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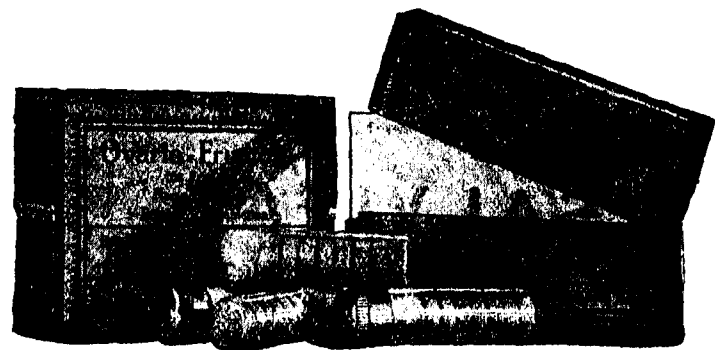
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EDITOR

Dr. M. R. Guruswami Mudaliar, B.A., M.D. C.M.



Vol. VI. No. 2.

October 1926

Nothing is more estimable than a physician who, having studied Nature, knows the properties of the human body, the diseases which assail it, the remedies which benefit it, exercises his art with caution, and pays equal attention to the rich and the poor.—Voltaire.

Wheresoever the sun doth shine, wheresoever the wind doth blow, wheresoever there is an ear to hear, and a mind to conceive, there let the precepts of life be made known, let the maxims of truth be honoured and obeyed.—Anon.

There is to me an inexpressible charm in the lives of the good, brave, learned men whose only objects have been, and are, to alleviate pain and to save life.—G. A. Sala.

Vol. VI.	CONTENTS	No. 2.
		PAGE.
1. RESEARCH AND INDIAN MEDICAL STUDENTS By Captain J. C. David, M. B. B. S.		87
2. SOME ANOMALIES OF ORIGIN OF THE VERTEBRAL ARTERY By A. Ananthanarayana Iyer, B.A., M.B.B.S.,		96
3. THE SPLEEN By Dr. T. Krishna Menon, M.B. C.M.		101
4. PROLONGED LABOUR By Dr. P. Venkatagiri, M.B.C.M.		108
5. HEART FAILURE By Dr. K. Vasudeva Rao, M.D.		115
6. CATALYSIS—ENZYLE ACTION By S. A. Raghavaingar		121
7. CASE REPORTS A Case of Severe Abdominal Injury Two Unusual Cases of Liver Abscess A Peculiar Type of Eruptive Fever		128 130 133
8. CURRENT MEDICAL LITERATURE Differential Diagnosis in the Tropics Experience of Yellow Fever The Place of Anatomy in Medicine		138 140 141
9. MADRAS MEDICAL COLLEGE—ANNUAL PRIZE- GIVING		151
10. EDITORIAL COMMENTS		162
11. THE COLLEGE DAY (Friday 20th August, 1926). By T. K. Krishnawami.		165
12. SPORTING By R. K. Chettur		169
13. IN LIGHTER VEIN		175
14. LETTERS TO THE EDITOR		178
15. LIST OF PRIZE-WINNERS		181

THE MADRAS Medical College Magazine

Vol. VI

OCTOBER

No. 2

Research and Indian Medical Students

BY CAPTAIN J. C. DAVID, M.B.B.S.

Times out of number, we have heard the accusation levelled against the Indian student that he has no taste or capacity for doing any sort of scientific research. Are there any real grounds on which such an accusation can stand? Are we, Indian students actually so utterly incapable of original research? I anticipate the answer—it is an emphatic 'No'. Then, why is it that responsible persons indulge in such allegations? We are familiar with the original researches of pioneer Indian scientists, like Sir J. C. Bose who has converted the study of botany into a romance and Dr. C. V. Raman, F. R. S., whose researches on the scattering of light has procured for him the fellowship of the Royal Society. The other day, I read in *The Modern Review* of a lecture delivered by an Indian chemist—Venkataramiah was the name, I think—

to the members of the Academy of Science of Paris demonstrating to them that Hydrogen was trivalent. If this be true, it will mean a revolution in Chemistry and all our ideas of this science. I know there have been numbers of our young men who have done various and fruitful researches in other biological sciences. Coming nearer home to the medical research workers, we can testify to the world-famous researches on the etiology and treatment of Kala-Azar by Dr. Raghavendra Rao and Dr. Brahmachary. The Indian Officers of the Medical Research Department have not been lagging behind their European colleagues in pursuing various researches into questions of bacteriological, entomological and epidemiological importance. The names of Soparkar, Mhaskar and Turkhud are not unfamiliar to us. We hear every day about the work carried out at the Calcutta School of Tropical Medicine on the Indigenous drugs of India by Major R. N. Chopra, M.A., M.D., I.M.S. Students of Pharmacology are familiar with the work of Hardikar on the action of Quinine on metabolism. I daresay, there are many more of our countrymen who are even now engaged in scientific research for which they might in coming years become famous.

But we need not go away with the idea that all is well with India, for the number of our young men devoting their lives to purely scientific research is quite infinitesimal compared with the number of energetic European workers. We must admit that research as a career does not appeal to the average Indian Student. What is the cause of this? As usual with all the troubles of our land, the reason for this also is mainly economic. Research work does not pay. The social customs of our land also stand in the way. Before the young medical student

emerges out of the college with a qualification, he finds himself handicapped with a family to support. If he has no children of his own, the joint-family system provides plenty of responsibility for him. So, even the mind that may be best equipped for a career of research has to turn to the problem of keeping the wolf from the door. On the other hand, taking the instance of a brilliant young man who is keen on devoting his life whole-heartedly to research, can we direct him to any institution that is equipped for the purpose, where he will be made welcome and provided with the wherewithals for carrying out his ideas? Do our colleges and schools provide research laboratories for our graduates? I refer to the Medical Colleges in particular. There are no such facilities as far as I am aware of. Such being the case, it is a grievous wrong to label the whole lot of Indian students as totally incapable of original research.

Now that we have made sure this accusation cannot stand, the first and foremost need in the country, in order to foster this research spirit among our students, is, of course, to provide openings for them. Well equipped laboratories have to be installed in all our Medical Colleges. The only laboratories now in existence that afford scope for research are the Bacteriological laboratories scattered about under the Medical Research Department. But I know of no institution that welcomes young medical graduates, as well as others, to cultivate research as a career, except of course, the Calcutta School of Tropical Medicine. In this institution such a thing is even encouraged. Young graduates in Science as well as in Medicine are here allowed to pursue their own researches and also help in other work in the various laboratories devoted to Pharmacology, Protozoology, Bacteriology and Analytical, Physiological and

Physical Chemistry. I daresay that when institutions of this kind are established elsewhere in other centres, energetic and talented students will be eager to volunteer themselves for a career of research. In our own province, the King Institute at Guindy offers a good nucleus for a central research institution; but its distance from the city and the teaching centre is a great disadvantage. So the best solution will be to develop our own College as not only an up-to-date teaching institution but also for affording scope for Post-graduate research.

We are all conscious of the imperfections of the Science of Medicine in its different branches. I need not go into details and point out the scope there exists for most fruitful research in the fields of Physiology, especially in the functions of the endocrine glands, Pathology, more particularly of several obscure lesions, and Bacteriology, of certain diseases ranging from whooping cough to Epidemic dropsy, as well as in the domains of Therapeutics. I shall only take up one branch of our Science and try to show the avenues that exist for useful and scientific research therein.

Pharmacology is not a new subject. But it was comparatively recently that scientists applied the principles of Physiology to the study of the action of drugs. It is in this way that we learn the correct use of drugs and eliminate their empirical application in the cure of disease. There is a vast, yet scarcely explored field for such a study in India. Dr. Watt, the author of the work *The Economic Products of India* in his presidential address to the section of Pharmacology of the first Indian Medical Congress, 1894, said "I venture to think, gentlemen, our ignorance of the nature and character of the products of this country is the chief cause, not only of many of our own defects but of our want of scientific progression.

It is impossible to urge, therefore, in too strong terms, the desirability of greater attention being given to the study of the indigenous drugs of India." Speaking on the same occasion of the progress of Indian Pharmacology, Dr. Kaney Lal Dey said "Clear of the mythology and superstition from which, not unlike the medical science of Europe, it evolved, but which lingers still in India, the Science has in some measure at least demonstrated the marvellously liberal provision of curative and remedial agents within the reach of the teeming millions of this Empire." Much more recently, speaking on the same subject at a meeting of the Medical section of the Asiatic Society of Bengal, Major Chopra I.M.S., said "There is such an enormous field for research in this direction and so little has been done, that it is impossible for anyone individual or anyone institution to cope with it. A large number of workers are needed who will co-operate *with unbiassed minds* to find the truth. Chairs in Pharmacology should be founded by the various Universities and Medical Colleges, and facilities given for research work." Pioneers like Sir William Jones, John Fleming, O'Shaugnessy, Waring, Mohideen Sheriff, David Hooper, Dymock, Watt, Kaney Lal Dey, Major Basu and Colonel Kirtikar, who have tried to catalogue and study the Indian medicinal plants, have put us under a burden of eternal obligation to them. Though these worthy people catalogued for us the indigenous drugs, no attempt has been made to undertake a scientific study of these according to Pharmacological methods, except very recently when the section of Pharmacology was opened at the Calcutta School of Tropical Medicine. We owe a debt of gratitude to Major R. N. Chopra I.M.S., for initiating such a scientific study of these drugs.

The idea of such a study is not to add all these drugs

to the already overburdened Pharmacopœa. The underlying object, besides being to discover the truth of the so-called specifics and infallible cures much exploited in this land, is to make our country self-supporting in the matter of its drug supply. In the words of Dr. Watt "A child-like dependence is rapidly taking the place of self-help which in no department is more to be deplored than in that of the knowledge of indigenous drugs". If our country can supply its own needs our drug bill will certainly come down greatly; and considering the poverty of the masses and their inability to take advantage of the spread of scientific medicine in India, this cheapening will certainly be a boon.

More need not be said to convince one of the great usefulness of a well-directed research on scientific lines into the armamentarium of the village herbalist. Now let us consider the possibilities of some of the well-known indigenous remedies. The diuretic properties of *Boerhaavia diffusa* (Punarnava) were well known to the practitioners of the indigenous system of Medicine; but it was Major Chopra who worked out scientifically the pharmacological actions of this drug; and now very few medical practitioners can afford to dispense with this drug from their Pharmacopœa. *Adhatoda vasica* (adhatodai) has been reputed to be an expectorant and antispasmodic. Its leaves are scattered over fields to prevent pests from working havoc. This has been analysed and a volatile oil and an alkaloid (*Vasicin*) have been extracted. The antiseptic properties are due to the oil and the alkaloid has expectorant and moderately antispasmodic actions. *Saussurea lappa*, (Kuth, Kushta) was known to the ancient Greeks and grows wild in Kashmir. It is used as a perfume and exported as such to China. An extract of the root has been found to be very efficacious in the vago-

tonic type of Asthma. *Psoralea corylifolia* (Karpō-Karishi, Babchi) has been found to be very useful in the treatment of Leucoderma. The essential oil has been tried with encouraging results in this disease. *Hollarrhena antidysenterica* (Veppālai, Kurchi) from which an alkaloid, Conessine has been isolated, has a great reputation as a cure for dysentery. There are other drugs the actions of which are not so definite but which have also great possibilities. Among these may be mentioned—*Saraca indica* (Asoka) and *Abroma augusta* (ult Kambal) in menorrhœgia and dysmennorrhœa; *Bombax malabaricum*, the silk cotton tree, *Pistacia integerrima* (Kakrasingi), and *Garcinia mangoostana* (mangoosteen) in the treatment of dysentery and chronic diarrhœa; *Tribulus terrestris* (Nerinji, Gokshur) as a diuretic; *Melia azadirachta* (Veppa maram) and *Alstonia scholaris* (chattim) as antiperiodics; *Ocimum sanctum* (Tulase) as an expectorant and carminative; and *Sida cordifolia* (mayirmanikam, Berla) as a nervine tonic. That much advertised panacea for all the ills of the fair sex "Kesari's Lodhra" is probably a preparation of *Symplacos Racemosa*, known in Sanskrit as 'Lodhra', It is supposed to stimulate the uterine tissues and act as an astringent. Yet another drug that is full of possibilities at the present moment is *Gymnema Sylvestre* (Shiru Kurunja, mesha sringi). The leaves have the remarkable property when chewed of deadening the sense of taste to sweet and bitter substances. It has been said that diabetic urine to which this juice is added fails to reduce Fehling's solution. Dr. Mhaskar M. D., of Haffkin's Institute, Bombay, is, I understand, investigating its antidiabetic properties with a certain amount of success.

Besides these drugs whose actions have not yet been studied, India abounds in medicinal plants that are already in the British Pharmacopœa and which ordinarily we

import from Europe and America. If these resources can be utilised we can be not only absolutely self-supporting in the matter of our drug supply but it will be a great economic gain for us. During the war, the price of Santonin which was mainly imported from Russia went up to several hundred rupees per pound. We need not have suffered at all if we had tried to look around us for a supply of this extremely useful drug. *Artemesia maritima* grows abundantly in the high altitudes of the Himalayas. Major Chopra found that Santonin, equal in value to that of the European market, could be extracted from this plant; and arrangements are now in progress in Kashmir to utilise this source on a commercial basis. Kaney Lal Dey said "There is enough Belladonna on the Himalayas to supply the world." Indian Valerian, Hyoscyamus, Podophyllum, Aconite, Gentian, Rhubarb and Digitalis—all these drugs grow in some part or other in India and if their active principles are found to be in no way inferior to the imported varieties it will be a great material gain to us.

Such are the paths along which Pharmacological research in India may be very usefully directed. The work will have to be extended over several years before anything tangible can be achieved. The chemical analysis of crude drugs will take a lot of time. Sometimes more than a year has to be spent before successfully isolating the active principles of just one plant. So that means patience and money. Along with Pharmacological laboratories, fully equipped chemical laboratories will have to be organised. There is no dearth of well-qualified and eager chemists in our land to undertake such a job.

I maintain that this is the only rational way of helping the Ayurvedic and Unani systems of Medicine. We cannot recognise 'Systems' in Medicine.

Our science is a universal one. It is neither Western nor Eastern. We have no right to stick to anything simply because it was done so by our ancestors. We have to be abreast the march of science. Japan did not look down upon the so-called "Western system of medicine" as some in our country seem inclined to do. On the other hand she has enriched it by the contributions of men like Kitasato, Shiga etc. Are we to lag behind? Our traditions are more glorious than those of most other nations. Shall our prestige in the future be dimmed because we sat down on the road-side unwilling to march ahead? When half of Europe was sunk in barbarism, the Aryans were well versed in the science of Ayurveda. They were eminent and practical botanists. But in modern times Europe has advanced wonderfully in scientific discoveries, whereas we seem to have called 'a halt' where our ancestors left us. Let us by all means probe into the secrets of Ayurveda; but at the same time let us advance further and put the knowledge that is our heritage on a strictly scientific basis. I can only conclude with the words of a great saint—"whatsoever things are true, whatsoever things are honest, whatsoever things are of good report, if there be any virtue and if there be any praise, think on these things."

Some Anomalies of Origin of the Vertebral Artery

BY A. ANANTHANARAYANA IYER B.A., M.B.B.S.

Senior Demonstrator in Anatomy, Medical College, Madras

During the years 1912 to 1926 the following anomalies of origin of the Vertebral artery have been recorded in the "Abnormalities Book" in the Anatomy department of the Medical College, Madras (India). In this period 828 bodies were dissected.

No.	Date	Description of Abnormality
I	20-II-1921	The Vertebral artery of the right side springs from the right Common Carotid at the level of the intervertebral disc between the VII Cervical and the I Dorsal Vertebra.
II	7-12-1917	The left Vertebral arises directly from the arch of the Aorta.
III	9-11-1918	The left Vertebral arises directly from the root of the Subclavian very near the Aortic arch.
IV	15-12-1918	The left Vertebral arises directly from the arch of the Aorta.
V	27-I-1919	Two left Vertebral arteries. One arising from the arch of the Aorta, the other from the left Subclavian artery in the normal position. The one in the normal position is a small vessel.

VI 3-3-1919 The left Vertebral and the left Internal Mammary arise directly from the arch of the Aorta instead of from the Subclavian.

VII 26-8-1926 The left Vertebral took origin from the Aorta between the origins of the left Common Carotid and the left Subclavian. It enters the foramen of the transverse process of the V Cervical Vertebra.

VIII 29-8-1926 The left Vertebral takes origin from the Aorta at the upper angle of the junction of the left Subclavian with the arch of the Aorta. It enters the foramen of the transverse process of the V Cervical Vertebra.

It is now well recognised that the Cervical portion of the Vertebral artery is formed by a series of longitudinal anastomoses between the upper seven dorsal segmental arteries and the disappearance of the proximal portions of the upper six segmental arteries. The seventh pair of segmental arteries takes part in the formation of the Subclavian artery: the left forming the whole of the left Subclavian and the right a considerable portion of the right one.

An explanation of the anomalies enumerated above on the basis of the development of the artery has to be attempted.

In the cases II, IV and VII reported above, the left Vertebral takes origin directly from the Aortic arch. Robinson in Cunningham's *Text Book of Anatomy* explains

this anomaly by supposing that the proximal part of the primitive Subclavian got absorbed into the Aorta and as a consequence the Vertebral and the Subclavian got separate origins from the Aorta. Cairney while admitting that such a process is by no means impossible, raises an objection that there is no reason why such an absorption should occur in a few cases and not in all. He suggests that the Vertebral might have from its inception incorporated the stem of the VI segmental artery, while the Subclavian incorporated the stem of the VII segmental in the usual manner. Rather than consider these two theories as in any way antagonistic, it will be more reasonable to consider them as true, each in its own way, while one theory may be the right explanation for one variety of abnormality and the other theory for another variety, while there may be some cases left, where one could not positively assert which theory would be the more correct interpretation.

As for Cairney's objection against the absorption of the primitive Subclavian on the ground that there appears to be "no reason why it should occur in some cases and not in all," it is not a serious one. It only shows the limitation of our knowledge. We have not yet known the reason. But a case like III reported above where the left Vertebral springs from the root of the Subclavian from very near the arch of the Aorta and like VII where the left Vertebral takes origin from the Aortic arch at the upper angle of junction of the Subclavian with the arch of the Aorta, would show a stage half-way in an absorption process the ultimate result of which would be a left Vertebral taking distinctly separate origin from the Aortic arch. In case VI where the left Vertebral and the left Internal Mammary arise directly from the arch of the Aorta we find the process of absorption of the primitive Subclavian

going a little further even to include the Internal Mammary artery.

But we find a different state of affairs in case V. There are two Vertebral arteries, one from the arch of the Aorta, the other from the left Subclavian. Unfortunately the record gives no information as to the further course of the two arteries. But it is clear so far as it goes. The small vessel from the Subclavian represents the normal Vertebral. The additional left Vertebral which took origin from the arch of the Aorta then could not be obtained by a process of absorption of the primitive Subclavian. It must be a persistent 6th dorsal segmental artery which in normal cases disappears. Cairney in evidence of the theory stating that the abnormal left Vertebral artery quotes the case of Gladstone and Wakeley of a 17 mm. embryo, in which the left Vertebral had an independent origin from the left dorsal Aorta about midway between the left Common Carotid and the left Subclavian arteries. Case V recorded above is another piece of evidence in support of such a theory.

Only one case remains to be explained: Case I in which the right Vertebral artery took origin from the right Common Carotid. If we suppose the persistence for some unknown reason of the 6th segmental artery and also the 5th Aortic arch on the right side, then the explanation becomes easy. The 4th right Aortic arch, part of the right dorsal Aorta and the right 6th segmental artery will form the right Vertebral taking origin from the Common Carotid. The right 5th Aortic arch, part of the right dorsal Aorta and the right 7th segmental artery will give rise to an apparently normal right Subclavian.

Finally, I wish to thank Dr. T. Sundara Reddi F.R.C.S.I. Professor of Anatomy, Medical College, Madras, for his kind permission to publish these notes.

Summary : -

8 Cases of abnormal Vertebral artery, 7 on the left side and one on the right side are recorded.

An explanation of the abnormalities on the basis of the development of the artery is attempted.

A left Vertebral that springs from the Aortic arch between the left Common Carotid and left Subclavian may be either a result of the absorption of the primitive Subclavian or due to a persistence of the left dorsal segmental artery.

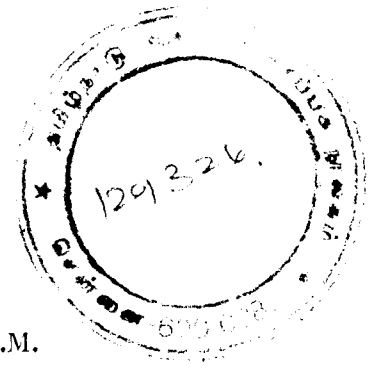
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The Spleen

BY DR. T. KRISHNA MENON, M.B.C.M.

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This viscus has been the object of considerable speculation among Physiologists. It has, at one time or another, been considered as the seat of the Soul, dreams, melancholy, laughter, sleep and even of venereal appetite. At one time it was supposed to secrete the fluids for the joints, nerves and stomach, and also bile. Other views were that it acted as a factory for turning out R. B. C., as a reservoir to store up blood, and even that it had no function whatever but merely served the purpose of a cushion to fill up the space. Recent clinical views hold that it acts as a blood-filter, as demonstrated by the presence of worn out R. B. C., iron and bacteria, and to keep up the fashion, for in Medicine too, as in other spheres of life there is fashion, it has been credited by endocrinologists as one of the accessories for controlling the calcium fixation in the tissues. It is not essential to life, its work in calcium metabolism being taken up by the parathyroids.

*The Spleen :—*Occupies a space, oval in outline, $2\frac{1}{2}'' \times 3\frac{1}{2}''$ in area, and lies in the left hypochondrium below the diaphragm in close contact with the left side of the chest wall.

*Percussion :—*To determine the anterior and upper limits the percussion must be lightly done, while for defining the posterior border the percussion tap must

J.L.
L. 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

be heavy. The patient should be sitting up, or be semi-prone, with the left hand raised well above the head. The anterior border of the spleen is on the level of the IX, X, and XI ribs in the mid-axillary, posterior axillary and scapular lines respectively. Posteriorly it extends to about $1\frac{1}{2}$ " from the spinal column. There is a band of resonance between the posterior border and the erector spinae, which is absent in cases of kidney encroachments.

Palpation:—is best done with the patient lying down and with the knees drawn up. Normally, the spleen cannot be palpated, so that a palpable spleen may safely be taken to be enlarged. On the contrary, an enlarged spleen may escape detection by palpation because of a strong phrenocolic ligament which prevents it from growing downwards.

Enlargement of the spleen:—is the main clinical sign with the viscus. Enlargement is associated with many conditions. The growth is downwards and forwards, and if the organ is sufficiently enlarged, the anterior notch can be well defined. The spleen, it must be remembered, moves with respiration. These enlargements have to be differentiated from:—

1. *Enlargement of the left kidney:*—if sufficiently enlarged, and in relation to the diaphragm, the kidney also moves with respiration. Note the band of resonance caused by the colon in front of the tumour, absence of resonance between the outer border of the erector spinae and the tumour, and the absence of the splenic notch.

2. *Omental Growths:*—lie transversely across the abdomen in the epigastric region; the feel is quite distinct.

3. *Tubercular Mesentery:*—Here the tumour is generally round about the umbilicus and in the left lower quadrant of the abdomen, but may be present in the left

hypochondrium. A peculiar knotty feeling with soft areas between is a marked feature of this.

Enlargement of the spleen may be either *apparent* or *real*. *Apparent* enlargement may be due to the following causes:—

1. Left basal consolidation of lung
 2. Left pleural effusion
 3. Left pleural thickening
 4. Left thoracic neoplasm
 5. Faecal accumulation in the splenic flexure
- and
6. Displacement downwards, which again, may be due to

- a. Pleural effusion
- b. Empyema
- c. Thoracic tumour
- d. Massive pneumonia
- and e. Pneumothorax.

The above could be differentiated by the history and the thoracic signs and symptoms. Faecal accumulation in the splenic flexure is soft, has a doughy feel, pits on pressure and disappears after a purgative or a high enema.

Real enlargement may be either *acute* or *chronic*.

Acute Real Enlargement

The following are the conditions where there is acute real enlargement of the spleen:—

1. *Acute hyperaemic spleen.*
2. *Acute hyperplastic spleen.*

These two conditions do not present any symptoms other than that of enlargement and are important only as of diagnostic value in anticipating danger of rupture, their essential difference being only one of vascularity.

3. *Acute infections, as in—*

Acute Poliomyelitis	Pneumonia
Acute Miliary Tuberculosis	Pyæmia
Acute stage of Malaria and Kala Azar	Relapsing fever
Diphtheria	Small Pox
Erysipelas	Scarlet fever
Cerebrospinal Meningitis	Typhoid
Poisons—KCIO ₄ , Pyrogalic Acid	Typhus
Inf. Endocarditis	Tub. Peritonitis
	Septicæmia.

Chronic Real Enlargement

There are several conditions in which the spleen is chronically enlarged and they are :—

1. *Malaria*:—Here there is a history of intermittent fever with regular periodicity; the liver is enlarged later. Blood examination shows secondary anæmia, leucopenia, mononucleosis, pigment in mononuclears, parasites may be seen. Spleen puncture shows pigment, occasionally parasites.

2. (a) *Kala-Azar*:—There is a history of irregular fever of long duration—the liver also is enlarged; there is total and relative decrease of polymorphs; mononucleosis, specially of the large endothelial type, and an increase in transitionals are present. Peripheral blood may show the parasites in polymorphs and mononuclears. Liver and spleen punctures show the L. D. bodies.

(b) *Urea-stibamine* spleen here the spleen remains still enlarged after a course of urea-stibamine injections for K. A.

3. *Leukaemia*—(a) *lymphatic*: Lymph glands are enlarged. Total and relative increase of lymphocytes, especially of the large type, are present.

(b) *Myelogenic*:—Here myelocytes preponderate; neutrophile, basophile, and eosinophile types are present. Liver also is enlarged.

4. *Pernicious Anæmia*.—this is a disease of the hæmatogenetic system; the cause is unknown. Red blood cells show anisocytosis, punctate basophilia, poikilocytosis, Colour Index is +1. Nucleated R.B.C., specially megakaryoblasts present.

5. *Passive congestion*.—secondary to cardiac failure (primary or secondary), or portal obstruction. Look for signs of primary disease *e.g.* heart.

6. *Atrophic Cirrhosis*.—Primary enlargement and later atrophy of the liver. The spleen enlarges later as a result of obstruction to portal circulation—dilated veins, ascites, and Facies Hippocratica are present.

7. *Hypertrophic Cirrhosis*.—Liver is enlarged first—the spleen later. Jaundice is present and is progressive. Haemorrhages are common. Pyrexial crises with increasing jaundice are a marked feature. Urine contains bile, fæces being coloured normal.

8. *Amyloid disease*—is secondary to chronic suppurative conditions and therefore careful search must be made for such foci. There will also be evidences of amyloid degeneration in other organs *e.g.* albuminuria and diarrhoea.

9. *Acholuric Jaundice*—Familial, generally in children, occasionally seen in adults, without any cause. In this condition the liver is not enlarged. Jaundice is present, and is increased by excitement, exertion, cold. (Pruritus, xanthoma, and a slow pulse, which form the signs of cholæmia, are absent.) The urine does not contain bile. Fæces remain normal. The R. B. C., are small with polychromasia; colour index is—1. Crises with nucleated R. B. C. are noted. Fragility of the R. B. C. is increased.

10. *Lymphadenoma*—(Hodgkin's disease) The lymphatic glands, especially the posterior cervicals and occipitals,

are enlarged. Lymphoderma of the nape of the neck is also present, as also secondary anaemia with increase of eosinophiles. Gland section shows increase of eosinophiles, fibrous tissue, large mononuclear endothelial cells, and occasionally giant cells.

11. *Splenic Anaemia* (Banti)—some consider that Banti's disease is the later condition where, with splenomegaly, cirrhosis of the liver is also present. There is primary enlargement of the spleen, with a well-marked anaemia of secondary kind, the R. B. C., being slightly diminished and hæmoglobin reduced, no nucleated R.B.C., being present. There is an increase of polymorphs, and either normal or slightly reduced fragility. The lymphatic glands are not enlarged, and cirrhosis of the liver occurs later with consequent symptoms.

12. *Rickets*—in marasmic children—liver is enlarged. There is thickening of the ends of the long bones. Note the rickety rosary, pot-belly, temperature, peevishness, and the sweats at night, especially about the forehead.

13. *Von Jaksch's anaemia* (Pseudoleukaemia Infantum)—occurs generally in infants up to 3 years, with well-marked secondary anaemia; the spleen is hard, smooth and not tender. Lymphatics do not often appear enlarged in life; nucleated R. B. C., are present. Polymorphs are increased, myelocytes are found and later on, there is lymphocytosis.

14. *Polycythaemic Splenomegaly*—only signs are those of polycythaemia *i.e.*, dyspnoea, cyanosis, clubbing of fingers, and increase in the number of R. B. C.

15. *Hæmochromatosis*—general pigmentation of the body. Fibrosis of the liver with enlargement is present. It is associated with glycosuria. There is bronzing of the exposed parts—oral mucous membrane is free. Compare this condition with Addison's disease.

16. *Gaucher's disease*—occurs in childhood, females being affected more than males. Other members of the family also are affected. A characteristic feature is the long duration without any incapacitating signs. The abdomen is barrel-shaped, and the liver is markedly increased in size. Jaundice is not present; other glands are not enlarged. Brownish pigmentation of skin is present. Very large endothelial cells, characteristic of Gaucher's disease are found in the spleen, liver and bone marrow.

17. *Sarcoma*—rare—found only in both extremes of life.

18. *Hydatid*—due to *T. Echinococcus*—this condition is very rare and is a pathological curiosity.

Reduction—in size may be *real* as an abnormality in development or *apparent*, when it may be due to—

1. Unusual arching of the abdomen
2. Emphysema
3. left pneumothorax—slight, and
4. displacements upward, due to
 - a. Tympanites
 - b. Retraction of lung.

Prolonged Labour

BY DR. P. VENKATAGIRI, M.B.C.M.

Difficult labour ends usually in some artificial interference, though more rarely it may terminate without such interference.

Labour according to Herman is natural "when the mother is in good health, and the pelvis of not less than its normal size, when the child is living and is of not more than natural size; when the vertex presents with the child's back in front; when the membranes do not rupture until the os is at least three-fourths of its full size; when the placenta is implanted above the lower segment of the uterus, and is not detached until the child is born; when the uterine retraction and contraction go on at such a rate that the child is born within 24 hours from the beginning of labour pains and continue after the child is born." Abnormalities on the part of the child or mother may lead to prolonged labour. The twenty-four hours limit is only arbitrary, as usually, labour terminates naturally within 14 to 16 hours in primiparæ and 6 to 8 hours in multiparæ. When labour is prolonged for more than 24 hours it tells upon the health of the mother or child or on both. In prolonged labour greater muscular effort is called for on the part of the mother. The pains are protracted; sleeplessness is present; food is not taken and these increase the liability to postpartum hæmorrhage and sepsis.

* A special lecture delivered at the Giffard School, Madras, on 4th September 1926.

The causes of prolonged labour may be classified as follows:—

- I. *Faults in the powers*—i.e. labour complicated by anomalies of uterine action.
- II. *Faults in the genital passages*—including abnormalities in the direction of the birth canal from the vulva and vagina to the cervix, uterus and pelvis.
- III. *Faults in the foetus*—of position, size, nature etc.—i.e. anomalies of the foetus.
- IV. *Accidental complications*—eclampsia, hæmorrhage, anæmia, etc.

I. *Faults in the powers*:—Primary uterine inertia comes first. In this condition the labour pains are weak from the commencement, as the uterine action is weak and sluggish. Do not put the patient to sleep as this is the proper treatment for secondary uterine inertia. Primary uterine inertia needs stimulating treatment, unless the patient is tired and the os is not dilated in which case she can be given rest for some time. The methods of stimulating the uterus are administration of stimulants such as *spts. ammon. aromaticus*, *glucose* and *pituitrin* in small doses. Some think that pituitrin may cause asphyxia of the foetus and rupture of the uterus but pituitrin is the proper thing to give in primary uterine inertia. Pituitrin however, is of course contra-indicated in obstructed labour. Pituitrin $\frac{1}{4}$ c.c. every 2 hours combined with 10 gr. of quinine and plenty of glucose is very efficient. Ergot or any preparation of it is never administered before the expression of the placenta. After the placenta is expressed it can be given in the form of the liquid extract of ergot $\mathfrak{z}$ ii in $\mathfrak{z}$ i of water by mouth, or when immediate action is required $\frac{1}{2}$ c. c. of pituitrin by injection can be given.

In secondary uterine inertia, the patient is exhausted and the uterus inactive from fatigue.—For such a condition, give the patient a sleeping draught containing chloral and bromide—gr. xx combined with Tr. opii. 20 m. Some recommend scopolamine and morphia combined.

In cases of tonic contraction of the uterus resulting from prolonged labour the proper thing to do is to give $\frac{1}{3}$ gr. of morphia, put the patient deeply under an anaesthetic and immediately deliver.

2. *Faults in the passages*—may be at the

- i. *Vulva*—e.g., a rigid perineum especially in an elderly primipara. It may need either forceps or episiotomy.

Narrow vulval orifice as a result of healing of previous tears; or sloughing etc. Treatment consists in suitable incisions, helped perhaps with forceps.

For tumours of the vulva, such as haematoma or other tumours, excision is indicated.

Abscess of the glands of Bartholin; elephantiasis of the vulva, etc.—suitable treatment is indicated.

- ii. *Vagina*—abnormalities or congenital defects such as congenital septa; absence of the vagina; vaginal cysts, vaginal cicatrices, tumours etc. Treatment in these cases is incision as in congenital septa or cicatricial contractions; excision for tumours or cysts and caesarian section if proper local treatment is not possible.

For prolapse, push it up and apply forceps.

- iii. *Cervix*—

Hypertrophy—Treatment is sometimes caesarian section; sometimes incision and dilatation, depending on the conditions actually present.

Rigidity and spasm—may be either nervous or organic—Chloral and bromide with morphia may overcome spasm; for organic rigidity De Ribes' bag or caesarian section.

For new growths, cancer, myoma etc. treatment is caesarian section.

- iv. *Uterus*—obstruction to delivery may be due to contraction ring, fibroids in the lower uterine segment or cervix. In these cases if the child is alive caesarian section is the proper line of treatment. If the child is dead embryotomy is indicated.

Labour in elderly primiparae,—after the age of 35 or 40 years—is usually prolonged and terminated by forceps—the same difficulty may arise in very young primiparae. Full bladder and rectum sometimes, are a cause of prolonged labour. The bladder is relieved either by catheterisation or if this is not possible, by supra pubic cystotomy, and the rectum by enemas. Ovarian and para-ovarian cysts may cause prolonged labour, the line of treatment in such cases being caesarian section.

3. *Faults in the foetus*:—of

- i. *Position*—such as—occipito-posterior. In these cases, the head may not be engaged, os only $\frac{3}{5}$ dilated and the pains going on for 3 or 4 days; or the head may be engaged, os fully dilated and a caput succedaneum formed without any sign of advance. In these cases, version may be done with success, but this is not usually recommended as there is the danger of rupture of the uterus. Increased risk of sepsis may be overcome by careful cleansing, application of a coat of Tr. iodine or Tr. benzoin, or the use of gloves. A pro-

phylactic dose of antistreptococcal serum can be given. When however, the head is jammed in the cavity, delivery by forceps alone is indicated. A strong and vigorous pull is usually necessary, and rupture of the perineum is invariable.

Face presentation—For chin-posterior cases, rotation, with fingers in the mouth, can easily be done and delivery with forceps may then be done if necessary.

ii. *Size.*—

Excessive size of the foetus may necessitate caesarian section. In some cases when the os is fully dilated forceps may be tried, and if labour be prolonged and the child yet alive symphysiotomy or pubiotomy may be done.

For monsters, hydrothorax, hydrocephalus, foetal ascites etc., destructive operations are the proper remedy. For locked twins disengagement is not usually possible, and then, embryotomy may be necessary.

4. *Accidental Complications*—where the child is alive, and the woman near full term, do a caesarian section; but, if the woman be long in labour caesarian section may yield bad results. In cases where there is imperfect dilatation of the os, measures such as Champetier de Ribes' bag, or version etc., may be tried.

Signs and symptoms of prolonged labour:—

General symptoms

- i. *Rise of temperature.*—Above 99.4° may be due to fatigue, muscular exertion, liberation of toxins, sepsis from repeated vaginal examina-

tions, which are often necessary to know the condition in cases of prolonged labour, and premature rupture of the membranes. Active interference is necessary when there is a high temperature. In these cases puerperal sepsis has to be combated.

- ii. *Rise in the pulse-rate*—is due to the same causes as of rise temperature. Interference should be active if both temperature and pulse rise.
- iii. *Loss of sleep*—from pain, nervousness, apprehension of trouble, haemorrhage, instrumental delivery etc.
- iv. *Exhaustion*—from prolonged muscular effort, frequent vomiting, lack of nourishment etc. The best thing to do in such a condition is to give the patient intravenous glucose; 3 gr. of luminol given twice, will induce sleep.

Local signs.

- i. *Uterus*—may be either in a condition of secondary uterine inertia or may be tonically contracted or threatening to rupture, with a rising Bandl's ring, prominent round ligaments and thinned out lower uterine segment.
- ii. *Vagina*—Premature rupture of the membranes resulting in dry labour—foul lochial discharge, cervix loose, and hanging fringe-like, presenting part high up, and if there be impaction, cyanosis of the vulva, oedema, and a large caput may all be present.

General lines of treatment.

First and foremost, determine the cause and remedy it. Sustain and maintain the strength of the patient, give glucose intravenously if necessary. If the uterus be fatigued give the patient rest and put her to

sleep by a chloral and bromide draught. Take the greatest care to prevent sepsis, avoid premature rupture of the membranes, do not let the patient stand or walk, and be gentle in making a vaginal examination. Pituitrin, given with judgment has no dangers; do not give pituitrin if there is obstruction to labour and when you cannot hope to deliver *via naturales*. If large doses be given, have the necessary instruments ready. Lastly, keep everything ready for dealing with post-partum haemorrhage which is apt to occur in these cases. Foetal asphyxia is the rule rather than the exception and every thing must be made ready to deal with it.

References:—

1. *Difficult Labour*—Herman.
2. *Difficulties and Emergencies of obstetric Practice*—Berkley and Bonney.
3. *Obstetrics*—W. Williams.

[We are indebted to Mr. L. Seshadrinathan, IV M. B, Class, for a *verbatim* report of this lecture—Secretary.]

Heart Failure

As observed by French writers.

BY DR. K. VASUDEVA RAO, M.D.

With the increasing knowledge of the minutest working of the heart we are now in a position to diagnose the earliest signs of heart failure. Of recent years there has been a lot of work done in this direction and it may not be out of place to say what the French people think of this condition.

Most often heart diseases are secondary to rheumatism at one period or other, and these lesions when neglected lead on to heart failure. The diagnosis in these cases is not difficult, but to diagnose heart failures when no valvular lesions are detectable is very difficult and it is here that the French people have really done very useful work.

To them alcohol appears to be the prime factor in producing heart failure. It is an undeniable fact that alcohol produces a certain amount of myocardial degeneration which when continued for a long period may and probably will produce a permanent damage to the muscle wall and thereby pave the way for heart failure in time to come. But to think that heart failure is caused by mere intoxication is rather hard to believe. An instance is quoted, of a patient, by Professor Vaques of France, wherein a habitual drunkard, who used to consult Professor Vaques very often for digestive troubles, was suddenly taken ill with acute symptoms of heart failure. This patient with the best available mode of treatment did not recover, and post mortem it was found that the

heart did not show any signs of degeneration and the professor concluded that the large dose of alcohol he had had the previous night was the cause of heart failure.

They appear to think that a normal heart cannot fail in its function unless an intoxicating element is present, such as alcohol, infections like diphtheria, or an organic lesion, even though the heart is subjected to any amount of overwork.

Professor Vaques divides the diagnosis of heart failures into three classes.

1. Failure of the left ventricle.
2. Failure of the auricles.
3. Failure of the right ventricle.

1. Failure of the left ventricle.

The symptoms pointing to failure of the left ventricle according to him are

1. Tachycardia.
2. Bruit de galop.
3. Extra-systole.
4. Painful dyspnœa.
5. Sub-sternal pain.
6. Cough.
7. Elevation of the diastolic and fall of the systolic pressure.
8. Pulsus alternans.
9. Pulsus bigeminus.

Tachycardia.—Taking the first point into consideration we find that a pulse rate above 80 per minute in an elderly person is always a bad sign of failure of the left ventricle. It is explained by saying that the heart is not able to keep up the blood pressure by the force of its contraction and what is lost in force it makes up in its rapidity; hence, the pulse rate increases. This rule applies

to conditions wherein the pulse rate is rapid without any exciting cause to account for the tachycardia.

Bruit de galop.—This is the name given to a loud thud that is heard in the interval which follows the second sound. This sound is best heard at the apex, sometimes in the tricuspid area. In its early stages it is said to resemble a reduplicated first sound which later on becomes more mid-diastolic in time. This bruit is always present in cases of nephritis either acute or chronic, giving a warning that the heart requires some help. This rarely occurs in asthenia and in acute fevers. Professor Vaques thinks that the sound is due to the sudden distention of the ventricles by the ingushing blood from the auricles, and it disappears as soon as the mitral valve has given way, when this sound is replaced by a systolic murmur at the apex. He considers that this bruit is a sign not of hypertrophy but of dilatation of the ventricle, and that it should therefore be taken as a very early sign of heart failure.

Extra-systole.—English and American authors do not attach any importance to the occurrence of extra-systoles in hearts wherein there is no sign of any organic defect, but to French authors these extra-systoles are significant of impending heart failure, especially failure of the left ventricle. There are two instances wherein the appearance of an extrasystole is of greater significance than in other cases, namely (1) when they are increasing as the time goes on, and (2) when the blood pressure is above normal.

The other symptoms enumerated by Professor Vaques are not in any way new to us and therefore they do not need any explanation. It may here be mentioned that the estimation of blood pressure, both systolic and diastolic always is of very great help especially in cases where the person has been suffering from high blood

pressure. A fall in the systolic pressure whilst the diastolic pressure remains elevated is a very serious symptom of failure of the left ventricle.

2. Failure of the auricles.

The symptoms are slow to appear and they do not mean that the end is near. It is revealed by the complete arrhythmia and cases have been recorded where the patient lived with this condition for a fairly long period.

3. Failure of the right ventricle.

The symptoms are either dyspnoea or cough, digestive disturbances, oedema of the body, enlargement of the liver and cyanosis with serous effusions. The blood pressure may or may not be affected.

Having some idea of the signs that may help us in locating the trouble, there is one other problem that has to be considered, namely the cardiac failures where the kidneys are affected. When symptoms of both kidney and heart trouble are present it is rather difficult to come to a definite conclusion as to which condition is primary and which is secondary. From the point of view of treatment it is immaterial as to what the primary cause is when once the heart has failed; it is the heart failure that demands our immediate attention. But from an academical point of view it is but right that we should be in a position to make out which is the primary cause.

There are many facts to be taken into consideration before coming to a definite conclusion as to the primary cause.

1. History of the patient.
2. Age of the patient.
3. Examination of the heart.
4. Examination of the urine.
5. Estimation of urea in blood.

6. Estimation of urea in urine.

7. Response to treatment.

From the history of the patient many valuable facts can be gathered, for a history of rheumatic fever, in years gone by, will of a certainty direct us towards the heart, or again, a history of prolonged fever may lead us to infer that the heart might have been damaged, or the history of having had attacks of this nature will make us conclude that the primary cause is the heart.

An examination of the heart reveals to us its exact condition, for, if there are any lesions e.g. valvular, they certainly point to the heart.

Examination of Urine.—In both the conditions there is an appreciable decrease in the quantity of the urine, but a thorough examination will certainly reveal, very often, the exact origin of the trouble. In both there will be albumin, but where there is a kidney lesion the quantity of albumin present is greater, except in one condition, and that is in chronic interstitial nephritis. Here, there may or may not be any trace of albumin, but the examination of a centrifuged specimen of urine under the microscope will be of greater aid than the presence of albumin, because when once granular and epithelial casts are detected under the microscope, the lesion can at once be traced to the kidney.

When the ordinary examination of the urine has not helped us in deciding whether the kidney or the heart is at fault, the biochemical estimation of urea in the urine will be of more use. Under normal conditions, the kidney is able to excrete about 3 to 4 per cent of urea in the urine *per diem*, but when, by reason of some pathological change in the kidneys, their structure is altered, the same quantity of urea is not being excreted

and the quantity of urine also is decreased. In the case of heart failure, on the other hand, where there is a secondary chronic congestion of the kidneys, the amount of urea is also decreased, but the percentage of urea is greater as the kidneys try to excrete the whole quantity of the urea in the small quantity of urine. When the whole quantity of the urea cannot be excreted by the kidneys the residual urea accumulates in the blood, thus increasing the percentage of blood-urea. Hence, in actual kidney lesions as chronic parenchymatous nephritis, or chronic interstitial nephritis, there is more of residual urea in the system which the kidneys are not able to eliminate in the urine, thereby giving rise to a high percentage of urea in the blood. But in heart failure, the residual quantity of urea is very small, causing the percentage of blood-urea to be much lower than that in pronounced kidney disease.

In all these cases, the rapidity with which a patient responds to treatment always puts us on the right track. In the case of heart failure, absolute rest in bed, small feeds of liquid food, and large doses of digitalis, very often bring about marked improvement within 72 hours, whereas in chronic kidney trouble the response to treatment is not so prompt.

Catalysis—Enzyme Action

BY S. A. RAGHAVAIENGAR,

First year.

"In science one always loses by plausible explanation published prematurely; the only correct method of attaining certain knowledge is to be found in leaving the incomprehensible until the explanation sooner or later is given by facts which are so clear that divided opinion upon the matter can scarcely arise."—*Berzelius*.

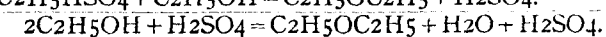
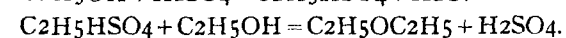
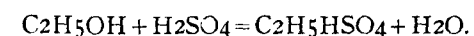
Ferments and enzymes have been in use from the earliest times. Broadly speaking, the curdling of milk, which has been known ever since the Aryans set foot in India, is the commonest of the applications of fermentation. Coming to comparatively more recent times we find that the preparation of a number of 'aristams' in Ayurvedic Medicine involve, fermentative actions. Considering the Christian era the preparation of vines, vinegar etc., involved the use of ferments. It is an open question whether those who used the ferments in all these preparations knew their nature. Probably not. They cared more for the final products than for the mechanism by which the changes were brought about. Here lies the difference between the spirit of modern science and the spirit of ancient science.

Before discussing how far enzymes are catalytic agents it is necessary to know what catalytic agents are. Of course, the terms 'catalysis' and 'catalytic agents' are the bywords of the student of Chemistry. The question, "what is the role of the oxides of nitrogen in

the preparation of sulphuric acid?" is at once answered by saying, "It acts as a catalytic agent." But, what is the machinery of catalysis? In other words, how and why does the presence of the oxides of nitrogen promote or otherwise alter the reaction? Though several explanations have, from time to time, been put forward to explain this question, still, a satisfactory explanation which cannot be disputed is required. Just as various theories—corpuscular theory of light, law of universal gravitation, Euclidian geometry, and so on—have been found unsound, so, sooner or later, the theory of catalysis may be overthrown. But, it is not possible to consider at length all the theories or to put forward a more plausible one.—Further, the subject of catalysis, especially of enzyme action, can be briefly defined in a sentence and disposed off. Usually one is satisfied when one knows that catalysts are promoters of reactions, and enzymes are colloidal catalysts. But such a definitional knowledge would be of no use. It is exactly akin to defining fever as rise of temperature. The evolution of the theory of catalysis is of historical and of scientific interest. It shows how people first imagined the process to take place and how out of the rough incorrect conception the present theory has been evolved. Above all it shows how scientists tried, unlike as in ancient days, to account for the existing phenomena by 'plausible' theoretical arguments and how the arguments failed being 'premature'. It shows the "Mathematics in Chemistry". 'No science is complete unless the phenomena treated therein are proved mathematically'; no chemical actions can be said to be understood unless they are proved to take place by rigorous theoretical arguments.

Enzyme action is, after all, a particular kind of catalysis. It was only in the second quarter of the

nineteenth century that catalysis was recognised to be a distinct branch of science worthy of attention. To Berzelius is due the credit of having come to the conclusion that catalytes are bodies which accelerate, positively or negatively, already existing reactions. He studied the role of the various factors in a number of reactions previously described by others. In most of them he found that one or other substance remained unaltered at the end of the reaction. Berzelius called it a 'catalyte'. Others followed in the footsteps of Berzelius. Among them Clement and Desormes studied the action of the oxides of nitrogen in the chamber process for the manufacture of sulphuric acid. They proposed that alternate formation and decomposition of 'chamber crystals' facilitated the reaction. Thus the foundations for the present "Intermediate Compound Theory" were early laid. In 1854 Williamson explained the formation of ether from alcohol by the formation of ethyl-hydrogen sulphate—an isolated compound—as an intermediate compound according to the equations given below.



Ostwald, however, claims to be the first to have conceived the idea that catalytic agents accelerate but do not initiate a reaction.

A substance may be said to act as a catalyte if:—

(i) the substance is chemically unaltered on completion of the reaction. Physical properties may however change; e.g. in the preparation of oxygen from potassium chlorate, if crystalline manganese dioxide be used as the catalyte it becomes amorphous.

(ii) minimum amounts of catalyte be enough to

transform large quantities of reacting substances.

(iii) it does not affect the final state of equilibrium.

(iv) the velocities of the two inverse reactions are modified to the same extent.

Catalysis is positive or negative according as it accelerates or retards a reaction. If owing to the reaction, products are formed which in any way modify the action of the catalyte, 'auto-catalysis' is said to take place which in its turn may be positive or negative. As Ostwald said, "There is probably no kind of chemical reaction which cannot be influenced catalytically and there is no substance, element or compound, which cannot act as a catalyser."

The following are the most interesting of the various other theories about catalysis.

(i) Formation of intermediate compounds including the association theory of chemical combination.

(ii) Effects of surface absorption.

(iii) Electro-chemical Theory.

(iv) Effects of alteration in the density of the absorbable and radiant energy.

In most fermentation processes enzymes take part. There are cases where enzymes alone act as catalysers. Ferments are catalytic agents obtained from living tissues. Living cells are essentially present. Enzymes are lifeless products from the cells. Before the 16th century the ideas of fermentation were peculiar. Alcohol fermentation may be taken as an example of a simple case of fermentation. It was considered to be pre-existing in the grains used and to be liberated from impurities by the ferments. In 1682, Becher proved that sugar was necessary to produce alcohol and that alcohol did not pre-exist in the grains. Towards the end of the 18th

century i.e. about a hundred years afterwards, Lavoisier demonstrated the composition of sugar and obtained a quantitative liberation of alcohol and carbon dioxide. In 1837 Cagniard De la Tour in France, Schwann and Kützing in Germany, independently observed the budding of certain cells. They inferred that reproduction of these organisms was responsible for fermentation. This was their "Vitalistic Theory". But others said that the ferment decomposed and in doing so set up and transmitted a shock to the molecule of the acted substance, which consequently decomposed. This was in brief "The Vibration Theory". But Pasteur proved that the former was correct. Naegeli, however, tried to reconcile the two rival theories. He stated that the ferment was a living cell in vibratile motion which movement was communicated to the reacting substance. Twenty years later Pasteur proved that alcoholic fermentation was an intracellular change. Thus the theories of fermentation developed.

It was the opinion of Scientists that enzymes formed a separate and distinct class of catalytes from ferments. But in 1896 Emil Fisher showed that the juice obtained by rupturing yeast cells could still cause ferment action in sugar. Lactic and acetic ferments also behaved similarly. So the definition of enzymes had to be modified. It was considered as the active reagent in the ferment. Berzelius showed that enzymes were also catalytic agents as they obeyed the same laws. But certain modifications and deviations were also observed. The following will give a rough idea of the deviations observed.

(1) Enzymes are specific in nature i.e. certain enzymes act only on certain substances but not on others.

(2) Action slows down after a time.

(3) There is a maximum and a minimum concentration of products for enzymes to act.

(4) There is a narrow range of temperature beyond which enzymes fail to act—about 25 C for vegetable enzymes and 37 C for animal enzymes.

(5) Solutions should normally be neutral.

To answer why such variations occur trials were made to enquire into the constitution of enzymes. But as enzymes are always impure, as attempts to purify the enzymes result in destruction of the enzyme, as the enzymes do not dissolve in any substance being colloids, all the attempts failed to give even a rough figure. It was known that enzymes act by hydrolysis, oxidation, reduction or clotting. A class of enzymes, similar to vaccines in function, called anti-enzymes are also known. Experiments on velocity of reaction were made, mostly by optical methods, to see how far enzyme actions obeyed the law of mass action. The reactions are monomolecular and the equation $k = \frac{1}{t} \log \frac{a}{a-x}$ applies to these reactions. In 1850 Wilhelmy found k to be a constant. In 1890 O'Sullivan and Thompson found that the velocity increased slightly until 80 per cent of sugar was converted into alcohol and then decreased. But still they did not consider this as a reason to think that law of mass action was not applicable to enzyme actions. They rather thought that certain unnoticed deviations from the ideal conditions brought about the divergence from the mass law; and they sought to find out what the deviations were. In 1902 A. J. Brown found that the velocity was not constant. He inferred from his observations that a given quantity of enzyme could invert a fixed quantity of sugar in unit time. After a certain proportion was inverted he found that the velocity diminished. These changes were considered to be due to liberation of products which acted as positive or negative auto-catalytes. It was found that invertase could resist higher temperatures in the presence of cane

sugar than in its absence (O'Sullivan and Thompson). They accounted for this by considering invertase to be present as an intermediate compound in the presence of cane sugar, and the intermediate compound to be capable of resisting higher temperatures than pure invertase. It was further noted that when the quantity of enzyme was large, action proceeded as observed by Wilhelmy; otherwise as observed by Brown. Also, A. S. Brown showed the products of reaction could accumulate around enzyme molecules and remove it from the sphere of action. Reversion also was considered to be a cause.

Summing up, reversibility, negative auto-catalysis, destruction and change of enzyme were considered to be the chief causes for diminution in velocity reaction below that required by the law of mass action. Combination of enzyme with substrate i.e. positive auto-catalysis was considered responsible for increase in velocity.

Case Reports

A case of severe abdominal injury

Penetrating wounds of the abdomen are increasing in number as a result of the many bus accidents in this city and the mortality of such cases is great. There was one case that is particularly of great interest because of its ultimate recovery in spite of very extensive injury to the small intestines.

A small girl, by name Vijaya-Lakshmi, was admitted into the Second Surgeon's wards on the night of 29-6-26. Her history was that she was sitting on the front seat of a Ford bus, by the side of the driver, and that at about 4 a. m. the bus collided with a bullock cart in the vicinity of Saidapet, and that the cart was smashed to pieces, with the result that one of the pieces pierced the abdomen of this girl who was seated in the front of the bus, as already mentioned.

Her condition when she came into the hospital was this:—the patient was cold and clammy, pulse 130 per minute, resp. 45, and temp. 99.4. On inspection, the abdominal wall showed a big transverse wound about 6 inches long, and 2 inches below the umbilicus; the anterior abdominal wall was completely torn including the peritoneum, and the small intestines to a length of 3 feet were protruding through this opening. The tear in the peritoneum was at the same level as the tear in the skin. From one portion of the protruding gut the mesentery was torn to a distance of 2 inches and at another portion of this gut, the serous and muscular coats of the intestines were torn to a distance of 1 inch; there was no extravasation of the contents of the gut.

There was a second wound in the right loin in the mid-axillary line, about 2 inches above the anterior-superior spine of the ilium. It was 2 inches long and in an oblique direction, and through it the cæcum and the appendix were protruding.

The patient was immediately removed to the theatre by Capt. Verdon. The wounds were cleaned and the gut was returned into the abdominal cavity. Two drainage tubes were kept in, one in the anterior wound and the second in the wound in the loin.

For one complete week the patient was in a very precarious condition; her temperature going up to 104° in the evenings, a tender and a distended abdomen, a rapid pulse varying from 160 to 180 per minute, respirations varying from 50 to 70 per minute, made us all think that she was going in for acute peritonitis; throughout this period there was plenty of discharge of pus from the two drainage tubes.

She was given on two consecutive days 20 c.c. of antistreptococcal serum, and second hourly fomentations to the abdomen were ordered; for the first two days the patient's bowels did not move, and attempts to open them were scrupulously avoided. The patient was kept on sips of glucose water and brandy by mouth for these two days, with the result that the pulse rate never went above 140 per minute, the distention of the abdomen decreased, and on the morning of the third day of admission, a glycerine enema was given with a very good result. Just before the enema was given the patient was given an injection of pituitrin $\frac{1}{2}$ c.c. and eserine 1/100 gr. and this probably helped in producing a good result after the enema.

From the 4th day onwards a glycerine enema was repeated on alternate days and the patient was fed on whey and albumin water, the brandy being continued.

Gradually the pulse rate came down, respirations slowed, the distension disappeared, and her temperature came down to normal.

The drainage tubes were removed on the 6th day and the wounds were fomented every two hours. In about two weeks time the wounds healed and from the 20th day onwards the diet was changed to a solid one.

When she was discharged from the hospital on 10-8-26, she was completely cured and had gained in weight.

My thanks are due to Major K. G. Pandalai, Second Surgeon, and Captain Verdon, R. M. O. for allowing me to report this case.

DR. K. VASUDEVA RAO, M.D.
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Two Unusual Cases of Liver Abscess

Case I.—Admitted into M4. Wards on 7-8-26.

Name.—M.

Age.—35 years.

Sex.—Male.

Residence.—Perambur.

Complaint.—Pain in the right side of the chest, difficulty in breathing, and distressing cough.

Duration.—20 days.

Previous history.—Four months ago the patient had an attack of fever, continuous and high, lasting for five days. When the fever subsided he noticed a swelling on the right side of the chest which subsided twenty days ago and reappeared once again. The troublesome cough began afterwards.

History of Present Illness.—The present illness began twenty days ago. The patient lies down on his right side and has severe dyspnoea while lying.

Physical Examination.—Fairly well-nourished man of 35 years; cyanosed; had a temperature of 100° on admission.

Respiratory system.—Marked bulging of the whole of the right side of the chest, resembling the side of a barrel. Movements diminished. V. F. diminished. Dull on percussion. Breath sounds also diminished.

Circulatory system.—Heart boundaries normal. There is a systolic murmur, heard best in the mitral area.

Alimentary system.—Spleen not palpable. Liver can be palpated 2½" below the costal margin.

Urine.—Slightly acid: Sp. Gravity 1010. Sugar, albumen and deposits, nil.

Suspecting the case to be one of empyema pushing the liver down and causing the respiratory distress, an exploratory aseptic needle was driven into the right pleural cavity, and on aspiration, pus and serous fluid were drawn out. Since this aspiration did not improve the condition of the patient, who was steadily becoming worse, he was transferred to S3 wards on 8-8-26. as a case of *suspected empyema*.

On 10-8-26, the empyema was opened and drained without further delay. A portion of the 6th rib on the right side was resected in the mid-axillary line, and an opening was made. After four to five pints of pus were removed, the source of the pus was found to be a liver abscess which had burst into the pleural cavity. The abscess was well drained.

The patient has recovered, his general condition is good, and is moving about as usual. No cough or breathlessness.

Case II.—Admitted on 4-8-26 into S3 wards.

Name.—M.

Age.—40.

Sex.---Male.

Complaint.---Extreme pain and tenderness on the right wall of the chest.

Duration.---10 days.

Previous history.---Patient had an attack of dysentery four years ago.

History of present illness.---He noticed a swelling on the right side of the chest about 10 days ago. It gradually became tender and painful.

On physical examination it was found that the right wall of the chest bulged out, there was slight dyspnoea, that the pulse was rapid and irregular and that there were signs of a mild peritonitis.

On the night of the day of admission, the patient was rather bad; turpentine stupes did not give him any relief. The patient was restless and sleepless; pulse was rapid, feeble and collapsing, and although adrenaline and atropine 1/100 gr. were administered, the patient continued to be bad.

The next morning, the abdomen was swollen and tympanitic, and extremely tender. A diagnosis of acute diffuse peritonitis, possibly due to perforation of a gastric or duodenal ulcer, was made.

On 5-8-26, after 1/60 gr. of strychnine and 1/100 gr. digitalin had been administered, the pulse slightly improving after this, a laparotomy was performed. A large quantity of pus gushed out of the abdomen, and on exploration it was found that the pus had originated from a huge abscess, about the size of a cocoanut, in the liver. The patient showed signs of collapse during the operation. So, since all the pus could not be drained away, two drainage tubes were left behind, one in the abscess, and the other in the general peritoneal cavity. Two counter incisions were made in the 7th and 8th intercostal

spaces in the right mid-axillary line. A great deal of gauze was packed tightly around the drainage tubes to protect the peritoneum. Pulse 104—respiration 32. There was no rise of temperature after the operation.

The patient recovered, and in due course, the tubes and stitches were removed. He was given a course of emetine injections.

Liver abscesses may terminate in various ways, rupturing spontaneously or by becoming encysted or absorbed. The abscess may rupture into the lung, pleurae, stomach, bowel, pericardium or into a blood vessel, or into the peritoneum. Rupture into the pleural cavity unless relieved at once by drainage, will give rise to an empyema, while rupture into the peritoneal cavity, will cause an acute diffuse peritonitis to develop. It is not for the peculiarity in the mode of termination that the above cases have been reported, but because in neither of the cases was the liver suspected to be the source of the mischief, for it was not until the cases were operated upon that the real cause was discovered.

I must thank Dr. G. V. James M. D., Third Surgeon, for giving me permission to publish the notes of these two cases.

K. NARAYANAMURTHI, IV YEAR.

A Peculiar Type of Eruptive Fever

During the course of the last two months there has been an epidemic of a fever which appears to be a hybrid of influenza and measles; and in this epidemic I was called in to see a peculiar type which I propose to discuss here.

The patient is a young man of 18 years, rather of a delicate build, and subjected to epilepsy for the last 10 years. For this complaint he was taking 80 grains of

bromide to ward off the attacks. The patient came to me in the middle of August with a history of two days fever. On examination it was found that the temperature was 103.8, pulse 130, and respirations 24. No abnormality was found with any of the organs except a deficient air entry in the left apex which appeared to be due to an old lesion. His blood showed leucopenia and no parasite; his tongue was coated and bowels loose. For 12 days the fever continued, the temperature ranging from 103 to 105. The coating on the tongue increased and the case was being treated on the lines of enteric. During these days the pulse was never dicrotic, the spleen was not palpable and neither were there any pea-soup stools. Widal was negative 1 in 25.

On the 13th day the temperature dropped down to normal but after remaining so for 4 days, the fever again appeared on the 17th day but was not high, the evening temperature being 102°. On the 4th day after this relapse, there was a peculiar rash on the body. Excepting the palms of the hands and the soles of the feet all the other portions of the body were studded with these eruptions, which were of a confluent nature and set so closely that it was difficult to distinguish one from the other. The mucous membrane of the buccal cavity was free. The peculiarity of eruptions was that they were hard to the touch but did not suggest of their being deep in their origin. There was no congestion around each papule. These eruptions appeared during the course of the night and no papule reached the vesicular or pustular stage. For a period of 8 days the rash did not show signs of going down and it was only on the 9th day of their appearance that those on the forehead first subsided leaving black charred spots, giving the appearance of particles of coal sprinkled over the forehead.

During all these 9 days the temperature was raised above normal, the morning reading being 100° or 101° and the reading in the evening being 102° or a little over. I noticed that from the very first day of the appearance of this rash, the blood showed no signs of leucocytosis. There was leucopenia and the urine was clear till the 8th day when the eyelids began to swell. The urine now showed the presence of an appreciable quantity of albumin.

On the 14th day the whole rash disappeared from the body and there was a peeling off of the dermis throughout the body. The temperature dropped down to normal on the 12th or 13th day.

Before arriving at a diagnosis we have to think of the following possibilities:—

1. Bromide rash.
2. Modified type of small-pox.
3. Malignant measles.
4. Scarlet fever, and
5. A hybrid of influenza and measles.

Before discussing the diagnosis we have to decide whether the complaint started from the first day of the fever and consider the return of the temperature after it was normal for 4 days as a relapse, or take these as two separate infections.

Now taking the first possibility into consideration, the fact in favour of bromide rash is that the patient is a confirmed epileptic who has been taking 80 grains of bromides every day for the last 8 years. Against it are the facts that bromide rash though extensive when it occurs does not show itself on the mucous membranes; the rash is not papular in nature but more

erythematous in character; that it is not accompanied by any disturbances of temperature of the body, and lastly that the rash in this case did not show any signs of abatement even after the bromide was stopped for over a week. The possibility of the rash being due to bromide can therefore be eliminated.

We have next to think of modified small-pox. In favour of it are the high temperature that the patient had during the relapse, and the papular nature and rather hard feel of the eruptions, while against it are the following facts. None of the usual frontal headache, vomiting or backache was prominent in this case. The rash appeared on the 4th day whereas in small-pox it appears on the 3rd day; and the rash was not preceded by a prodromal erythema common to small-pox. The temperature persisted even after the appearance of the rash. None of the eruptions showed any signs of pus formation which is rather unusual though a few cases of small-pox have been reported where this stage was not noticed. The peculiar smell about small-pox patients was not present in this case. Lastly, the patient was vaccinated once in his infancy and was revaccinated about two years back.

Next we have to think of malignant measles. In favour of it are the points that the rash appeared on the 4th day of the fever after the relapse and that for the first 4 days the patient had high temperature.

The facts against it are that Koplick's spots were absent in their usual place, and the patient did not have the usual coryza and cough at its onset. The eruptions in measles do not usually leave behind any traces of their appearance and they usually disappear in about 4 or 5 days time. Even if they do not do so completely they at least show signs of going down.

As regards scarlet fever it may be dismissed as it has yet to be seen in India, but the effect on the kidneys raises a suspicion in our minds.

Considering all these signs and symptoms and also that they do not agree with those of anyone disease in India I am led to think that it is a hybrid of influenza and measles.

DR. K. VASUDEVA RAO, M. D.

Current Medical Literature

Differential Diagnosis in the Tropics

Colonel Proctor has taken up three tropical diseases common in India and has described cases in which they have simulated other diseases, his object being to indicate the protean manifestations of those diseases under review.

Malaria. The following table will illustrate his method.

Usual symptoms	... 362	Cholera	... 1
Anaemia	... 4	Difficulty in micturition	... 3
Vomiting	... 7	Respiratory conditions	12
Gastric pain	... 6	Collapse	... 3
Colic	... 2	Typhoid State	... 1
Haematemesis	... 3	Cerebral and nervous symptoms	... 7
Diarrhoea and dysentery	11	Jaundice	... 4

This table mentions the symptoms originally complained of by patients admitted to hospital.

He has described a case of "gastric pain" of about a month's duration which was rapidly relieved on the administration of quinine on finding the parasites. A Punjabi recruit had symptoms of complete transverse myelitis without any fever, deceiving all alike, but with the onset of fever of tertian periodicity the clue was obtained and quinine supplied the cure. In a case of renal colic with haematuria and rise of temperature, it was only when the temperature recurred on the succeeding evenings that a blood examination was made. The parasites were discovered, quinine was administered, and the colic vanished. The suggested pathology is blocking of the renal capillaries by parasites, and the passage of

blood clots. Where the symptoms are those of collapse or cholera it is difficult to diagnose; but the author has given the tip that whereas intravenous injection usually results in the passage of typical cholera stools and fresh vomiting in cholera, this is not the case in malaria; and in every case of vomiting to take a blood film or at least examine the spleen.

With the proper administration of quinine and a preliminary mercurial purge a fever lasting more than 4 days is not malarial. In this connection must be remembered the terminal rise of dengue, but here there is the slow pulse, etc.

Kala-Azar. By far the commonest mistake is to diagnose kala-azar as enteric, and so alive is the author to it that he is inclined to regard continued fever as kala-azar till proved to be enteric. He has given four points of difference, the last two being the most important.

(1) The spleen steadily enlarges in K. A., and usually reaches a larger size than in enteric,

(2) the patient's general condition is less toxic in K. A., than the duration of the fever would indicate,

(3) there is progressive leucopenia, and

(4) a double rise of temperature in 24 hours.

They enabled a case regarded as septic cholangitis to be placed in its true category. Bowel hæmorrhage is as common in K. A., as it is in enteric. As he has not found examination of the peripheral blood of value in diagnosis, one would conclude that he believes parasitological evidence to be unnecessary but he does speak of successful liver puncture elsewhere.

The first case of kala-azar shown to the author, in a hospital without microscope, proved to be spleno-medullary leukæmia and led him to remark that "it has always seemed curious to me that in a country where

pathological conditions of the spleen are common we scarcely even hear of splenomegaly due to conditions which prevail in Europe. I refer to splenic anæmia, acholuric jaundice, and syphilitic disease of the spleen in infants, to say nothing of the rarer Gaucher's spleen and Von Jaksh's disease."

Amœbiasis. Of acute amœbic intestinal infections, 238 were admitted with the usual symptoms, and 30 with the addition of fever. In 44 cases the only symptoms were diarrhoea alternating with constipation, in 5 appendicitis and in 5 difficulty in micturition. Appendicitis and dysentery are frequently confused; the order of appearance of symptoms is here of importance: in appendicitis there are pain, nausea, local sensitiveness and fever. The author has known carcinoma of the rectum treated as chronic dysentery till secondary deposits appeared in the liver.

Of 33 cases of amœbiasis of the liver, 7 had fever only, while 5 others showed lung symptoms. The greatest aid to diagnosis is X-ray screen examination. A case of cerebral abscess in Calcutta proved to be a pure amœbic abscess; it was missed although there was a history of dysentery.

Some Results of Treatment. Quinine taken over long periods may give rise to tachycardia. Sudden attacks of syncope are entirely due to this drug, and are treated by stopping it. The author is very much against administering quinine intramuscularly, and gives a list of the disasters he has seen; emetine and arsenic also have their tragedies. (Indian Medical Gazette, March, 1926.)

Experience of Yellow Fever.

Hanson during his work in Peru in 1919 contracted yellow fever and although the method of infection is

uncertain, he gives a history of first becoming ill at about 2 a. m. four days after contaminating a finger with blood from undoubted cases of the disease. Another doctor developed yellow fever about the same time $4\frac{1}{2}$ days after pricking his finger at an autopsy. In the author's case, the onset showed itself by a strange feeling of uneasiness, followed by a peculiar type of sore throat and taste like that of blood in the mouth. A moderate headache developed, followed by a marked soreness of the back which at first seemed to be localised in two large tender spots over the kidneys. Profound prostration supervened, with sensations of abdominal tenderness in the epigastric and liver regions. Though the temperature was never high there was profound toxæmia. The kidney almost ceased to function. The usual intestinal symptoms were presumably absent as the author does not mention them. Five points to be observed in the case and treatment of cases of yellow fever are

1. Absolute rest in bed from the first onset of symptoms to convalescence.
2. Foods of all kinds, even milk or albumins should be withheld until convalescence is established.
3. A cathartic which is not too drastic should be given as early as possible.
4. As much water as can possibly be drunk without causing vomiting should be given.
5. All visiting should be prohibited. When food is administered it should be soft and light for a period of two weeks. (Jl. Amer. Med. Assoc. Feb. 1926.)

The Place of Anatomy in Medicine.

The life of a medical student, especially in its earlier years, is full of novel experiences and strange adventures. There is for example the October morning when he shyly

pushes open the dissecting room door and, putting on an outward air of bravado to cover his inward trepidation, advances in search of the subject which is to afford him his first practical experience of human anatomy. As he discovers the object of his search we see him don immaculate apron and sleeves, undo the lid of a brand new case of knives, and seating himself by the subject, open his dissecting manual at the section devoted to the arm, impatient to commence operations. As he makes these preparations a sense of deep satisfaction takes possession of him, for he feels that at last he is to begin the real study of his profession. He had listened but with only a half-hearted acquiescence, when his lectures on chemistry, physics, and biology had claimed that theirs were the basal subjects of scientific medicine. But now all doubts had vanished; the stark subject which lies stretched on the table beside him measures the limits of his life's work; it is the field of all medical and surgical endeavour. No wonder, then, that the young student, as he makes his first incision and meets with those mysteries spoken of as superficial and deep fascias, feels that at last he has entered his profession. It was thus, in October days long gone by, that young medical students named William Harvey, Thomas Sydenham, John Hunter, Edward Jenner, Charles Bell, Marshal Hall, James Paget, and Joseph Lister entered the profession of medicine. Their first incision was also their blood-baptism to the profession of medicine. And so it will be in the future. Scalpel and forceps can never become antiquated, for as long as medicine endures, its practitioners must learn, by their use, the structure and working of the machine they would mend.

It is difficult for us who have grown grey in the service of medicine to recapture the enthusiasm, resolution, and outlook with which we first entered the dissect-

ing room. The task ahead seemed so simple; the kingdom we had to conquer, the human body, had but a few parts—a head and neck, thorax, abdomen and pelvis, upper and lower extremities, and some special organs of sense. Its bones and muscles had been duly numbered and named; the shape and surfaces of its organs fully described; all its vessels and nerves had been charted. With the optimism of youth we felt certain that before another October came round we should be masters of anatomy; by that time we hoped to have built up in our minds a picture or lay figure of the human body. This lay figure, reared in the dissecting room, we proposed to carry with us to the physiological theatre and laboratory, and there, as it were, have its machinery set in motion. It was to be for us what *Maconochie* became for Sir James Barrie—an *alter ego* which was to keep us company every day and everywhere. This anatomical *Maconochie* was, in due season, to go with us to the pathological department, and there his inward parts were to suffer all the diseases to which human flesh is liable; when the time came all the remedies of the pharmacopoeia should be tested on him and all his systems marked with therapeutic tags. He was to accompany us to the wards—if we ever got so far—there to serve as a lay figure on which we should graft experience gleaned from surgical and medical cases. Nay, in the distant future, when we had become practitioners, we conceived this lay figure, first built up by scalpel and forceps in the dissecting room, as the companion of our rounds—an epitomized embodiment of our medical knowledge—a representation of our whole stock-in-trade.

Why it is that in so many of us the zeal and enthusiasm with which we entered the dissecting room fade so soon and the anatomical "*Maconochie*" of our dreams is dead before the morning dawns? The art of dissection is

laborious; the accounts given in textbooks are accurate, detailed, and prolix, but as dead as the parts described. Very soon, unless a teacher is at hand, the youthful student of anatomy becomes submerged in a chaos of fact. Some of the best minds which enter the profession of medicine turn from anatomy with contempt; for them it is but a catalogue of names. Besides, the student who would realize his early ideal and the teacher who would willingly help him, have to keep an eye on examination papers. In every question the candidate is desired to "describe" or "enumerate" or "given an account of" shapes, relationships, and attachments of certain structures. All references to the purposes these structures serve in the living body are excluded. The student, in such circumstances, abandons his earlier and truer ideal and accepts the conditions which tradition has made for him.

British teachers of human anatomy have realized more fully than those of any other country what is wrong with their subject. Their subject has been killed by tradition, and if it is to take its place as the fundamental subject of medicine, they have to make it alive again. They are now revivifying it in many ways—by using living models as the subjects of their demonstrations and lectures, and by applying the discovery of Rontgen to the study of the living body. They desire that their students should carry from the dissecting room, not a memory of dead subjects, but of live men and women. No matter how high the ideals of the professor may be or how actively the demonstrator may supervise dissections, if this aim is to be attained—if the dead subject is to be made alive—each student has to do it for himself or herself. No one can perform this miracle for them. It is an easy matter to reflect skin, separate parts, and give a neat and clean demonstration of structures; to memorize descriptions

is, at most, only a mechanical art, but to build up a living picture of each part as it is dissected, to ask and answer the questions—What is the use of this structure? Why is it shaped so? entails real mental labour. Without this travail of the mind the labours of the dissector are thrown away and his time is largely wasted. It is this latter aspect of his work in the dissecting room which the modern student of anatomy fails to appreciate, and towards which his best books give him so little guidance. He clings to the hope that there is some easier way—some short cut—some system of mnemonics which will resolve his difficulties and assist him to satisfy the demands of his examiners. Sooner or later he will discover that in anatomy, as in all other branches of knowledge, there is for him but one royal road to learning—a diligent and intelligent application of all his mental powers.

It does not seem natural that the study of function should be separated from structure in the dissecting room, and it may happen that some student who reads this article will care to find out how anatomy became divorced from physiology. If he turns to the writings of John Hunter, which cover the latter half of the eighteenth century, he will find that anatomy, physiology, and surgery were taught by one man. John Hunter was a splendid anatomist, but when he dissected, his aim was to find out, not what an organ looked like, but what it did. He studied anatomy and physiology to get help in diagnosing and treating his patients. He studied dead things to understand the living, and observed living things to understand the dead. Then if the inquirer wishes to know how anatomy and physiology were taught early in the nineteenth century he should consult a textbook which was bought and read by medical students one hundred years ago. On its title-page this

textbook is described as: *The Anatomy and Physiology of the Human Body*, by John and Charles Bell (sixth edition, in three volumes, 1826). These two brilliant brothers, like Hunter, taught anatomy and physiology and practised surgery. In their great textbook anatomy and physiology are blended to their mutual advantage. When the textbooks which were used by students of the following decade—the “thirties” of last century—are consulted it will be seen that a “judicial separation” by mutual agreement had been effected between anatomy and physiology. Not a teacher of the time, so far as one can find, entered any form of protest. Indeed, we have only to turn to a book which every student of medicine should read—*Memoirs and Letters of Sir James Paget*—to see that the change received an enthusiastic welcome. The passage which I quote relates to 1842 when Paget was 28 years of age, and just beginning to get a foot on the first rung of the professional ladder:

“The time had come, in fact it had long ago come, when it was necessary to separate the teaching of physiology from that of anatomy. The separation had been made some years before at University College, and at the Aldersgate School, the rival neighbours of St. Bartholomew’s, and in some other schools. It was now resolved to make it at ours; and my election to the physiological lectureship was sure. The plan was to have a lectureship on descriptive anatomy and another equal in rank and pay on general anatomy and physiology.”

In this way anatomy became divided into two branches—descriptive anatomy and general anatomy—physiology being appended to the latter. Very soon descriptive anatomists were named *anatomists* without any qualifying adjective, and general anatomists became known as *physiologists*. No doubt the separation of anatomy into two branches had become inevitable, but the student of to-day may wonder why cleavage took the line it did. He may wonder still more how it was that the anatomists of that time were

content to hold the husk of the human body when other anatomists ran away with the kernel and called it physiology.

A search for an explanation will carry the inquirer into one of the most interesting episodes in the history of medicine. A reference to the writings of Dr. Robert Knox—a brilliant if somewhat unbalanced exponent of the anatomy of his time—throws much light on the matter. Knox was never tired of extolling the marvels of the new science invented in the schools of France—the “science of descriptive anatomy.” The anatomist’s sole business, he held, was to give an accurate description of structure. There was also a science of form—“morphology”—but that, he held, had nothing to do with so mean an aspect of matter as function. Probably British anatomists would not have been content to remain mere “describers” had not Sir Richard Owen, during the “forties” of last century, leavened their subject by infusing into it his archetypal speculations. Owen’s speculations were dying when, in 1859, Darwin led anatomists away on a new and very interesting chase—the search for the origin of man’s body. Then, later in the nineteenth century, came the study of the human embryo, and the light that it threw on man’s evolution. More and more the anatomist became the historian of the human body and concerned himself less and less with the action of its parts.

Without doubt anatomy as a subject has prospered and attained enormous proportions since the disruption effected almost a century ago. Its sister subject, physiology, has thriven out of knowledge. But the student of to-day, when he becomes the medical man of to-morrow, and has to relieve the ever-growing congestion in medical education, will doubt if anatomy and physiology have developed along the lines which are most profitable for medicine.

For if he surveys the real additions which have been made to human anatomy in recent years he will see that they have been made, not by anatomists, but by physiologists. Gaskell, Langley, Ferrier, Sharpey-Schafer, Sherrington, and Head have been the best British anatomists of my time. Indirectly Joseph Lister has done more than all of them for the progress of practical anatomy, for he it was who gave the surgeon access to all parts of the body, and with every departure in surgery there opens up a new field in practical anatomy.

A renaissance is on foot in human anatomy. For the good of medicine and the right progress of their own subject teachers of anatomy are no longer content to confine their efforts to mere description. They feel that the man who describes the anatomy of the brain and central nervous system must also, if labour is to be saved and time economized, deal with the mode in which its several parts perform their functions. Who could describe the human heart intelligently unless he explains its uses as a pump? Any account of the lungs, thorax, and respiratory passages is useless if the mechanism of the act of breathing is omitted. Sooner or later—and the sooner the better if the student is to be served—a new dividing line has to be drawn between the departments of anatomy and physiology, and that dividing line should not separate structure from function.

I seem to have struck a note of discontent with the present state of anatomy. An impression of this kind is not the one which I wish to convey to young men and women who are now beginning the study of the human body. A knowledge of how this body is made and how it works must provide the basis for all the more practical subjects of medicine. The beginner has to face the fact that to attain such a knowledge requires regular and unremitting

application. Application, however, is not enough to attain success; toil soon degenerates into sheer drudgery unless interest is stimulated and maintained. How is this interest to be maintained?

There are many ways. One of the best is to acquire the habit of reading medical journals; never a week passes but there are reported clinical and other cases which have a bearing on anatomy, and in this way students come in touch with the latest applications of their subject to medicine. Besides, this habit of keeping in touch with medical literature is one worth acquiring for its own sake; it will stand students in good stead when they have become busy practitioners or have joined the ranks of consultants or of specialists. Another way of maintaining interest in anatomy is to make occasional visits to the operating theatre, to out-patients, or to the *x-ray* department. A visit to the *post-mortem* room will often give a practical bearing to what the student may have observed in the dissecting room.

A glimpse now and then at the pages of *Proceedings* and other publication issued by anatomists and physiologists will place him in touch with subjects which are interesting his teachers and reveal the lines along which new fields of research are being opened up. At least a pastime of this kind will remove from the student's mind a delusion widely held by the public at large—that all worth knowing about the human body has been discovered long ago.

I would not take away a single moment of the leisure which the student proposes to give to general literature—nor to amusement or sport—but there are many books on medical biography which will well repay study and help to maintain interest in anatomy and physiology. Especially would I commend the lives of Harvey, Hunter, and

Marshall Hall. Every student should get to know John Hilton's book on *Rest and Pain*, not only for what he has to say, but also for the way he says it. Then there are a number of excellent modern books which deal with the evolution of the human body, and explain the history of its many curious structures. For my part I still find great profit in reading Archdeacon Paley's *Natural Theology* and Sir Charles Bell's Bridgewater treatise. The explanation they give may have become antiquated, but the facts and contrivances they describe are still before our eyes, and the manner in which these authors place their facts before the reader has a charm and clarity which are still unexcelled. By such diversions the students will relieve the monotony of the more routine studies required of him by teachers and examiners, and qualify himself, not only for the work of life, but to take a wide and permanent interest in the welfare of his profession. (Sir Arthur Keith, M. D., F. R. C. S., British Medical Journal Sept. 1926.)

Madras Medical College

ANNUAL PRIZEGIVING.

The annual prize distribution of the Medical College took place on Friday evening at the College Hall, under the chairmanship of Major-General F. H. G. Hutchinson, C. I. E., I. M. S., Surgeon-General with the Government of Madras. The College was tastefully decorated, and there was a large attendance. The Rajah of Panagal sent a message regretting his inability to be present.

The Surgeon-General, on arrival, was received by the Principal and members of the staff. After inspecting the guard of honour provided by the military pupils and the College company of the University Training Corps, Major-General Hutchinson was taken to the hall.

The report of the Medical College for the year 1925-26 submitted by the Principal afforded interesting particulars connected with the College during the year under report.

Distribution of Prizes over, Major-General F. H. G. Hutchinson, C. I. E., I. M. S., the Surgeon-General, addressed the gathering as follows:—

Mr. Principal, Professors and Students:—In opening an address on an occasion such as this it is usual to express appreciation of the honour in being asked to deliver it: if I do not dilate on this it is not that I am insensible of the privilege, but I feel more deeply the attached responsibility of clothing with appropriate words, the thoughts I wish to convey to you. I have come here today in a dual role: first as one of yourselves, a fellow student, to tell you of the vantage ground of experience in the heritage you have adopted by becoming students of

Medicine. In my second role I came as an official, to distribute to some of you tangible rewards for student-ship.

Such rewards are open only to a few; but each one of you can gain the lasting reward, for a life time spent in study, the reward of happiness: the happiness results from a succession of acts all of which tend towards one end. The end or good towards which every student of Medicine strives is the conquest of disease. The heritage, therefore, which we all as students of Medicine have adopted, is a succession of actions through which the conquest of disease will become a reality.

Professor Julian Huxley, in his "Essay on Progress," defines *reality* as a component of three separate parts. First, there is that which is outside man, the outer man of fact, the revelation of which to man has been gradual throughout the ages and dependent on man's own effort by study to unravel nature's secrets. Secondly, there is that which is inherent in the mind of man, his judgment, ideals, superstitions and dogmas. In the third place there is the need for intermediation between the outer known, the mass of knowledge gained by study, and the inner felt, man's opinions. It is to a consideration of these three aspects of the conquest of disease to which I invite your attention for a few minutes this evening.

The outer known, or in other words accurate knowledge of the nature of disease. Let us follow very briefly the steps in human endeavour to understand it. If you cast your minds back some 20 to 50 thousand years you will obtain a mental picture of the time when the unit of society was the family living in isolation and in conflict with neighbouring families, all animals and adverse physical influences. Man, through bitter experience, learnt to avoid the pangs of death by hunger and thirst, through

poisonous foods and waters; to lessen the dangers and hardships from extremes of climate, floods, and droughts. He thus acquired the art of self-preservation, and perhaps more important still, recognised the need for study of the reasons from happenings. Can there be reasonable doubt but that in hunger and thirst and in the effects on the body of foods and herbs, poisonous and non-poisonous, we have the origin of medicine; that the need for storage of water led to the manufacture of mud vessels and to the pottery industry; that the necessity for protection against cold, damp, the missiles of enemies and the thorns of the thicket inspired the tanning of skins and the weaving of the hair of animals for personal wear. It is probable that, as man spent his days in hunting other men and animals, it was woman, who through family ties was forced to remain at home, first invented industries. Be this as it may, one would excel at pottery, another at tanning, another at weaving, and another in knowledge of foods and herbs and so on. This individual predilection led to exchange or barter, and to the gradual abandonment of family isolation in favour of a community of several families, and finally to the social system of the present day based as it is on industrial divisions. This change from isolation to aggregation introduced or accentuated attention on another adverse influence to which man in isolation had been a comparative stranger: diseases as distinct from wounds and injuries.

Picture to yourselves the effect on the minds of this primitive people of a healthy young adult struck down, enfeebled, incapacitated and perhaps killed by some cause unseen and not understood. Can you wonder that at first the cause was held to be supernatural, the possession of the body by malignant spirits or demons?

This belief, though it may not have originated, certainly stimulated the study of occult sciences, and was a factor in the association of the ecclesiastic with medicine, an association which was responsible for the literary *excellence* of the early medical classics.

The point for us to remember is that these early thinkers were closely observing phenomena and studying the reasons underlying them. This study led to the partial abandonment of the supernatural theory in favour of the materialistic view that disease is the result of some adverse factors within the body: the so called humours. This humoral theory still persists, and though wrong we may pause to admire the intuition of its originators in placing the seat of disease within the body.

On the fall of the Greek and Roman civilisations, and unfortunately from advance in Medical knowledge, the art of observation was lost during some ten centuries, during which practitioners of medicine fell into a slough of ignorance and self conceit. How was the lost art regained?

In the early years of the reign of Henry VIII, King of England, an act was passed authorising the Bishops to examine and license practitioners of medicine. Each Bishop was permitted to call in expert assistance, if he found it convenient. Thus, less than 400 years ago the power of the ecclesiast over the physician was predominant in England. Seven years later, the same king divorced the medical profession from the Church by founding the Royal College of Physicians: the President was to be elected by the members annually, and an examining body composed of the President and three elects was created. To this step which made the medical profession responsible for the standard of knowledge of its members we owe all modern advance in know-

ledge which has solved the mystery of disease. Linacre, the first President, was a man of great intellectual attainments, who revived the study of the Greek medieval classics and was the intellectual grandfather of the giants who succeeded him and re-introduced observation and initiated the experimental method into medical science. Men like Harvey who devoted their lives to the study of the body, its organs and their functions, and founded the sciences of Anatomy and Physiology, the pillars on which medical knowledge is based.

Men like Hunter who spent their time in studying disease through its effect on the organs of the body, instituted the science of Pathology. These indefatigable workers in an absolutely unexplored field reaped an abundant harvest of facts, facts which were hidden from the wonderful writers of ancient days. Great as the accumulation of knowledge was, it was insufficient to throw complete light on the nature of disease, which was still in the partial shadow of theories based on inadequate knowledge.

It was not till the microscope revealed that the organs of the body are composed of innumerable cells that the final dispersal of this shadow became possible.

The anatomists and the physiologists of the 17th and 18th centuries had proved the body to be an efficient mechanism: the recognition of its cellular constitution has shown that it is more than a mechanism, far more, for it is a perfect and living democracy.

You all know that this body of ours springs from a single cell, which divides and subdivides into innumerable daughter cells, each of which migrates to its appointed station to carry out its pre-destined function whole-heartedly for the good of the body democracy.

Can you conceive of such whole-hearted disinterested work by a multiplicity of cells with widely different functions without some controlling, some directing force, some form of government?

Sir Arthur Keith illustrates this control by the sequence of events in training for physical exercise. The muscles are exercised and develop; all the related organs in the body—bones, lungs, heart, arteries and organs of digestion undergo responsive growth. The only explanation is that muscles in growth throw out missives which evoke a reflex response in other structures. The definite correlation of such response in health points to a controlling centre or centres: when control is deranged there is absence of correlation, and disease results. Think over acromegaly and its association with the pituitary gland and growth response to exercise. The microscope further revealed that in disease, cells foreign to the body are present. Speculations on the cellular nature of disease are not absent from the writings of Greek and Roman philosophers. These speculations were turned into fact by the discoveries of Pollender and Davaine, Pasteur, Koch, Cohn and others. We have now the certain knowledge that disease is a conflict of the nature, either of an invasion of the body democracy by foreign cells or internecine strife within the body as a result of weakening of the controlling system.

These discoveries have opened up the vast fields of knowledge comprised in prophylaxis, parasitology, bacteriology and immunity. Knowledge of recent origin, which has added to the outer mass of fact ascertained by anatomists, physiologists and pathologists, the data essential for the potential conquest of disease. This is no idle remark, for, the main scourges of humanity, cholera, enteric fevers, smallpox and malaria, have been bridled in

those countries in which knowledge has been fully applied.

Much knowledge still remains hidden, and must be dug out by study before the conquest of all disease will be possible. It is for you students to take your share in its revelations. There is scope for all physicians and surgeons working in the wards and outpatient departments of hospitals, for laboratory workers, and above all for the general practitioner. Has it ever struck you that the diseases from which people die bear little relation to the ailments for which patients consult the general practitioner? Can it be that these ailments are the preliminary and early stages of the diseases seen in the wards of a hospital? Whatever the answer to this may be there is no doubt that the crying need of the present day is for the study of disease in its early stages when tissues have not been damaged or altered and cure is certain. This knowledge can only be acquired in the outpatient departments and in the consulting rooms of the general practitioner. It is not sufficiently recognised that work in the outpatient department requires the attention of a physician of experience and skill, just as much as in the wards. When this is realised the feeling that such work may be beneath the dignity of even the most experienced physician will disappear.

The general practitioner of the future will benefit, for, the medical students will receive instruction in all stages of disease working whole-heartedly together for the advancement of knowledge under a directing centre just as do the cells of our body democracy.

I have left little time in which to discuss the two remaining aspects of the conquest of disease: man's opinions and the need for mediation between knowledge and opinion. It is a truism that knowledge is in advance

of its application. Why? A saying of the late King Edward VII is frequently quoted in the press. He was discussing tuberculosis and remarked, "If preventible, why not prevented?" Why not indeed? The excuse for inaction, which is generally advanced is poverty, and lack of funds. History has shown that this is not a valid reason, for, whenever man has been convinced of the necessity for action in the interest of preservation, that action has invariably been taken. The difficulty lies in convincing man of the need, in dispelling apathy, and in ridding the world of the crushing power of the dictum that "one man's opinion is as good as another's". The only solution is education. Let us make sure that we in our conversation and advice do not provide a stumbling block to advance. Remember that the man without scientific education finds difficulty in distinguishing between facts and deductions from facts. Facts last for all time, deductions may be and often are wrong. A faulty deduction has before now upset, in the opinion of mankind, the facts upon which it is based. Stick to facts and action for preservation indicated thereby will be taken. The reason for this confident assertion is that two forces impel action when preservation is at stake, the forces of fear and humanity. Instances in history of the action taken as a result of these two forces by man in his conflict with adverse physical influence are of absorbing interest, but I must confine myself to a very short account of their impulse in the struggle against disease and poverty.

From the earliest historical times, temples were dedicated to special diseases, and it is probable that these were concerned more with prevention than with the treatment of the sick poor.

Evidence relating to gratuitous treatment in the pre-Christian era is scanty: hospitals there were in India, and

a few in Greece. The main provision for treatment seems to have been in open shops, a very few of which in Greece could accommodate in-patients.

At the beginning of the Christian era the Emperor of Rome introduced a policy for encouraging foreign practitioners to settle in Rome by granting them freedom from civic obligations. In return for this privilege they were asked to treat the poor gratuitously. This policy, however, led to the appointment in the 4th century of state or urban medical officers whose duty it was to treat the poor in their districts. At about the same time Bishop Basil of Rome founded a large charitable hospital in Cæsarea, and 30 years later a similar institution was started in Constantinople by the Archbishops. These charities perished from inanition on the death of the founders amidst the wars and civic strife of that period.

In the 6th century the monastic system took root, and each monastery served as a hospital. It was on this medieval foundation that the hospital system of modern Europe arose.

Time will not permit me to trace in detail the growth of institutions and enactments for the relief of poverty and suffering. It will suffice to point out that in the middle of the 18th century the spirit of humanity received a great impetus, and hospitals multiplied and the relief of suffering was incalculable. Yet up to some 60 years ago the sum total of disease experienced no diminution. In 1848 and 1855 the first Public Health Acts of England, introduced by reason of fear of approaching cholera, raised sufficient opposition to prevent the general adoption of their provisions.

What was wanting so recently as 60 years ago? The outer mass of fact was insufficient to convince man that action suggested opinion and to direct was on the right

lines: the nature of disease was not understood. Then came a determined effort to educate the public in the brilliant discoveries of the cellular nature of disease, and thereby to create a public opinion based on accurate knowledge.

The result was immediate. The year 1872 saw the initiation of a series of Acts and Regulations for the improvement of the conditions under which people live and work; and for the provision of facilities for the recognition and treatment of disease in its early stages.

The important point to remember is that the outer mass of knowledge, through the educative zeal of the medical profession and other public spirited individuals in a few years so influenced public opinion in England that these acts and Regulations have been applied in spirit and in letter. The consequence has been that the conquest of disease is well on the way to reality: for, the death rate has fallen by over 50 per cent. and the expectation of life has been doubled.

Compare this with the present condition of this great Presidency. Are we not now very much in the condition England was some 60 years ago? The relief of suffering in the hospitals and dispensaries is splendid: yet the death rate remains high, over 40 per thousand in this city. the expectation of life has not been raised: the many scourges of humanity—cholera, enteric fevers, small pox and malaria are still rife. Why should this be so? The forces of fear and humanity are present; the mass of knowledge is available and awaiting its application. There is just one link in the chain missing: public opinion has not been educated: the outer mass of known fact, world wide in its significance, has not yet reached the general public, and so has not reacted on the inner felt: man's judgment, ideals, superstitions and dogmas.

Herein lies another field of work for you all: preach in season and out of season the facts relating to the nature of disease, and take your place in India among the mediators between the outer known and the inner felt. The conquest of disease will then become a reality in India, and in 25 years or less the death rate will be halved and the expectation of life will be doubled.

Have I made your heritage clear? On the one hand advance in knowledge through continued observation and study and on the other hand the explanation to the people of the significance of knowledge.

Prove worthy, for, it is a glorious heritage. (Loud Cheers).

Lieut-Colonel Bradfield proposed a vote of thanks to the President.

With three cheers to the President the function terminated.

Editorial Comments

The term that is coming to a close has been one of great activity in the College. There has been much social and intellectual activity among which the foremost function was the annual entertainment to the graduates of the year. This is practically our College Day and we take advantage of the occasion to stimulate a free and hearty commingling of teachers and students—such as one as we do not get opportunities to bring about during the remainder of the year. The function was organised by the students themselves in the name of the Medical College Association. All ranks in the College heartily co-operated, a commendable spirit of fraternity and good-will prevailed all round and we could not help agreeing with the opinion of many who said that for hearty co-operation and a general spirit of good cheer our College easily holds the first place. The function was a great success and the organisers, both ladies and gentlemen, deserve our sincere thanks.

* * * *

The next important function of the term was the annual prize distribution. This is considered an official function and is organised by the Principal on behalf of the College Council. The Surgeon-General with the Government of Madras had been chosen to preside on the occasion. The Medical College Company of the University Training Corps furnished a guard of honour. The Professors in their academical costumes mustered in full strength. The meeting was held in the historic Library Hall of the College. Col. Hingston, the Acting Principal in the course of his Annual Report commented on the in-

crease in the percentage of failures in certain examinations of the University. The Principal, no doubt in his fervour for the improvement of the College, made what cannot but be styled certain unfortunate references to the general ability of the students, particularly the lady students, as well as of some of the Professors. We understand on reliable authority that a great deal of irritation has thereby been caused in the minds of both students and Professors and but for the fact that it is causing some unrest we should not have thought it necessary to refer to it in these pages. We heartily wish that that speech had not been delivered and we would earnestly request our students to allow an amount of latitude to the Principal of the College who after all means kindly by them and to the Professors we would say, "try to forget and forgive, and return good for evil."

There is an ancient saying in India that the swan has the power of selecting the milk from a mixture of milk and water. There is also a proverb which says that 'wise words should be listened to even if they come from little children'. Following this principle we shall refer only to what appears wholesome and constructive sentiment in the Principal's speech. He advised the students to improve their general education and knowledge, and to develop above all a practical and clinical turn of mind. This is a very desirable thing in itself and we appeal to our students to take to heart these weighty words of the Principal. Turning to the Professors, the Principal asked them to be sympathetic to the students, at the same time to realise their responsibility towards them and to inspire the young students with their impressive teaching and personality.

We really have some anxiety lest the Principal's exhortation to the Surgeon-General to use his influence with

the Government and to reduce the pace of Indianization of the medical service, be listened to and acted upon, for we were hoping that with increasing Indianization larger numbers of our Alumni in after life might have a fair chance of serving their country in the Medical department.

The Principal made an appeal for co-operation all round in order to maintain the high reputation of the Institution. We hasten to assure him that as far as this College is concerned, goodwill and co-operation would always be forthcoming, so long as all are made to feel the commonness of their interests and the unity of purpose in the working of the College.

The Surgeon-General who delivered the usual oration to the prize winners wisely avoided controversial topics and treated us to a high-class dissertation on the medical profession and its ideals, his remarks being greatly appreciated.

The inaugural meeting of the Medical College Association was held in the Hygiene Hall when Capt. Basu, I.M.S. delivered an instructive address on "Rejuvenation and its relation to the ancient Yoga System". Major K. G. Pandalai presided. A large gathering of students was present. A few Professors and Assistant Professors also attended. The Lecturer dwelt at length on the ancient methods of keeping fit and prolonging life. The Chairman in his concluding speech referred to the difficulties of adapting ancient methods to modern conditions and gave a few illustrations of Rejuvenation as practised to day.

As this issue is leaving the press the College is in the throes of the October University Examinations. We are aware how anxious these days are to both students and Professors. To the former we would say, "keep your heads cool and plod on" and to the latter "be just and merciful".

The College Day

(Friday 20th August, 1926.)

There were a few welcome changes this year in the celebration of our College Day. The Garden party was arranged in a fashion that was both novel and pleasing. The tables were placed under the shade of the trees by the side of the College fountain. Considerable attention had been devoted to artistic detail. A stranger at our College gate would have witnessed a rather unusual scene for this part of the world—a mixed party of ladies and gentlemen, with a lady at the head of each table, attending to the guests. He would have been agreeably surprised at the healthy co-operation that prevailed between the volunteers of either sex; his eyes would have been regaled at the sight of graceful and picturesque figures moving to and fro, attending to the details of the buffet and the tables. He would have felt what a corrective such a mixed gathering was towards rounding off any angularities of manner and behaviour in our young ladies and gentlemen. There is no gainsaying the fact that the company of ladies is a real check on our young men in social gatherings—and our ladies may be assured that such mingling greatly helps to produce a healthy mental outlook all round.

The usual practise of holding the meeting in the Library Hall which used to be packed to the full, with the overflowing crowd pushing and straining and peeping over shoulders at the doors, or hanging from the flimsy galleries to get a glimpse of the fun on the platform, was rightly given up—and the more spacious and airy Biology Hall was specially fitted up for the evening's entertainment, decorated with flowers, flags and festoons. Here

also the practical help rendered by our sister-students was very evident. The artistic effect of the whole show, it is but fair to state, was in large measure due to the endeavour's of Mrs. Williams of the fourth year class and her band of lady-volunteers.

Another factor, and a solid one too, that contributed to the unusual success of the function was the improved finances of the Association. The big worry of going about for donations being taken off, the committee could devote their whole attention to the details of the function. It is hoped that now at least our "doubting Thomases" would have been convinced of the immense usefulness of a compulsory subscription for the Association.

The meeting commenced at 6 p. m. Almost all the Professors—some of them with their wives—members of the College staff, and students were present. In the unavoidable absence of Lt. Col. Hingston, I.M.S., Col. Croly I.M.S. was voted to the chair. Major K. G. Pandalai I.M.S., our popular Vice-President, addressing the new graduates spoke as follows:—

The Medical College Association extends to you their heartfelt congratulations on your success. You have after five long years of hard work attained a position of responsibility and comparative ease. It behoves you to conduct yourselves in after life in such a manner that you will prove a source of pride not only to the College but also to those teachers who have helped to train you. You have heavy responsibilities, to the State, to yourself and to your profession. We should take part in and promote all movements of a peaceful and progressive nature. We should maintain law and order and we should always help the authorities in maintaining law and order. To yourself there is the duty of earning a respectable livelihood.

It is here that I want to remind you of the temptations that lie before you in your path. Do not aspire to become rich in a day. Hard work and patience will pay in the long run, but do not try any shortcuts to wealth. Your immediate concern should be to advance your scientific knowledge by study, both here and in foreign countries. You can, those of you who cannot afford to proceed abroad, devote your time either to obtaining the M. D. or M. S., degrees of our University. After spending your post-graduate days as honorary Physicians or Surgeons in the city hospitals, those of you who can proceed abroad should do so not with a view to obtain merely a pass degree, but in order to make a special study of some branch of medicine. I strongly discourage pupils proceeding overseas to obtain merely a pass degree which can be more cheaply and easily obtained in our own country.

The great majority of you, however, may have to spend your lifetime as general practitioners in more or less outlying parts of the Presidency. To them I wish to address a few words. Wherever you may be, try and get into touch with other practitioners of medicine and live on the most cordial terms with them. If possible try and form a society of medical men so that you may be enabled to periodically exchange views on problems common to all. Secondly, be on friendly terms with any large hospital there may be in your neighbourhood. There is always a great deal to learn from the men who are attached to large hospitals, for they gain much more experience from a variety of cases than the general practitioner. There should be no rivalry with the hospital in your neighbourhood. On the other hand, there should be good understanding and friendship between both.

Finally, Major Pandalai welcomed the new graduates to the fraternity of the medical men of Madras and ex-

horted them always to hold high the torch of science and to educate and enlighten the people round wherever they might happen to be practising.

Mr. V. Srinivasan, the winner of the Blue Ribbon of the College, replied in suitable terms.

Lt. Col. Croly speaking next desired the new graduates to take part in athletics and advised them to remain examples of health and good cheer in whatever surroundings they might happen to be living.

Then followed an interesting programme of variety entertainment, consisting of music, Eastern and Western, by students of the College, both ladies and gentlemen, which kept the audience entertained for more than an hour. Dr. Tagore's National Song was sung in chorus by a party of lady students, and with the singing of the National Anthem (God Save the King) the function came to a close.

T. K. KRISHNASWAMI

Sporting

BY R. K. CHETTUR

Judging by the progress our College teams have made in the several Inter-Collegiate Tournaments we seem to have already made a fair start on the same perilous path to perdition, down which, it will be remembered, the Hockey Team had occasion to rush like an avalanche last year. The unwonted enthusiasm of some of our hockey and football players, which, showing itself as it did at the commencement of the year, effectually deceived us into building several castles in the air, has once again lapsed, only too soon it is to be regretted, into the usual apathy and indifference. Even more troublesome than a recurring decimal as an October examination certainly is, and however troublesome and herculean might be the task of preparing for a fresh campaign, yet, how a healthy game, once or twice in the week, associated as it is with diversion, amusement and recreation, can materially affect the success of our players in the examinations, is more than can be reasonably comprehended. But however that may be, once the horrors of the dreaded examinations are over, and affairs have come to a happy conclusion, we hope they will once again cheerfully enlist themselves for active service, for with hearty co-operation and without that air of pessimism that sometimes pervades the very atmosphere around some of our men it is certainly none too difficult a task for us to vanquish our enemies and win back the trophies this year.

The College football team has won all the matches in the first round except those two in which it was beaten by the Christian and Law Colleges. Although, to a certain

extent, the absence of Shunker and Peter, who were pitting their strength against each other on a neighbouring battle-field, was responsible for the defeat our team met with at the hands of the Christians, it must, at the same time, be said to the credit of the winners that they played the better game. We might have pulled off this match, but the one chance of equalising that our forwards had through Balakrishna Menon, our left extreme, was spoilt through the malicious intervention of a wretched rabid dog, which without either owner or motive, suddenly rushed into the field, actually bit him at that psychological moment when he was about to score a goal, and as promptly rushed out again. Even Fate appears to be *dogging* our footsteps.

Against the Lawyers our team was considerably handicapped through the absence of Ghani who might have played had he interested himself sufficiently. Without the usual centre-half the defence was steady at no period of the game, while the forwards although in full strength were a scrappy lot. From a few spasmodic rushes which appeared to make little or no impression on the opposing defence, the College forwards managed to score a goal to our great jubilation. Our hopes of victory which were so speedily raised were as quickly dashed to the ground by the referee who, long after the event, disallowed the goal on the very doubtful grounds of off-side, a piece of glaring and obvious injustice which ultimately resulted in our losing this match.

We have met with a reverse in cricket this year at the hands of our old and long-suffering rivals, the Presidency College. Winning the toss, they hit up a total of 166 runs. With such a fairly tall total to hit up, our men ought to have played cautiously, but instead, they hit recklessly and indiscriminately, ran when they ought not

to have run with the natural consequence that for the shameful total of about 60 runs all our men were dismissed. It remains for the College to wipe out the disgrace when we play them next on our own grounds.

The match with the Lawyers ended in a comparatively easy victory for us, although our men had a very bad time of it fielding first in the sun. They were all dismissed for 71 runs, Uggappa and Nanjappa, their most reliable bats being dismissed sooner than they expected. We won this match by six wickets and a few runs.

Although Pachiappas College sustained a crushing defeat at our hands on our grounds, some of their players still stoutly maintain, and try to convince other colleges, that they would have beaten us *if* some things had happened, and *if* some things had not happened. We can only remind them that there is much virtue in "if". Whatever might have been the prospects of our side *during* the course of the game, the indisputable fact remains that we hit up about 190 runs. It is true that some of our best batsmen were out for silly catches, and that had it not been for the tremendous stand made by Bhandari and Chandra Rao, it is really difficult to say what might have happened. Our opponents doubtless argue that *if* these two had not played so well *they* would certainly have won the match. If they are *still* deluding themselves in this manner which is as inconceivable as it is ludicrous, even when they remember how hard they struggled for a meagre paltry total of about 40 runs, all that remains to be said is that they belong to that incorrigible class of individuals who even though vanquished can argue still.

The progress of the Hockey team has been far, *very* far indeed, being satisfactory. Of all the matches played in the first round we have drawn one, and

we are supposed to have lost another against the Presidency College. We have yet to play the Engineering and Law Colleges.

The first time we played the Christian College the match had to be abandoned in the middle owing to rain. The replay proved to be a very interesting struggle for both teams played well and were evenly matched. The referees were slightly "out of form" in this match for they failed to assert themselves as usual. It was positively sad to see them so quiet and lifeless, but as the game progressed, and we had scored one goal, their referee roused himself a little, thought it high time to interest himself in the proceedings, overlooked an obvious, palpable and glaring offside, and allowed his men to equalise in the last few minutes. But as a result of this rare and happy policy of non-intervention, the game was very fast, of a much higher standard than usual, was keenly contested from start to finish and though the match ended in a draw we were not particularly sorry as we had had the rare opportunity of playing *real* hockey.

To compensate for this, our next match with the Presidency College ended in *chaos*, in a veritable maelstrom of confusion. Much blame has been unnecessarily and unjustly laid on our shoulders by those who consider themselves the aggrieved party. Stating plain facts from an unbiassed point of view, the behaviour and the rulings of the Presidency College referee would have exasperated even Job, and it is easy to understand how our men, who neither pretend nor claim to have any of the divine virtues of that martyr, were soon goaded to that stage when even the proverbial worm would have turned.

It must be admitted, in all fairness, that the Presidency College had scored three goals to our only one, this, as will be seen, being the only point in

their favour. Ten minutes before time one of our players deliberately picked up the ball while it was in play, and threw it out of the field, shouting at the same time to *their* referee, in whose half the incident happened, that it was not fit for play. *This* referee, as if corroborating the action and opinion of the player, threw *another* ball which he had with him at the time. But on seeing that it had outgrown its original dimensions, that it was soft to the touch like an overripe mango, and had lost all the appearances of a ball in a respectable condition, we reasonably refused to play with that ball. I asked the other Captain whether he was prepared to use a better one, but on his telling me that he would have to go to Uberoi for another we declined to play further.

Human nature being what it is, the Presidency College players, we admit, have some cause for grievance since they were leading by two goals and it was on consideration of the circumstances of the case that I was inclined, at the time, to persuade our men to play on sportingly. But with some of the players glaring at each other from dangerously close quarters, with each one in possession of a stout and reliable weapon in the shape of a hockey stick, with all simultaneously shouting, arguing and gesticulating wildly, and with the two referees "carrying on" on their own with equal ferocity, such a thing was not to be thought of. Confusion reigned supreme, and in the midst of a terrible wordy war between *our* twelve and *their* twelve *their* umpire suddenly blew off one long blast on his wretched whistle, but with what idea he did it he alone knows best.

Never to my knowledge has an Intercollegiate match ever yet ended in such a sensational and novel manner. Where the success or failure of a college team depends on the umpire, who enters the field with the one idea that *his*

side *must* win, it is not difficult to understand why and how such painful situations arise in Intercollegiate matches. In football, fortunately for one side and unfortunately for the other, there is only one referee, while in cricket, although each side has its own referee the chances for displaying that mistaken feeling of loyalty are rather limited. While we can only lament the occurrence of such an unhappy incident and devoutly hope that it may never be repeated again the fact still remains that until serious steps are taken to rectify the obvious defects in the present system, the existing state of affairs, disgraceful as they are, must and will continue.

What the result of this particular match is to be and how it will affect our success in the tournament we do not in the least care. We have been cheated too often by referees in public and collegiate Tournaments to be upset by such trivial reverses, and accustomed as we are to them, we will "carry on" as usual, playing the game for the game's sake and not for a paltry cup or a still paltrier medal, remembering the famous and stirring lines of Newbolt,

"It is not for the sake of a ribboned coat,
Or the selfish hope of a season's fame,
But his Captain's hand on his shoulder smote
Play up! Play up! and play the game!"

In Lighter Vein

You Could'nt Blame Him

The bus conductor had had a harassing day. First of all, it was raining—and conductors are not fond of rainy days. Troublesome old ladies, irritating old gentlemen, people who tried to avoid payment of their fares, and other bus pests had all combined to do their worst.

It was late in the afternoon when an American tourist boarded the bus.

"Say, conductor," he exclaimed, "I want your Saint Paul's Cathedral."

"Oh, all right," said the conductor, rather shortly,

"I say," repeated the American in a louder tone, "I want your Saint Paul's Cathedral, and I want it quick."

"Don't worry, gov'nor," retorted the now thoroughly fed-up conductor; "I'm getting it wrapped up for you!"

* * * * *

Extract from Evening Paper:—"A shilling was found in a herring caught today by the South coast fishing fleet."

Next Morning's Paper:—"The Scottish fishing fleet sailed for the South coast during the night."

The Missioner

She had inspected every parrot in the shop, and the dealer was getting tired. She declared one bird was too green to go with the carpet, and another too red for the curtains, and so on; at last she almost settled on a purchase. Then suddenly she asked:

"But is he a good bird? I mean, I hope he doesn't use dreadful language."

"He's a saint, lady," breathed the dealer fervently, "sings hymns beautiful. I had some parrots wot used to swear crool, but, if you'll believe me, this 'ere bird converted the lot of them."

* * *

Forgot Himself

Referee (in a football match). "Free kick!"

Players (excitedly) "who for?"

Referee (absent minded) "us!"

* * *

Sarcasm

Passenger:—"And here is a penny for you, my good man."

Porter:—"Could'nt you make it a couple of ha'pennies guv'nor? I could jingle'em, anyhow."

* * *

Did Shakespeare Play Football? Or to Please all Parties, was Bacon a Sport?

Although Shakespeare makes only one direct reference to the football player, a close study of his plays has convinced us that he himself followed the game.

His one allusion to a footballer is in itself strong evidence of this. "Base football player" are the words he uses in *King Lear*, Act I., Scene 4. The reference is probably to foul play—on the other side.

But if this example fails to carry conviction, we can find confirmatory evidence everywhere throughout the plays. In *Hamlet*, Act III., Scene 3., for instance, occur the words, "trip him," which, to have their full value, should be read in conjunction with *Twelfth Night*, Act I., Scene 3, where we find the frank confession, "I have the back trick."

This confession brings us to the consideration of Shakespeare as a player. When he talks of "the virtue of a good wing" (*All's well that Ends well* Act I., Scene 1.), we

see that he learned the back trick against forwards of merit: and we know him at once as a back of the robust, stick-at-nothing school ("not nice but full of charge" *Romeo and Juliet*, act V., Scene 2.), when in the first part of *Henry IV*, Act V., Scene 1, we read that "nothing can seem foul to those that win."

Of the team for which he played all we know with any certainty is that it was famous for its striking and artistic colours. For Shakespeare was too good a partisan to intend the phrase "Heavenly harnessed team" in *Henry IV*, Part I., Act III., Scene 1., to refer to any opposing eleven.

It would almost seem, on one occasion at least, the poet was to be found keeping goal, but that was probably only in a friendly match not taken too seriously. Perhaps it was at a stage *fete*, at any rate, "the net has fallen upon me" (*Henry VIII*, act I., scene 1) suggests a practical joke or faulty materials such as would never be tolerated in a League contest.—*Punch*.

Letters to the Editor

Sir,

While every institution worthy of its name has erected some kind of memorial or other in memory of those who died during the Great War or while on Active Service, it is very regrettable that our *Alma Mater*, the Madras Medical College, has done nothing for its students including those in the I.M.S. and I.M.D. services.

I therefore suggest that a memorial in the form of a marble carving or tablet containing the Roll of Honour should be erected either in front of, or inside, the Library Hall.

This is the least we can do by way of our tribute of esteem and affection to our friends who "saved others but could not save themselves." It is to be earnestly hoped that some I. M. S. men will speedily convene a meeting for concerting the necessary steps for an object so noble must readily command the attention of all medical men.

"In Memoriam."

Sir,

There are many grievances which need redress, and of which the first is the time-honoured cry for a hostel. Though this is to some extent relieved by the Royapuram Hostel and the University Club admitting some of our students, still the majority of the students live in private quarters and, in such quarters to lead a healthy life consistent with their finance is impossible. The authorities close their eyes to this state of things and make a vain show ("for University purposes") of being interested in the students' residences. It is a matter to be regretted that the premier medical institution in the Presidency is

without a hostel when second grade colleges boast of their own hostels, not to mention some high schools which can also boast of the same.

Will the College do anything to remedy this? say, in the shape of renting a big house or a number of houses in a healthy locality and leaving each in charge of a member of the staff who may or may not be paid for the job—and each of these houses can accommodate a good number of students. This is what the Presidency College has done, and what the Presidency College can do, *why not* the Medical College?

The next point is regarding the College Tiffin-rooms—these are too small for the present number of students and are very dirty, the tables are all sodden and never cleaned properly—the room is congested and there are no electric fans to relieve this feeling. Besides this, the quality of water supplied in the tiffin rooms is abominable—to say the least of it—and there are the so-called filters which are in reality excellent culture-beds for bacteria, and *Medical* students have to drink this water in their hurry. Talking of the water-supply, one is also reminded of the insufficiency of the same—more water, clean water and cool water must be supplied both in the tiffin-rooms and in the Library hall. The Tiffin-rooms must be provided with tables of a washable material (preferably stone-topped ones), with electric fans overhead and more seats. Then about the Library—this name is a misnomer—to remind the students that it *is* a library there are 2 placards—one strictly prohibiting smoking and the other enjoining absolute silence—both of which are observed in their breach. The students cannot do any better for they certainly want a retiring room where they can lounge or smoke or shout and thus spend a weary moment. To enforce the carry-

ing out of these two orders the authorities must give the students a retiring room as otherwise they are not justified in enforcing these orders.

Apart from this, those who are inclined to make use of the library for study are not able to do so because of their brethren who are inclined to use the library for other purposes, and as a retiring room is non-existent this state of things must and cannot but continue.

Also, one is reminded of the complete inaccessibility of medical journals to students. Magazines must be placed on the tables for perusal by students and should not be monopolised by the staff. The College and all that appertains to it are meant mainly for the students and not for the staff. As long as this principle is not observed there is the possibility of some busybodies holding up Indian intellect to ridicule and insult.

"Aggrieved"

[The Editor sympathises with "aggrieved" and wishes to point out that if the Medical College authorities only move in the matter it is quite easy to secure accomodation in the Engineering College Hotel, at Guindy, which is now practically empty. Regarding the Library, we certainly realise the difficulties, but until that happy time comes when the students can boast of a Common Room we would request them to put up with the inconveniences, remembering, at the same time, the time-honoured adage that what cannot be cured must be endured. If "aggrieved" wants to shout in the Library as he would like to, we would remind him that there are many trees in the compound whose shade is admirably suited for this, or any other, manner of spending weary moments. Nothing definite, we are afraid, can be said just now about the journals but, given time, we think there is a possibility of these being rendered accessible in the near future to students also.—Ed.]

LIST OF STUDENTS WHO WERE AWARDED CERTIFICATES OF HONOUR, PRIZES AND MEDALS

(1) CERTIFICATES OF HONOUR.

1st in Osteology	... E. C. Srinivasan
2nd in Osteology	... D. V. Srinivasan
2nd in Osteology	... P. H. Vittal Rao
1st in Physics	... T. Vasudevan Nambissan
1st in Inorganic Chemistry	... T. B. Medappa
1st in Inorganic Chemistry	... P. Raghavendracharya
1st in Organic Chemistry	... M. Sitarama Row
1st in Biochemistry	... S. Krishnamurthi Rao
1st in Biochemistry	... Miss D. Kanthamany
2nd in Biochemistry	... C. Srinivasan
1st in Anatomy	... S. M. Ganapathy Sundaram
2nd in Anatomy	... C. Srinivasan
1st in Materia Medica	... M. Sitarama Row
2nd in Materia Medica	... R. Lakshmanan
1st in Pathology	... K. G. Krishnaswami
2nd in Pathology	... S. Pichumani
3rd in Pathology	... Miss D. M. Satur
3rd in Pathology	... T. D. Venkatakrishnayya
4th in Pathology	... C. K. Padmanabha Menon
1st in Hygiene	... C. K. Padmanabha Menon
2nd in Hygiene	... K. G. Krishnaswami
1st in Medical Jurisprudence.	... A. A. Asthagiri
2nd in Medical Jurisprudence.	... M. V. Thiagarajan
1st in Medicine	... M. Narayana Prabhu
2nd in Medicine	... P. Ratnaswami
3rd in Medicine	... Miss S. Verghese
1st in Surgery	... S. T. Achar
2nd in Surgery	... D. Subramania Iyer
3rd in Surgery	... R. E. S. Muthiah
1st in Midwifery	... K. S. Sanjivi

(2) PRIZES.

The Vangeyzel's Prize for Inorganic Chemistry	... T. Vasudevan Nambissan
The C. Raitt Dunhill prize for Proficiency in Physiology	... S. Krishnamurthi Rao
The Thomson Memorial Prize in Anatomy for the best among Travancore Students	... P. M. Joseph

The Muhi-uddin Shariff Memorial Prize for Materia Medica among Muhammadan students.	... Syed Abdul Hassan
McNally Memorial Prize for proficiency in Hygiene	... C. K. Padmonabha Menon
The George Smith Prize for proficiency in Pathology	... K. G. Krishnaswami
The Bannerman Prize for proficiency in theoretical and practical Bacteriology	... A. F. Lasrado
The Branfoot Memorial Prize for proficiency in Midwifery and Gynaeceology	... V. Srinivasan
The Sibthorpe Second Prize for proficiency in Surgery	... D. Subramania Iyer
The Sibthorpe First Prize for proficiency in Surgery	... S. T. Achar
The Allan Ewan Grant Prize for Second rank in Medicine.	... P. Ratnaswamy
The Price Memorial Prize for excellence in Medicine	... M. Narayana Prabhu
The Maitland Memorial Prize for excellence in Clinical Medicine.	... B. Mukunda Row

(3) MEDALS.

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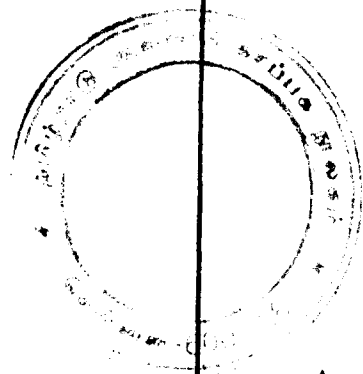
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