

The following is an example of left ventricular aneurysm.

A man aged 65 was admitted to hospital under Dr. Shirley Smith complaining of cough and shortness of breath on exertion. Four years previously he had an attack of intense precordial pain with malaise and sweating. The Wassermann reaction was negative, the electrocardiogram showed regular rhythm, P-R interval normal, notched QRS in leads I and II, and inverted T waves in leads I, II, and III. The blood-pressure was 118/76. On screen examination and in anterior and oblique radiograms a circular opacity was visible in the region of the apex of the left ventricle, which was thought to be part of the heart shadow. The kymogram is shown in fig. V on plate. It will be noted that normal pulsations are visible on the left border of the heart until we come to the protuberance at the apex where they cease abruptly. A faint wavy outline can be seen in this area which is probably due to a deposit of calcium in the sac of the aneurysm. Transmitted pulsations are visible in the ribs on both sides of the chest wall. There is a double line of pulsations in the upper part of the right border of the heart apparently due to the superior vena cava externally and the aortic arch more internally.

Disturbances of rhythm.—Kymography cannot compete with electrocardiography in the demonstration of disturbances of the rhythm. Very rapid movements cannot be shown, and too few pulsations are registered on one film. With a pulse-rate of 60 and an exposure time of three seconds, only three cardiac cycles are registered; while with a pulse-rate of 120 six complete cycles will be shown, but in this case the wave form will be very narrow and difficult to read.

Pericardial lesions.—The kymograph has a definite value in illustrating lesions of the pericardium. Where fluid is present there is an absence of normal pulsations and a definite enlargement of the heart shadow, the appearance being fairly characteristic. Sometimes it may be possible to separate the heart shadow from the fluid, but this is unusual. A deposit of calcium in the pericardium is fairly easy to detect and where it is extensive its influence on the heart movements can be seen.

CONCLUSIONS

It will be appreciated from the above rather brief description that kymography has a very wide application in the radiology of the heart. It can replace telerradiography since with a suitable apparatus a film can be taken at a distance of six feet which will show not only the outline of the heart but also the character of the pulsations in each part of the heart border. It enables us to assess the enlargement of the different chambers of the heart and the size and condition of the aorta. We can also separate extraneous shadows from the heart and great vessels. It is of considerable value in lesions of the pericardium, and in the examination of the oesophagus. It is recommended as an accessory but very useful apparatus in the radiological examination of the heart and lungs.

I should like to take this opportunity of acknowledging the valuable assistance which I have received from my colleagues at the London Chest Hospital during this investigation.

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TREATMENT OF PNEUMONIA WITH M. & B. 693

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With Bacteriological Observations by

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M. & B. 693, or 2-sulphanilyl-aminopyridine, is a recent preparation, which has been shown by Whitby (1938) to be active against pneumococcal infections in mice. Its action was further investigated by Fleming (1938), who demonstrated that the drug had a bacteriostatic but no bactericidal effect in concentrations likely to be reached in the body. Clinical trials were made by Evans and Gaisford (1938) on 100 cases of lobar pneumonia with very favourable results, and more recently Reid (1938) and Robertson (1938) have reported cases in which recovery from pneumococcal meningitis followed its use.

An investigation has been carried out in the Native Hospital, Nairobi, on 100 native cases of pneumonia, admitted between the end of August and the beginning of November, 1938. Of these 50 were treated with M. & B. 693 and the remainder were given the customary non-specific treatment. The only selection of patients which was made was to reject those dying within twenty-four hours of admission, and those who had been ill for more than five days before admission. In the former class, 2 were in the treated group and died four and six hours after admission, and 3 were in the control group. Patients who had been ill for more than five days before admission were not included.

It was intended to allot patients alternately to the treated and control groups as they were admitted; owing, however, to a delay in obtaining supplies of M. & B. 693, 25 consecutive cases in the middle of the series were taken as controls, followed by 25 in the treated group; otherwise the original programme was followed. The diagnosis in every case was based on the history, a blood-stained or rusty sputum, and the finding of a small area of tubular breathing, not necessarily complete lobar consolidation.

DOSAGE

The dosage employed was similar to that recommended by Evans and Gaisford—namely, 2 half-gramme tablets every four hours with an initial dose of 4 tablets (2 g.). A reduced dose was given to children according to age. Administration was continued for twenty-four hours after the temperature became normal, except in a few cases in which there was a slight rise of temperature in the second week. The largest total quantity given to a single patient was 40 g., the average being 18.5 g.

Table I shows broadly the total doses used.

TABLE I—DOSAGE

Total dose (g.)	Under					
	10	10-14	15-19	20-24	30-34	35+
No. of patients	2	20	13	6	4	5

No remedy was given in addition to the M. & B. 693 except an occasional aperient; sulphur-containing aperients were avoided.

SEX- AND AGE-INCIDENCE AND DAY OF ADMISSION

Pneumonia is relatively uncommon among native women, and there were only 2 female patients in the treated group and 4 in the control group. There were 6 children below the age of eighteen, the youngest being eight. The majority of subjects in both groups were young men between the ages of twenty and thirty; the oldest patient was about forty-five. The average age was twenty-six in the treated group and twenty-five in the control group.

Table II shows the age-distribution in the treated and control groups.

TABLE II—AGE-DISTRIBUTION

	Under						
	20	25	30	35	40 or 45		
Treated ..	5	7	18	14	3	3	50
Control ..	5	10	22	11	1	1	50

These figures are only approximate, as few natives know their age.

The two groups are roughly comparable as regard the day of illness on which they were admitted (table III).

TABLE III—DAY OF ILLNESS ON WHICH PATIENT WAS ADMITTED

Day of admission	1	2	3	4	5	—
Treated ..	4	11	20	8	7	50
Control ..	6	15	16	12	1	50

It will be noted that the control group has a slight advantage both in younger age and earlier admission.

FATALITY-RATE

There were 8 deaths in the control group, a case-mortality of 16 per cent., which is a rather low figure. The mortality from pneumonia in the Native Hospital, Nairobi, during the six years 1932-37 was 22 per cent. With the addition, however, of the 3 cases in which death occurred during the first twenty-four hours, and which were excluded from the control group, the death-rate in this series equals the average.

There was only 1 death in the treated group.

The patient, a woman aged about twenty-five, was admitted on the second day of the illness with a consolidation of the right lower lobe. A type I pneumococcus was cultured from the sputum. Two days after admission to hospital she became delirious, and vomiting began on the third day to such a degree that the administration of M. & B. 693 was seriously interfered with. The temperature varied between 99° and 101° F. and was normal for four days before death, which occurred on the ninth day. The pulse-rate did not fall with the temperature, and death was probably caused by heart failure. No post-mortem examination could be obtained. There was no granulopenia, and it seems unlikely that death was due to the effects of the drug.

EFFECTS OF TREATMENT

One of the most remarkable effects of M. & B. 693 was its modification of the temperature chart. In many of the cases in the control group the temperature first reached normal at the crisis. In the treated group, however, the temperature first fell to normal within twenty-four hours of the commencement of treatment in 26 cases, and within forty-eight hours in 44. In every case the temperature first reached normal within three days, as shown in table IV.

After the initial fall there was a secondary rise of temperature in less than half of the treated cases. This secondary rise was generally only small, to not more than 100° F. Less frequently there was

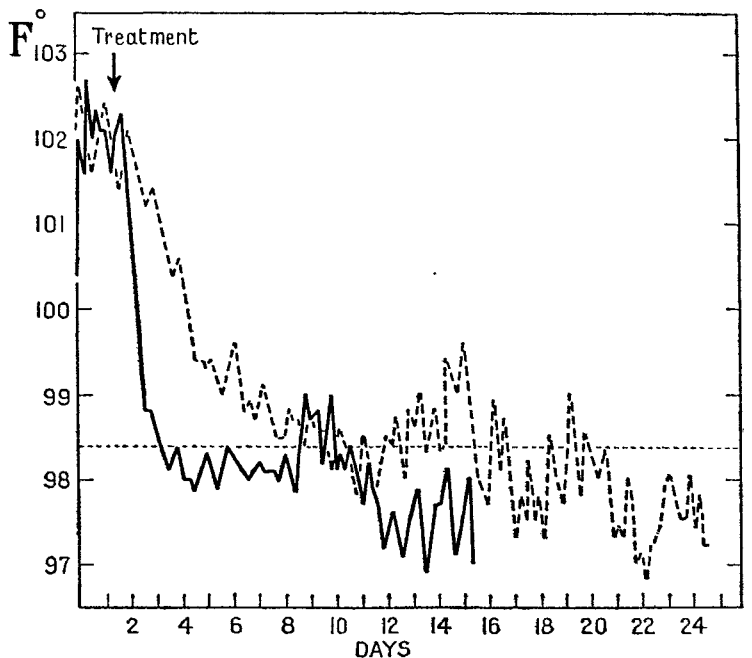
TABLE IV—DAY (AFTER COMMENCEMENT OF TREATMENT) ON WHICH TEMPERATURE FIRST REACHED NORMAL (TREATED CASES)

Day ..	1	2	3	4	5	6	7	8	9	10	Later ..	Aver. days
Cases ..	26	18	5									1.6

TABLE V—DAY ON WHICH TEMPERATURE FINALLY REACHED NORMAL (TREATED CASES)

Day ..	1	2	3	4	5	6	7	8	9	10	Later ..	Aver. days
Cases ..	15	11	6	2	3	4	1	1	4	1		3.5

a considerable secondary rise of temperature which was almost always associated with an extension of consolidation in the lung. In the treated group such extension was noted in 7 cases; in the control group extension was found in 23 cases.



The mean of the temperatures of the treated group (continuous line) and the untreated (interrupted line).

The figures shown in tables IV and V are not strictly comparable with the control group, for in 22 cases M. & B. 693 was not given at once but was withheld until unequivocal signs of pneumonia had developed. The number of days that elapsed before the temperature first reached normal and finally fell to normal, from the time the patient was admitted, are shown in tables VI and VII.

TABLE VI—DAY ON WHICH TEMPERATURE FIRST REACHED NORMAL (TREATED AND CONTROLS)

Day ..	1	2	3	4	5	6	7	8	9	10	Later ..	Aver. days
Treated	13	26	8	1								1.9
Control	4	6	4	4	10	4	6	1	2	1		4.8

TABLE VII—DAY ON WHICH TEMPERATURE FINALLY REACHED NORMAL

Day ..	1	2	3	4	5	6	7	8	9	10	Later ..	Aver. days
Treated	5	16	11	2	1	4	3	1	2	3		4.0
Control		2	3	2	7	1	7	4	2	5	9	8.2

The accompanying figure shows the mean of temperatures in the treated and control groups; the arrow indicates the average time after admission at which administration of M. & B. 693 was begun.

The area of the curve above the normal line in the treated group was 1066 sq. mm., and that enclosed by the control group 2114 sq. mm.

In tables V-VII fatal cases have been excluded, also two cases, one in each group, in which inter-current affections supervened, necessitating a prolonged stay in hospital. The average number of days spent in hospital by patients in the treated group was 7.5, compared with 11.9 days in the control group (see table VIII).

TABLE VIII—DAYS SPENT IN HOSPITAL (RECOVERED CASES)

Days	4-6	7-8	9-10	11-12	13-14	15-16	17+	Total
Treated ..	24	14	4	0	3	3	1	49
Controls ..	1	7	12	6	8	2	6	42

COMPLICATIONS AND TOXIC EFFECTS OF THE DRUG

Only 3 cases in the series developed serious complications. One patient in the treated group ran a temperature for twenty-five days owing to an abscess of the buttock following an injection of quinine given before admission to hospital. In the control group one patient in whom delayed resolution occurred developed a parotid abscess, mental symptoms, incontinence of urine and faeces, and bed-sores and died three months later. One case in the control group developed an empyema.

Vomiting occurred in 12 of the treated cases, but was sufficiently severe to interfere with treatment in only one—namely, the patient who died. Cyanosis was met with in 2 cases in which larger doses had been given. This symptom is not easy to recognise in natives and it is possible that minor degrees were overlooked.

No case of granulopenia was observed in the treated group. Differential leucocyte counts were done on successive days during treatment in 8 cases. In these there was a moderate fall in the percentage of polymorphonuclear leucocytes. The lowest recorded figure was 32 per cent.

NOTE ON THE BACTERIOLOGY

(DR. DOWDESWELL)

Technique.—Specimens of sputum were sent to the laboratory as soon after the patients' admission to

TABLE A

Organism	Group treated with M. & B. 693	Untreated group	Total	Remarks	
Pneumococcal types	I	8+1(a)	11+1(b)	19+2	1 death in treated group, 4 deaths in untreated group
	II	1	3	4	—
	III	2	0	2	—
	V	3	6	9	—
	VII	3	0	3	—
	VIII	1	+1(c)	1+1	—
	XIV	1	0	1	—
	XV	0	0	0	—
	KwV	1	0	1	—
	Unclassified ..	21	22	43	1 death in untreated group
Streptococci ..	3	0	3	—	
<i>H. influenzae</i> ..	0	1	1	—	
No result ..	4	4	8	—	
Total ..	49	49	98	—	

(a) Recovered from abscess in a patient whose sputum yielded streptococci.

(b) Recovered from empyema in a patient whose sputum yielded an "unclassified" type of pneumococcus.

(c) Found in association with pneumococcus type I in the sputum.

hospital as possible. Half a cubic centimetre of an emulsion in saline was injected intraperitoneally into mice and cultures made from the heart blood, when the mouse was moribund, usually within twenty-four hours. Typing of pneumococci by agglutination was done in the usual way with formalinised saline suspensions of eighteen-hour cultures on blood-agar or peritoneal wash suspensions after preliminary centrifugalisation to throw down cells. Bile-solubility tests were done on each strain. Antisera for the nine most prevalent types in Kenya were used: those pneumococci not of one of these types are grouped as "unclassified."

The results obtained from the sputa of 95 of the cases described above are shown in table A.

The percentage incidence of types among the 90 strains recovered from 87 cases from both the treated and untreated groups is shown in table B.

TABLE B—INCIDENCE PER CENT.

A = This series. B = De Smidt's series.*

Series	Pneumococcal types									Un-classified	Strepto-cocci, &c.
	I	II	III	V	VII	VIII	XIV	XV	KwV		
A ..	23.0	4.4	2.0	10	3	2.0	1	0	1	48.0	4.4
B ..	21.5	8.25	8.25	6	7	9.5	3	3	3	30.5	—

* These results are taken from unpublished work by Dr. F. P. G. de Smidt, who investigated over 800 specimens from pneumonias in Nairobi between 1929 and 1935 and isolated 24 pneumococcal types.

In view of Whitby's (1938) findings on the action of M. & B. 693 on the different pneumococcal types in infected mice it would be interesting to see if the same differences occur in pneumonia in man. In this very small series the times elapsing between commencement of treatment and the final fall of the temperature to normal among those 12 patients yielding types I, VII, and VIII and those 6 patients yielding types II, III, and V averaged 4.1 days and 2.4 days respectively, which is not in accord with the results of the mouse experiments. However, it is clearly quite impossible to gauge the therapeutic activity of the drug in relation to the different pneumococcal types with such small numbers as we have here, and in the presence of the many undetermined factors that must be present in clinical cases.

SUMMARY

1. The results of treatment in 50 cases of pneumonia with M. & B. 693 are compared with the results in 50 cases which were given non-specific treatment.

2. There were 8 deaths in the control series, compared with 1 in the treated series.

3. The course of the disease was considerably modified by the drug, and the pyrexial period was reduced in the treated group.

4. In the small series under review it has been impossible to correlate clinical findings with different pneumococcal types. The drug appeared to be active against all types.

We are indebted to Dr. de Smidt for permission to quote his results; to Mr. J. S. M. de Souza for the work he has done on typing pneumococci; to Mr. A. Walter, formerly statistician to the Governors Conference, for statistical help; to Dr. J. I. Roberts for examinations of the blood; to the Director of Medical Services of Kenya for permission to publish this paper; and to Messrs. May and Baker for a supply of the drug sufficient for the treatment of 50 cases.

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CHRONIC CONSTRICTIVE PERICARDITIS

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(WITH ILLUSTRATIONS ON PLATE)

THE surgical treatment of constrictive pericarditis is slowly being adopted. Only a few accounts of the experiences of physicians and surgeons in their combined efforts in treating this disease are as yet available in this country. We feel that all information on the subject may be helpful, both in drawing attention to these cases and in throwing light on the risks, complications, and results of pericardiectomy.

The following is an account of three cases treated at King's College Hospital. Before giving the case notes we should like to discuss certain points that arose as the result of our experience with these cases.

PRELIMINARY MEASURES

All the patients were given considerable periods of rest in bed in hospital before operation. When ascites was present it was controlled either by Salyrgan or by tapping, and as much fluid as possible was got rid of before operation. This last seems an important point, for in case 2 the operation had to be abandoned at the first attempt after the skin incision, owing to respiratory embarrassment, and we thought that this was produced by the ascites; before a second attempt as much fluid as possible was withdrawn.

ANÆSTHETIC

The question of anæsthesia appears to us also of great importance; in case 1 and at the first operation in case 2 Avertin, gas and oxygen, and ether were used, but after the respiratory embarrassment above-mentioned it was thought that a basal anæsthesia was too depressing; in the subsequent operation and in case 3 a plain open ether preceded by morphia was used and proved most satisfactory. Apart from the first operation on case 2, the anæsthetic gave no undue anxiety, and it was most noticeable how little the patients were affected during operation.

OPERATION

A new exposure of the pericardium was used and found to be very satisfactory. A curved incision was made, starting in the middle line of the sternum about 1 in. below the sternal notch and carried outwards towards the left nipple, sweeping back to end just across the middle line at the xiphisternum. The skin-flap thus marked out was turned to the right. Portions of the second to the sixth costal cartilages were carefully removed after the perichondrium had been stripped. A sternum-splitting chisel was introduced at the right border of the xiphisternum and the sternum divided as far as the second interspace; a cross division was then made to the middle line from the second interspace. The sternal flap thus marked out was turned to the left

as an osteoplastic flap, giving a wide exposure of the pericardium and the edges of the pleura (fig. I).

The pleura were stripped back from the pericardium by gauze dissection. In all cases it was noticed that there were fine extrapericardial adhesions, and it would seem important that these should be separated far round to the left side before opening the pericardium, for it makes the subsequent removal of the pericardium much easier and more extensive.

Exposure of the pericardium showed at once the constrictive effect on the heart, for, although pulsations were visible, they were very much smaller than those seen on exposing the pericardium in the preliminaries of cardio-omentopexy.

After free exposure of the pericardium an incision was made into it with great care and a line of cleavage sought. The difficulty of doing this varied considerably in the different cases. When a portion had been freed, that portion was removed and a fresh portion separated, the pericardium being removed piecemeal.

Removal of the pericardium was carried out over the anterior and left side, as far on the right as possible, and in an upward direction. No special attempt was made to free the inferior or superior venæ cavæ.

In all cases a definite increase could be seen in the force of the heart-beat, and the heart at the end of the operation was apparently larger.

COMMENT

We are of the opinion that the symptoms of the disease are produced by the mechanical effect on the ventricles; these, being constricted, cannot fill to their capacity, thus producing a back-pressure effect on the auricles and a rise in venous pressure; this may affect the inferior vena cava in particular. The effect on the circulation is to slow the rate of the flow of blood between the arm and the lung. Other observers have demonstrated that the cardiac output is low and cannot be raised to the usual extent on exertion (Burwell and Strayhorn 1932). The stroke volume is actively reduced—it may be to 60 per cent. of normal (Burwell and Flickinger 1935).

FIRST CASE

A clerk, aged 34, was admitted to King's College Hospital in May, 1935, suffering from acute pericarditis. No effusion developed. There were no symptoms of rheumatism and no pleurisy. After several weeks the patient made a good recovery. The physical signs of the heart were then normal. The electrocardiogram then showed nothing of importance.

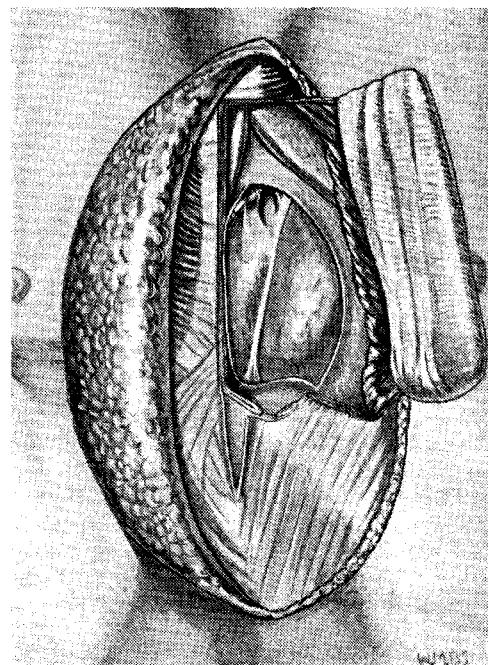


FIG. I.—Heart exposed, with skin-flap turned to right and osteoplastic flap (sternum) to left, showing fibrous band (found in case 2) running from right auricle, across right ventricle, to diaphragm.

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