complicated one, but he had no objection to refer the matter to the Council for enquiry and report, so that the representatives would know what the cost would be. The motion was finally lost by a heavy majority.

Other subjects of local and general interest, as well as the planning of emergency organisations of the profession in time of war were discussed and suitable decisions taken. The House appreciated the efforts of the Central Emergency Committee and the co-operation of the Ministry of Health and of Defence in giving concrete shape to the suggestions of the Association. It voted against compulsory immunization for diphtheria, and the recognition of lay psycho-analysts and therapists. It urged on the Ministry of Health to arrange suitable schemes and afford adequate funds for post-graduate courses to the panel practitioners.

Sir Beckwith Whitehouse was unanimously elected President of the Association for 1940-41, and the 108th sessions would take place in Birmingham.

The present session ended on July 27, after the usual annual dinner. Souttar, Chairman of the Representatives' Meeting, replying to the toast of the Association, said that next to the King Emperor the British Medical Association was one of the greatest imperial bonds and that on the solidarity of the British Empire depended the peace and the happiness of the whole world. The proceedings closed with *Bon Accord—happy to meet, sorry to part and happy to meet again*.

The Aberdeen Session was one of the most successful of B. M. A. sessions and the attendance of the members of the Representative Body was better than last year, though one member pointed out that it was poorer compared to American Medical Association's, and though at a certain stage of the proceedings there was no quorum, and the members had gently to be chastised by the Chairman for having left without permission. B. M. A. is indeed a powerful body today, and if only it makes genuine attempts to become more popular among the practitioners than what is the case now, it is bound to become a great asset to the British Medical Profession and the British nation. There is a feeling that the general practitioners are made scape-goats of policies and programmes which they do not really approve or think them to be of benefit to the profession as a whole. As in politics so in medicine, the Briton is a conservative—he changes rightly but changes slowly. He believes in orderly evolution.

The proceedings of the scientific section will be reported in my next letter.

metastases were observed in them. Despite the shrinking of their tumors, the disease had already progressed too far in most patients, and several months after refrigeration they died, while a few of the patients given this treatment are still living and comfortable.

"It is not a method of treatment of cancer" says Dr. Fay, "but suggests an important new adjunct to therapy." May be this refrigeration will be useful as a general cleaning-up treatment to rid the body of any dangerous germs it may harbour. Thus it will be tried probably on cases of heart disease, insanity, tuberculosis and other degenerative and infectious diseases.

SYMPOSIUM ON SULFANILAMIDE

One of the most complete symposium on the use of sulfanilamide has appeared in the U. S. Naval Medical Bulletin. Bell points out the fact that a blood level of 10 mgm. per 100 c.c. has proved adequate, and larger doses lead to toxic effects. The simultaneous administration of sodium bicarbonate may prevent many of the moderately toxic symptoms, and this alkalization enhances the therapeutic effect. The drugs of the sulfanilamide group are not cure-alls; they have a definite effect on the body cells, and are a valuable adjunct to established therapy, but their limitations must be recognized. When properly used, they are reasonably safe but it is necessary to obtain frequent white and red blood cell counts during therapy to be forewarned of impending neutropenia and anaemia.

Matbis, McNamara, Zikmund, Young and Ward conclude that sulfanilamide alone, or in combination with a standard local treatment, is an effective therapeutic agent in gonorrhoea. They recommended the following dosage:

	Grains		Grains
First day	60	Seventh day	80
Second day	80	Eighth day	80
Third day	120	Ninth day	60
Fourth day	120	Tenth day	60
Fifth day	120	Eleventh day	60
Sixth day	80	Daily thereafter	40

Ward concludes that sulfanilamide, 20 gr. q. i. d. for five days, gives quite as satisfactory results as much higher dosages, but Young concludes that, although the use of sulfanilamide may be recommended in all cases of gonococcal infection, its use should be discontinued after the first week if the results are not satisfactory.

DR. CHARLES H. MAYO IS DEAD

Dr. Charles Horace Mayo, one of the most famous surgeons in the country, who with his brother, Dr. William J. Mayo, made the Mayo Clinic world renowned and established a research foundation at Rochester, Minnesota, that became the medical Mecca of the world, died of pneumonia in a Chicago Hospital, shortly before his 74th birthday.

Both were acknowledged to be unusually competent surgeons long before the World War. Physicians and surgeons from all parts of the world have flocked to the Mayo Clinic in latter years. It has expanded, since it was founded by Dr. Mayo's father, the late Dr. William Worrall Mayo, from a modest clinic attached to a small hospital to one of the largest and busiest medical centres in the world. Dr. Charles H. Mayo was the younger of the two brothers.

In 1919, there were 60,645 registrations at the Mayo Clinic. The number of patients has increased every year, and today there are more than 500 physicians and surgeons and 1,200 other workers employed in the various departments of the clinic. Dr. Charles Mayo had performed thousands of operations in the course of

INDIAN MEDICAL NEWS

(From Our Own Correspondent)

The Editor has issued a mandate to me to be brief, as he cannot afford the usual space allotted to this letter owing to war crisis and consequent scarcity of paper. I am not in a position therefore to spin out my letter as before, and I do really sympathise with the position of the Editor whose space has suddenly become restricted while the demands on the same has been increasing month by month. The readers must rest satisfied for the time being with a brief resume of *Indian Medical News*.

The Government of India defence organisation is a master-piece of achievement. Within less than a week it has begun to function efficiently in which medical emergency arrangements form an important part. Ambulances, nurses and medical personnel are ready in every province for active service within or without India. The response of the princes and people of India indicate their unity and grim determination to stand by Britain in this hour of great peril to civilised humanity.

The Punjab Government will shortly give effect to a scheme intended to provide medical aid for 16,000 families in the far-away villages of that province. It is based on a co-operative system: 50 per cent will be contributed by the Government, 25 per cent by the concerned District Board and 25 per cent by the Medical Benefit Society. This differs from the Madras scheme in the fact that the Punjab Government is giving a reasonable quota while the former does not.

The Government of Bengal have allowed free microscopic examination of all sputum sent by the private practitioner to the Government Laboratory. The Madras Government has reduced the usual charges by half. Other provinces are likely to follow suit.

Following is the personnel of the Public Health Subcommittee of the National Planning Committee: Chairman—Col. R. N. Chopra; Secretary—Dr. Jivaraj N. Mehta; Members: Drs. S. S. Sokhey, B. C. Roy, Slim-uz-zaman Siddiqi, Deshmukh, J. C. Ray, Col. Abdul-Rahman and others. The subjects under its purview are Health-insurance, Nutrition and Medical and Public health relief.

The Punjab Government has issued the following amendment to rule No. 17 of the Government Service Conduct Rules: No Government servant shall, by any utterance, writing or otherwise, discuss or criticize in public or at any meeting of any Association any policy pursued or action taken by the Government nor shall be in any manner participate in any such discussion or criticism.

The Madras Government has also issued a similar G. O. dated March 1939.

The Tropical School of Medicine reports that opium smoking habit is declining in India. The main causes of addiction are association with other addicts, minor ailments, hard work, worry or strain.

The following hospitals in India have taken advantage of Lord Nufeld's offer of 'Iron Lung': (1) Ross General Hospital, Port Blair; (2) New Victoria Hospital, Ajmer; (3) Civil Hospital Mercara; (4) Irwin Hospital, New Delhi; (5) Lady Hardinge Medical College and Hospital, New Delhi; (6) Civil Hospital, Quetta.

his career. He was recognized in America as the originator of modern goitre surgery and as a pioneer in surgical treatment of the nervous system. Many of the greatest universities in the world conferred honorary degrees on him.

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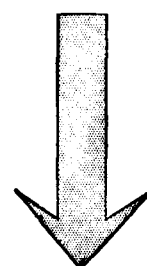
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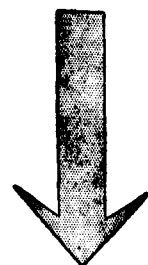


such as Malaria, convalescence is often of long duration. In most of these cases metabolism is completely disturbed.

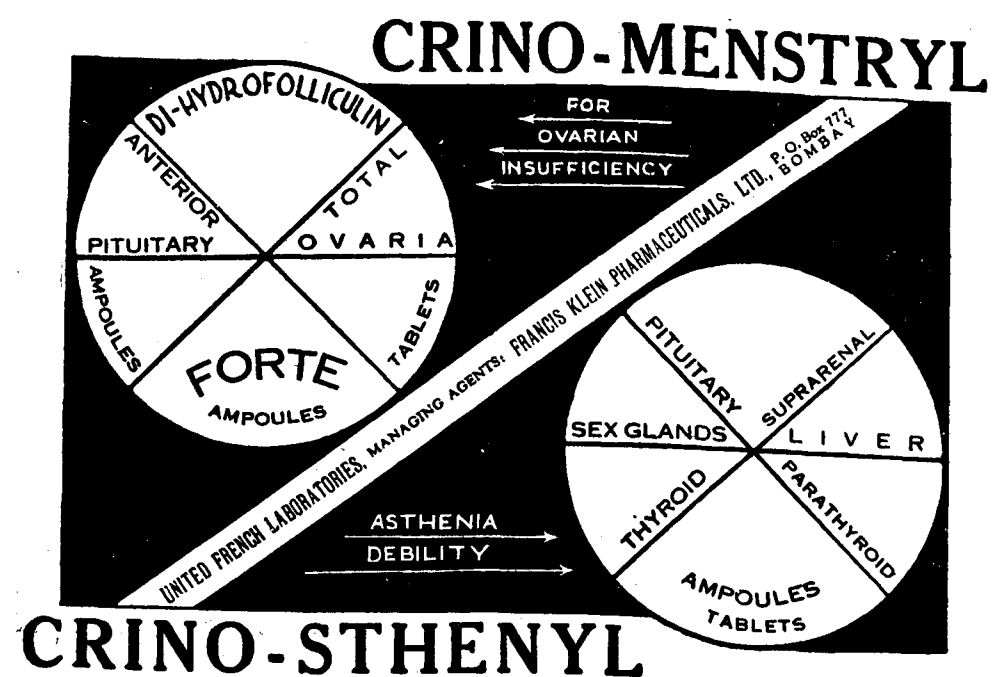
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(Wien. Med. Wschr., 84, No. 34.)



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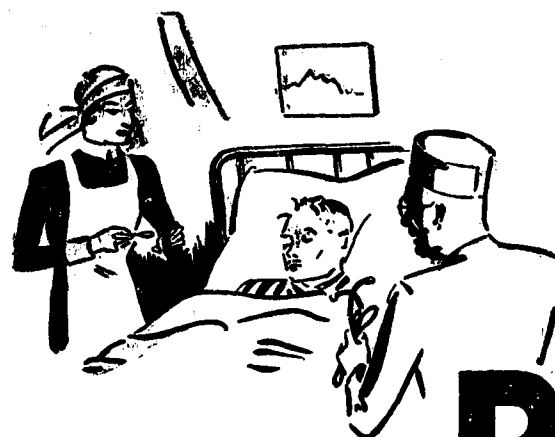
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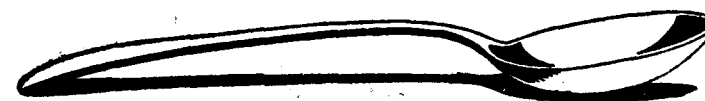
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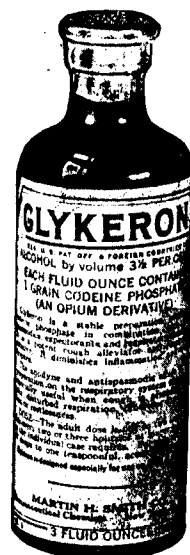
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